killer-performance-analysis.R

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```
rm(list=ls())

require(mgcv)
```

```
## Loading required package: mgcv
```

```
## Loading required package: nlme
```

```
## This is mgcv 1.8-34. For overview type 'help("mgcv-package")'.
```

```
require(ggplot2)
```

```
## Loading required package: ggplot2
```

```
require(chron)
```

```
## Loading required package: chron
```

```
require(dplyr)
```

```
## Loading required package: dplyr
```

```
##
## Attaching package: 'dplyr'
```

```
## The following object is masked from 'package:nlme':
##
##     collapse
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
require(plyr)
```

```
## Loading required package: plyr
```

```
## ------------------------------------------------------------------------------
```

```
## You have loaded plyr after dplyr - this is likely to cause problems.
## If you need functions from both plyr and dplyr, please load plyr first, then dplyr:
## library(plyr); library(dplyr)
```

```
## ------------------------------------------------------------------------------
```

```
##
## Attaching package: 'plyr'
```

```
## The following objects are masked from 'package:dplyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```
require(googledrive)
```

```
## Loading required package: googledrive
```

```
require(zoo)
```

```
## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
# install.packages(pkgs=c("mgcv",
#                          "ggplot2",
#                          "chron",
#                          "dplyr",
#                          "plyr"))
```

```
kpm <- drive_download(file=as_id("1a541yFoA2E1xGQEXwhC2Q1x81ZLxFMI1r5FDadc2Hmk"),
                      path="kpm data.csv",
                      type="csv",
                      overwrite=TRUE)
```

```
## > Using an auto-discovered, cached token

##   To suppress this message, modify your code or options to clearly consent to the
##   use of a cached token

##   See gargle's "Non-interactive auth" vignette for more details:

##   <https://gargle.r-lib.org/articles/non-interactive-auth.html>

## > The googledrive package is using a cached token for justinkdavis@gmail.com

## File downloaded:
##   * DBD Performance Metrics
## Saved locally as:
##   * kpm data.csv
```

```
# read file
kpm <- read.csv("kpm data.csv", stringsAsFactors=FALSE)
kpm$notes <- NULL
head(kpm)
```

```
##         date killer time map kills bloodpoints salt        addon1     addon2
## 1 2021-01-28    Pig 1215         4       25678    0 Combat Straps Video Tape
## 2 2021-01-28    Pig 1228         3       20548    0 Combat Straps Video Tape
## 3 2021-01-28    Pig 1245         4       23325    0 Combat Straps Video Tape
## 4 2021-01-28    Pig 1303         1       20713    0 Combat Straps Video Tape
## 5 2021-01-28    Pig 1327         4       26370    0 Combat Straps Video Tape
## 6 2021-01-28    Pig 1344         0       23207    0 Combat Straps  Last Will
##     perk1    perk2    perk3     perk4 crossplay platform
## 1 Monitor Whispers Enduring       BBQ         0      PS4
## 2 Monitor Whispers Enduring       BBQ         0      PS4
## 3 Monitor Whispers Enduring       BBQ         0      PS4
## 4 Monitor Whispers Enduring       BBQ         0      PS4
## 5 Monitor Whispers Enduring Bamboozle         0      PS4
## 6 Monitor Whispers Enduring Bamboozle         0      PS4
```

```
nrow(kpm)
```

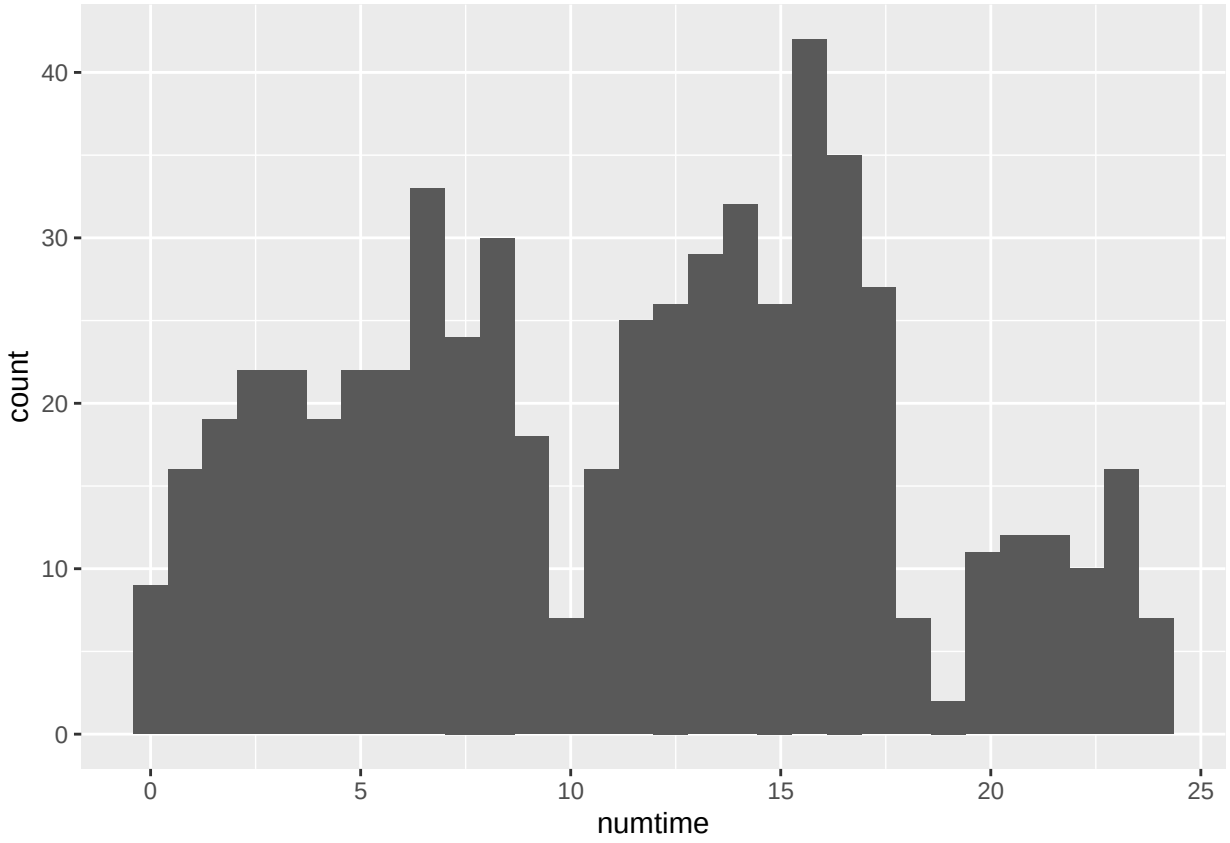
```
## [1] 599
```

```
# convert the date data
kpm$date <- as.Date(kpm$date, "%Y-%m-%d")
kpm$numdate <- as.numeric(kpm$date)
kpm$dayofweek <- format(kpm$date, "%u")
kpm$dayofweekfactor <- paste("_", kpm$dayofweek, sep="")
kpm$dayofweekfactor <- factor(kpm$dayofweek)
kpm$weekend <- factor(kpm$dayofweek %in% c("6","7"))

# convert the time data
kpm$hour <- floor(kpm$time / 100)
kpm$minute <- kpm$time - 100*kpm$hour
kpm$time <- paste(kpm$hour, kpm$minute, "00", sep=":")
kpm$time <- chron(times=kpm$time)
```

```
## Warning in convert.times(times., fmt): NAs introduced by coercion

## Warning in convert.times(times., fmt): NAs introduced by coercion

## Warning in convert.times(times., fmt): time-of-day entries out of range in
## positions NA set to NA
```

```
kpm$numtime <- as.numeric(kpm$time)*24
kpm$numweek <- as.numeric(as.character(kpm$dayofweek)) + kpm$numtime/24 - 1
ggplot(kpm) + geom_histogram(aes(x=numtime))
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 1 rows containing non-finite values (stat_bin).
```




```
# game number
kpm$gamenum <- 1:nrow(kpm)

# make sure the factors are factors
# cull killers with small counts
killercount <- dplyr::summarize(group_by(kpm, killer),
                                killercount=n())
killercount
```

```
## # A tibble: 13 x 2
##    killer    killercount
##    <chr>           <int>
##  1 Blight              1
##  2 Doctor              2
##  3 Freddy             13
##  4 Ghostface         274
##  5 Hag                 3
##  6 Huntress           13
##  7 Legion             23
##  8 Nightmare           1
##  9 Nurse               2
## 10 Pig               172
## 11 Spirit             86
## 12 Trapper             8
## 13 Trickster           1
```

```
# retain top five killers
killercount <- killercount[order(killercount$killercount),]
kpm <- left_join(kpm, as.data.frame(killercount),
                 by="killer")
kpm$killer[kpm$killercount <= 30] <- "_otherkiller"

# kpm <- kpm[kpm$killer %in% c("Pig",
#                              "Ghostface",
#                              "Spirit"),]

# kpm$killer[!(kpm$killer %in% c("Pig",
#                                "Ghostface"))] <- "_otherkiller"

kpm$killer <- factor(kpm$killer)
kpm$crossplay <- factor(kpm$crossplay)

## temporary pig
#kpm <- kpm[kpm$killer == "Pig",]

# define covariates to analyze
kpm$loss <- 1*(kpm$kills <= 2)
kpm$win  <- 1*(kpm$kills >= 3)

# perks
perklist <- sort(unique(c(kpm$perk1, kpm$perk2, kpm$perk3, kpm$perk4)))
perklist
```

```
##  [1] "A Nurse's Calling"      "Agitation"              "Bamboozle"
##  [4] "BBQ"                    "Beast of Prey"          "Blood Warden"
##  [7] "Brutal"                 "Corrupt Intervention"   "Devour"
## [10] "Discordance"            "Dragon's Grip"          "Enduring"
## [13] "Fire Up"                "Franklin's Demise"      "Furtive Chase"
## [16] "Hangman's Trick"        "Haunted Grounds"        "I'm All Ears"
## [19] "Infectious Fright"      "Iron Grasp"             "Iron Maiden"
## [22] "Knockout"               "Lightborn"              "Mad Grit"
## [25] "Make Your Choice"       "Monitor"                "Nemesis"
## [28] "NOED"                   "None"                   "Oppression"
```

```
## [31] "Overwhelming Presence"  "Pop"                    "Predator"
## [34] "Rancor"                 "Remember Me"            "Ruin"
## [37] "Shadowborn"             "Sloppy Butcher"         "Spies from the Shadows"
## [40] "Spirit Fury"            "STBFL"                  "Stridor"
## [43] "Surge"                  "Surveillance"           "Thanatophobia"
## [46] "Third Seal"             "Thrill"                 "Thrilling Tremors"
## [49] "Tinkerer"               "Undying"                "Unrelenting"
## [52] "Whispers"
```

```r
# define perk types
perktypes <- list("slowdown"=c("Oppression",
                               "Pop",
                               "Ruin",
                               "Sloppy Butcher",
                               "Surge",
                               "Thanatophobia"),
                  "chase"=c("Bamboozle",
                            "Brutal",
                            "Enduring",
                            "I'm All Ears",
                            "NOED",
                            "Predator",
                            "Save the Best for Last",
                            "Spirit Fury",
                            "Stridor",
                            "Unrelenting"),
                  "hex"=c("Ruin",
                          "Devour Hope",
                          "NOED",
                          "Undying",
                          "Thrill of the Hunt"),
                  "information"=c("A Nurse's Calling",
                                  "BBQ",
                                  "Discordance",
                                  "Spies from the Shadows",
                                  "Surveillance",
                                  "Thrilling Tremors",
                                  "Tinkerer",
                                  "Whispers"),
                  "stealth"=c("Monitor",
                              "Tinkerer",
                              "Whispers"))

for (curtype in names(perktypes)) {

  kpm[,paste("perks",
             curtype,
             sep="_")] <- 1*(kpm$perk1 %in% perktypes[[curtype]]) +
                          1*(kpm$perk2 %in% perktypes[[curtype]]) +
                          1*(kpm$perk3 %in% perktypes[[curtype]]) +
                          1*(kpm$perk4 %in% perktypes[[curtype]])

}
```

```
# # calculate a princomp of all these, since they correlate
# perkprincomp <- princomp(kpm[grep(pattern="perks_",
#                                   x=colnames(kpm),
#                                   fixed=TRUE)],
#                          scores=TRUE)
# kpm$perkprincomp <- perkprincomp$scores

# get a list of perks
sort(unique(c(kpm$perk1,
              kpm$perk2,
              kpm$perk3,
              kpm$perk4)))
```

```
##  [1] "A Nurse's Calling"      "Agitation"              "Bamboozle"
##  [4] "BBQ"                    "Beast of Prey"          "Blood Warden"
##  [7] "Brutal"                 "Corrupt Intervention"   "Devour"
## [10] "Discordance"            "Dragon's Grip"          "Enduring"
## [13] "Fire Up"                "Franklin's Demise"      "Furtive Chase"
## [16] "Hangman's Trick"        "Haunted Grounds"        "I'm All Ears"
## [19] "Infectious Fright"      "Iron Grasp"             "Iron Maiden"
## [22] "Knockout"               "Lightborn"              "Mad Grit"
## [25] "Make Your Choice"       "Monitor"                "Nemesis"
## [28] "NOED"                   "None"                   "Oppression"
## [31] "Overwhelming Presence"  "Pop"                    "Predator"
## [34] "Rancor"                 "Remember Me"            "Ruin"
## [37] "Shadowborn"             "Sloppy Butcher"         "Spies from the Shadows"
## [40] "Spirit Fury"            "STBFL"                  "Stridor"
## [43] "Surge"                  "Surveillance"           "Thanatophobia"
## [46] "Third Seal"             "Thrill"                 "Thrilling Tremors"
## [49] "Tinkerer"               "Undying"                "Unrelenting"
## [52] "Whispers"
```

```
# get a factor for builds
kpm$build <- ""
for (currow in 1:nrow(kpm)) {

  kpm$build[currow] <- paste(sort(c(kpm$perk1[currow],
                                    kpm$perk2[currow],
                                    kpm$perk3[currow],
                                    kpm$perk4[currow])),
                             collapse=":")
}
buildtable <- as.data.frame(table(kpm$build))
names(buildtable) <- c("build", "buildfrequency")
kpm <- left_join(kpm, buildtable, by="build")
#kpm$build[kpm$killer != "Pig"] <- "otherkillerbuild"
kpm$build[(kpm$buildfrequency < 5)] <- "uncommon build"
kpm$build <- factor(kpm$build)
table(kpm$build)
```

```
##
##         A Nurse's Calling:BBQ:Sloppy Butcher:Surge
##                                                 9
```

```
## A Nurse's Calling:Discordance:Sloppy Butcher:Surge
##                                                 16
##                      Bamboozle:BBQ:Brutal:Enduring
##                                                  8
##                         Bamboozle:BBQ:Enduring:Pop
##                                                 11
##                  Bamboozle:BBQ:Enduring:Spirit Fury
##                                                 20
##                     Bamboozle:BBQ:Enduring:Whispers
##                                                  9
##               Bamboozle:Brutal:Enduring:Spirit Fury
##                                                 28
##                     Bamboozle:Brutal:Enduring:STBFL
##                                                 19
##                  Bamboozle:Enduring:Monitor:Whispers
##                                                 12
##                  Bamboozle:Enduring:Pop:Spirit Fury
##                                                 10
##                Bamboozle:Enduring:Spirit Fury:STBFL
##                                                 11
##                Bamboozle:Enduring:Spirit Fury:Surge
##                                                  6
##         Bamboozle:I'm All Ears:NOED:Sloppy Butcher
##                                                  9
##                            BBQ:Devour:Thrill:Undying
##                                                 16
##                            BBQ:Discordance:Pop:Surge
##                                                 53
##                         BBQ:Discordance:Ruin:Undying
##                                                 16
##                        BBQ:Enduring:Monitor:Whispers
##                                                  9
##                         BBQ:Enduring:Pop:Spirit Fury
##                                                  9
##                             BBQ:Monitor:Pop:Whispers
##                                                  6
##                                  BBQ:Pop:Ruin:Surge
##                                                 18
##                               BBQ:Pop:Stridor:Surge
##                                                  7
##                              BBQ:Ruin:Stridor:Surge
##                                                 46
##                    Brutal:Enduring:Monitor:Whispers
##                                                 20
##              Devour:Discordance:Thanatophobia:Thrill
##                                                  6
##                  Devour:Thanatophobia:Thrill:Undying
##                                                 43
##                 Discordance:Pop:Sloppy Butcher:Surge
##                                                  5
##                Enduring:Franklin's Demise:NOED:Surge
##                                                  8
##                Enduring:Monitor:Spirit Fury:Whispers
##                                                  7
```

```
##             I'm All Ears:NOED:Sloppy Butcher:Surge
##                                                10
##                                     uncommon build
##                                               152
```

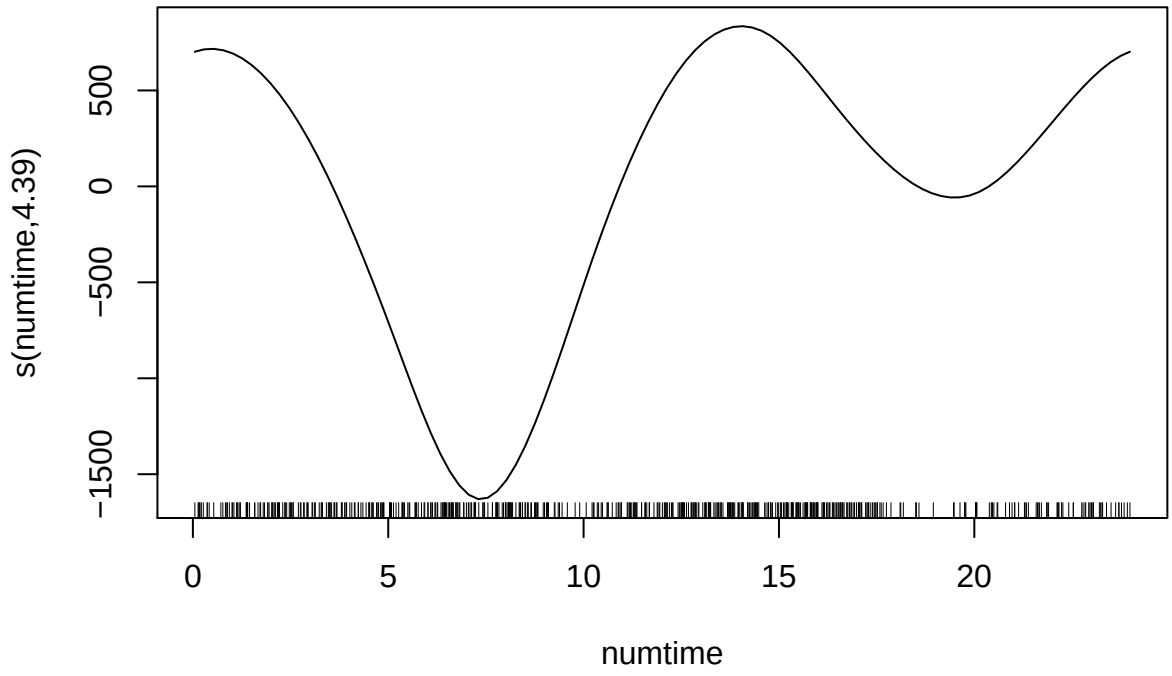
```
# add one especially for NOED
kpm$NOED <- 1*(kpm$perk1 == "NOED") + 1*(kpm$perk2 == "NOED") + 1*(kpm$perk3 == "NOED") + 1*(kpm$perk4 =

# # some plots
# ggplot(kpm) + geom_histogram(aes(x=bloodpoints), bins=10) +
#   facet_wrap(~killer, ncol=1, scales="free_y") +
#   ggtitle("bloodpoints per killer")
# ggplot(kpm) + geom_histogram(aes(x=bloodpoints), bins=10) +
#   facet_wrap(~kills, ncol=1, scales="free_y") +
#   ggtitle("bloodpoints by kill count")

# run a model on bloodpoints
bpmodel <- gam(bloodpoints ~ 0 + build + killer + crossplay + s(numtime, bs="cc") + s(gamenum),
               data=kpm)
summary(bpmodel)
```

```
##
## Family: gaussian
## Link function: identity
##
## Formula:
## bloodpoints ~ 0 + build + killer + crossplay + s(numtime, bs = "cc") +
##     s(gamenum)
##
## Parametric coefficients:
##                                                    Estimate Std. Error
## buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge      24228.4     1707.3
## buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge  26402.0     1427.0
## buildBamboozle:BBQ:Brutal:Enduring                   22988.8     1926.5
## buildBamboozle:BBQ:Enduring:Pop                      25010.8     1580.8
## buildBamboozle:BBQ:Enduring:Spirit Fury              25399.4     1296.0
## buildBamboozle:BBQ:Enduring:Whispers                 24558.8     1786.5
## buildBamboozle:Brutal:Enduring:Spirit Fury           24932.4     1266.7
## buildBamboozle:Brutal:Enduring:STBFL                 25536.9     1388.5
## buildBamboozle:Enduring:Monitor:Whispers             23220.9     1621.5
## buildBamboozle:Enduring:Pop:Spirit Fury              27172.7     1701.0
## buildBamboozle:Enduring:Spirit Fury:STBFL            24391.0     1709.6
## buildBamboozle:Enduring:Spirit Fury:Surge            25577.8     1940.5
## buildBamboozle:I'm All Ears:NOED:Sloppy Butcher      23600.8     1691.2
## buildBBQ:Devour:Thrill:Undying                       24435.6     1477.0
## buildBBQ:Discordance:Pop:Surge                       26595.7     1053.8
## buildBBQ:Discordance:Ruin:Undying                    28980.9     1524.5
## buildBBQ:Enduring:Monitor:Whispers                   20464.4     1878.2
## buildBBQ:Enduring:Pop:Spirit Fury                    25229.2     1628.3
## buildBBQ:Monitor:Pop:Whispers                        23249.6     2105.8
## buildBBQ:Pop:Ruin:Surge                              26984.8     1395.3
## buildBBQ:Pop:Stridor:Surge                           28089.0     2051.5
## buildBBQ:Ruin:Stridor:Surge                          26269.5     1384.8
## buildBrutal:Enduring:Monitor:Whispers                23373.4     1522.5
```

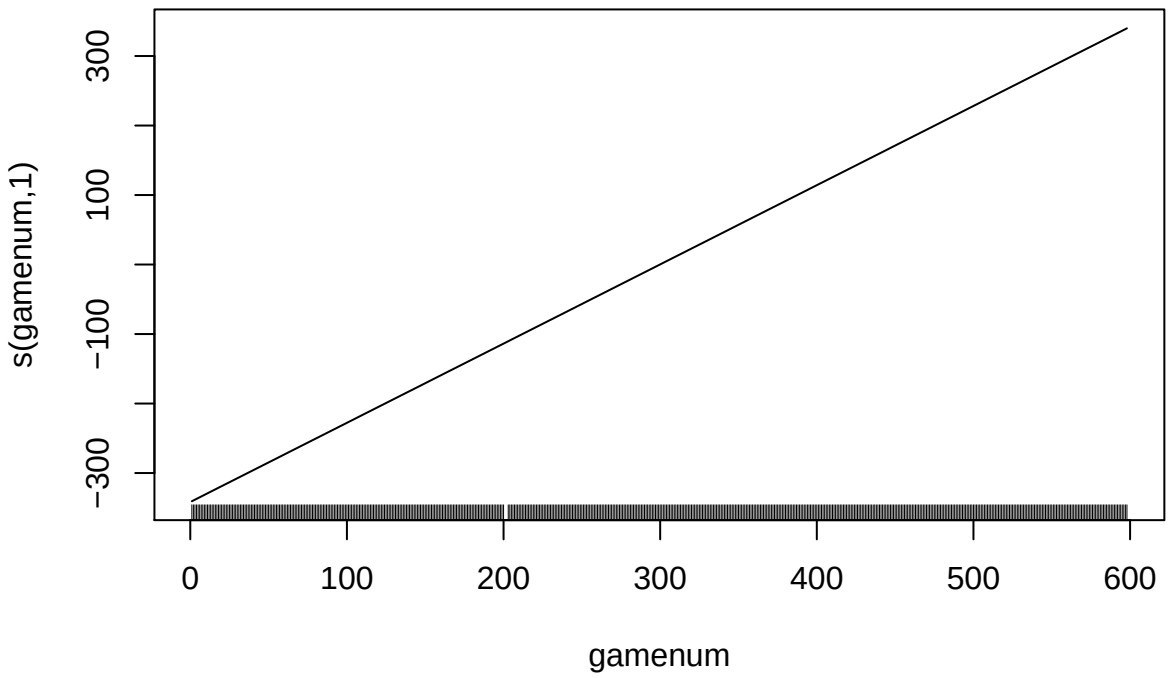
```
## buildDevour:Discordance:Thanatophobia:Thrill             28462.2     2061.5
## buildDevour:Thanatophobia:Thrill:Undying                 24721.3     1212.9
## buildDiscordance:Pop:Sloppy Butcher:Surge                29686.1     2121.9
## buildEnduring:Franklin's Demise:NOED:Surge               24967.3     1877.2
## buildEnduring:Monitor:Spirit Fury:Whispers               24381.1     1985.3
## buildI'm All Ears:NOED:Sloppy Butcher:Surge              26126.2     1756.3
## builduncommon build                                     25411.5      816.0
## killerGhostface                                         -1413.8      698.2
## killerPig                                               -1024.3      854.2
## killerSpirit                                              918.4      990.5
## crossplay1                                                571.1      627.1
##                                                        t value Pr(>|t|)
## buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge          14.191   <2e-16 ***
## buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge  18.502   <2e-16 ***
## buildBamboozle:BBQ:Brutal:Enduring                       11.933   <2e-16 ***
## buildBamboozle:BBQ:Enduring:Pop                          15.821   <2e-16 ***
## buildBamboozle:BBQ:Enduring:Spirit Fury                  19.599   <2e-16 ***
## buildBamboozle:BBQ:Enduring:Whispers                     13.747   <2e-16 ***
## buildBamboozle:Brutal:Enduring:Spirit Fury               19.682   <2e-16 ***
## buildBamboozle:Brutal:Enduring:STBFL                     18.392   <2e-16 ***
## buildBamboozle:Enduring:Monitor:Whispers                 14.321   <2e-16 ***
## buildBamboozle:Enduring:Pop:Spirit Fury                  15.975   <2e-16 ***
## buildBamboozle:Enduring:Spirit Fury:STBFL                14.267   <2e-16 ***
## buildBamboozle:Enduring:Spirit Fury:Surge                13.181   <2e-16 ***
## buildBamboozle:I'm All Ears:NOED:Sloppy Butcher          13.955   <2e-16 ***
## buildBBQ:Devour:Thrill:Undying                           16.544   <2e-16 ***
## buildBBQ:Discordance:Pop:Surge                           25.237   <2e-16 ***
## buildBBQ:Discordance:Ruin:Undying                        19.010   <2e-16 ***
## buildBBQ:Enduring:Monitor:Whispers                       10.896   <2e-16 ***
## buildBBQ:Enduring:Pop:Spirit Fury                        15.494   <2e-16 ***
## buildBBQ:Monitor:Pop:Whispers                            11.041   <2e-16 ***
## buildBBQ:Pop:Ruin:Surge                                  19.340   <2e-16 ***
## buildBBQ:Pop:Stridor:Surge                               13.692   <2e-16 ***
## buildBBQ:Ruin:Stridor:Surge                              18.969   <2e-16 ***
## buildBrutal:Enduring:Monitor:Whispers                    15.352   <2e-16 ***
## buildDevour:Discordance:Thanatophobia:Thrill             13.807   <2e-16 ***
## buildDevour:Thanatophobia:Thrill:Undying                 20.382   <2e-16 ***
## buildDiscordance:Pop:Sloppy Butcher:Surge                13.990   <2e-16 ***
## buildEnduring:Franklin's Demise:NOED:Surge               13.300   <2e-16 ***
## buildEnduring:Monitor:Spirit Fury:Whispers               12.281   <2e-16 ***
## buildI'm All Ears:NOED:Sloppy Butcher:Surge              14.876   <2e-16 ***
## builduncommon build                                     31.141   <2e-16 ***
## killerGhostface                                         -2.025   0.0434 *
## killerPig                                               -1.199   0.2310
## killerSpirit                                             0.927   0.3543
## crossplay1                                               0.911   0.3628
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##             edf Ref.df     F  p-value
## s(numtime) 4.39      8 2.384 0.000484 ***
## s(gamenum) 1.00      1 0.403 0.525876
## ---
```

```
## Signif. codes:  0 ’***’ 0.001 ’**’ 0.01 ’*’ 0.05 ’.’ 0.1 ’ ’ 1
##
## R-sq.(adj) =  0.104   Deviance explained = 97.3%
## GCV = 2.0292e+07  Scale est. = 1.8951e+07  n = 596
```

```
plot(bpmodel, se=FALSE, scale=0, select=1)
```




```
plot(bpmodel, se=FALSE, scale=0, select=2)
```



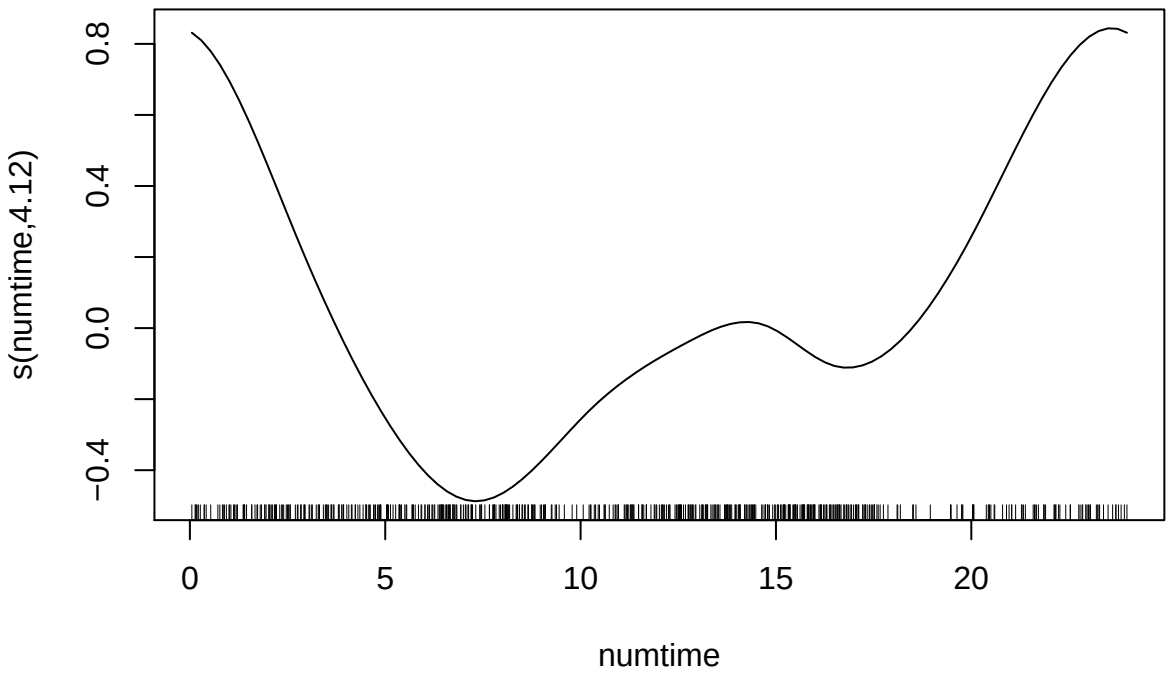

```
# myplots <- plot.gam(bpmodel, se=FALSE, select=0)
# tempdf1 <- data.frame(x = myplots[[1]]$x,
#                       y = myplots[[1]]$fit,
#                       weekend=myplots[[1]]$ylab)
# tempdf2 <- data.frame(x = myplots[[2]]$x,
#                       y = myplots[[2]]$fit,
#                       weekend=myplots[[2]]$ylab)
# tempdf <- bind_rows(tempdf1, tempdf2)
# ggplot(tempdf) + geom_line(aes(x=x, y=y, group=weekend, color=weekend)) +
#   ggtitle("bloodpoint model, cyclical term")

# run a model on kills
kpm$kills_plusone <- kpm$kills + 1
killmodel <- gam(kills_plusone ~ 0 + build + killer + s(numtime, bs="cc") + s(gamenum),
                 data=kpm,
                 family=ocat(R = 5))
summary(killmodel)
```

```
##
## Family: Ordered Categorical(-1,0.09,0.79,1.75)
## Link function: identity
##
## Formula:
## kills_plusone ~ 0 + build + killer + s(numtime, bs = "cc") +
##     s(gamenum)
```

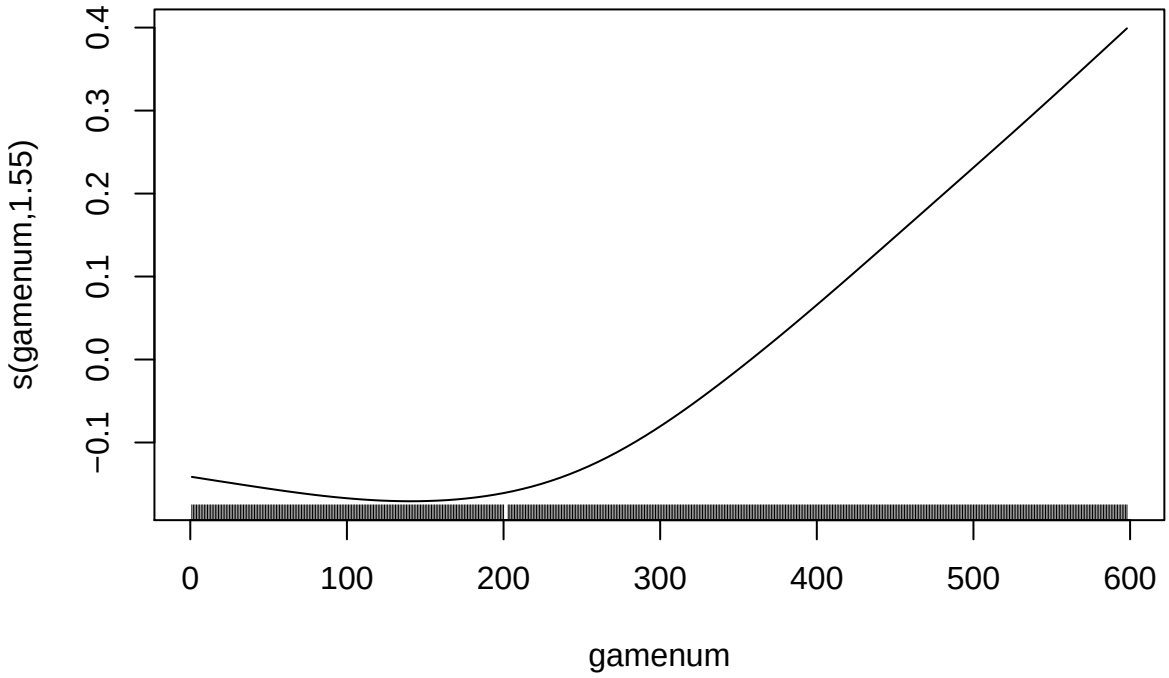
```
##
## Parametric coefficients:
##                                                    Estimate Std. Error
## buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge      1.29671    0.69351
## buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge  1.07755    0.55055
## buildBamboozle:BBQ:Brutal:Enduring                  -0.21719    0.82038
## buildBamboozle:BBQ:Enduring:Pop                      0.54962    0.57492
## buildBamboozle:BBQ:Enduring:Spirit Fury              0.28905    0.50173
## buildBamboozle:BBQ:Enduring:Whispers                 1.08201    0.74150
## buildBamboozle:Brutal:Enduring:Spirit Fury           0.43270    0.46457
## buildBamboozle:Brutal:Enduring:STBFL                 0.06046    0.52182
## buildBamboozle:Enduring:Monitor:Whispers            -0.77260    0.63518
## buildBamboozle:Enduring:Pop:Spirit Fury              0.71022    0.64156
## buildBamboozle:Enduring:Spirit Fury:STBFL            0.43877    0.67757
## buildBamboozle:Enduring:Spirit Fury:Surge            0.49361    0.69649
## buildBamboozle:I'm All Ears:NOED:Sloppy Butcher     -0.02787    0.62412
## buildBBQ:Devour:Thrill:Undying                       1.98380    0.60636
## buildBBQ:Discordance:Pop:Surge                       1.00715    0.37163
## buildBBQ:Discordance:Ruin:Undying                    1.76942    0.59724
## buildBBQ:Enduring:Monitor:Whispers                   0.11070    0.75821
## buildBBQ:Enduring:Pop:Spirit Fury                    0.42507    0.65122
## buildBBQ:Monitor:Pop:Whispers                        0.35920    0.81870
## buildBBQ:Pop:Ruin:Surge                              1.59172    0.54503
## buildBBQ:Pop:Stridor:Surge                           1.37844    0.88428
## buildBBQ:Ruin:Stridor:Surge                          1.45160    0.53561
## buildBrutal:Enduring:Monitor:Whispers                0.72230    0.59238
## buildDevour:Discordance:Thanatophobia:Thrill         2.38217    0.93022
## buildDevour:Thanatophobia:Thrill:Undying             1.52836    0.47437
## buildDiscordance:Pop:Sloppy Butcher:Surge            2.52309    0.95522
## buildEnduring:Franklin's Demise:NOED:Surge           0.36284    0.73152
## buildEnduring:Monitor:Spirit Fury:Whispers           0.99823    0.84814
## buildI'm All Ears:NOED:Sloppy Butcher:Surge          1.05290    0.59455
## builduncommon build                                  0.27455    0.25412
## killerGhostface                                      0.17474    0.29592
## killerPig                                            1.17456    0.37069
## killerSpirit                                         0.44754    0.43237
##                                                    z value Pr(>|z|)
## buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge      1.870  0.06151 .
## buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge  1.957  0.05032 .
## buildBamboozle:BBQ:Brutal:Enduring                  -0.265  0.79120
## buildBamboozle:BBQ:Enduring:Pop                      0.956  0.33908
## buildBamboozle:BBQ:Enduring:Spirit Fury              0.576  0.56454
## buildBamboozle:BBQ:Enduring:Whispers                 1.459  0.14450
## buildBamboozle:Brutal:Enduring:Spirit Fury           0.931  0.35165
## buildBamboozle:Brutal:Enduring:STBFL                 0.116  0.90775
## buildBamboozle:Enduring:Monitor:Whispers            -1.216  0.22385
## buildBamboozle:Enduring:Pop:Spirit Fury              1.107  0.26828
## buildBamboozle:Enduring:Spirit Fury:STBFL            0.648  0.51727
## buildBamboozle:Enduring:Spirit Fury:Surge            0.709  0.47851
## buildBamboozle:I'm All Ears:NOED:Sloppy Butcher     -0.045  0.96438
## buildBBQ:Devour:Thrill:Undying                       3.272  0.00107 **
## buildBBQ:Discordance:Pop:Surge                       2.710  0.00673 **
## buildBBQ:Discordance:Ruin:Undying                    2.963  0.00305 **
## buildBBQ:Enduring:Monitor:Whispers                   0.146  0.88392
```

```
## buildBBQ:Enduring:Pop:Spirit Fury                          0.653  0.51393
## buildBBQ:Monitor:Pop:Whispers                              0.439  0.66084
## buildBBQ:Pop:Ruin:Surge                                    2.920  0.00350 **
## buildBBQ:Pop:Stridor:Surge                                 1.559  0.11903
## buildBBQ:Ruin:Stridor:Surge                                2.710  0.00672 **
## buildBrutal:Enduring:Monitor:Whispers                      1.219  0.22273
## buildDevour:Discordance:Thanatophobia:Thrill               2.561  0.01044 *
## buildDevour:Thanatophobia:Thrill:Undying                   3.222  0.00127 **
## buildDiscordance:Pop:Sloppy Butcher:Surge                  2.641  0.00826 **
## buildEnduring:Franklin's Demise:NOED:Surge                 0.496  0.61989
## buildEnduring:Monitor:Spirit Fury:Whispers                 1.177  0.23921
## buildI'm All Ears:NOED:Sloppy Butcher:Surge                1.771  0.07658 .
## builduncommon build                                       1.080  0.27996
## killerGhostface                                           0.590  0.55486
## killerPig                                                 3.169  0.00153 **
## killerSpirit                                              1.035  0.30064
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##              edf Ref.df Chi.sq  p-value
## s(numtime) 4.117  8.000 22.176 5.28e-05 ***
## s(gamenum) 1.549  1.914  1.753     0.34
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Deviance explained = 5.95%
## -REML = 840.56  Scale est. = 1         n = 596
```

```
plot.gam(killmodel, se=FALSE, scale=0, select=1)
```




```
plot.gam(killmodel, se=FALSE, scale=0, select=2)
```




```
# run a model on clear wins
winmodel <- gam(win ~ 0 + build + killer + platform + crossplay + dayofweek + s(numtime, bs="cc") + s(ga
                data=kpm,
                family=binomial())
summary(winmodel)
```

```
##
## Family: binomial
## Link function: logit
##
## Formula:
## win ~ 0 + build + killer + platform + crossplay + dayofweek +
##     s(numtime, bs = "cc") + s(gamenum)
##
## Parametric coefficients:
##                                                    Estimate Std. Error
## buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge     1.082007   0.948704
## buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge  1.598866   0.855873
## buildBamboozle:BBQ:Brutal:Enduring                -0.391915   1.061389
## buildBamboozle:BBQ:Enduring:Pop                    0.773783   0.908506
## buildBamboozle:BBQ:Enduring:Spirit Fury           -0.084010   0.825230
## buildBamboozle:BBQ:Enduring:Whispers               2.110895   1.278005
## buildBamboozle:Brutal:Enduring:Spirit Fury         0.734197   0.741769
## buildBamboozle:Brutal:Enduring:STBFL               0.219368   0.862703
## buildBamboozle:Enduring:Monitor:Whispers          -1.282931   1.000318
## buildBamboozle:Enduring:Pop:Spirit Fury            1.266426   1.072312
```

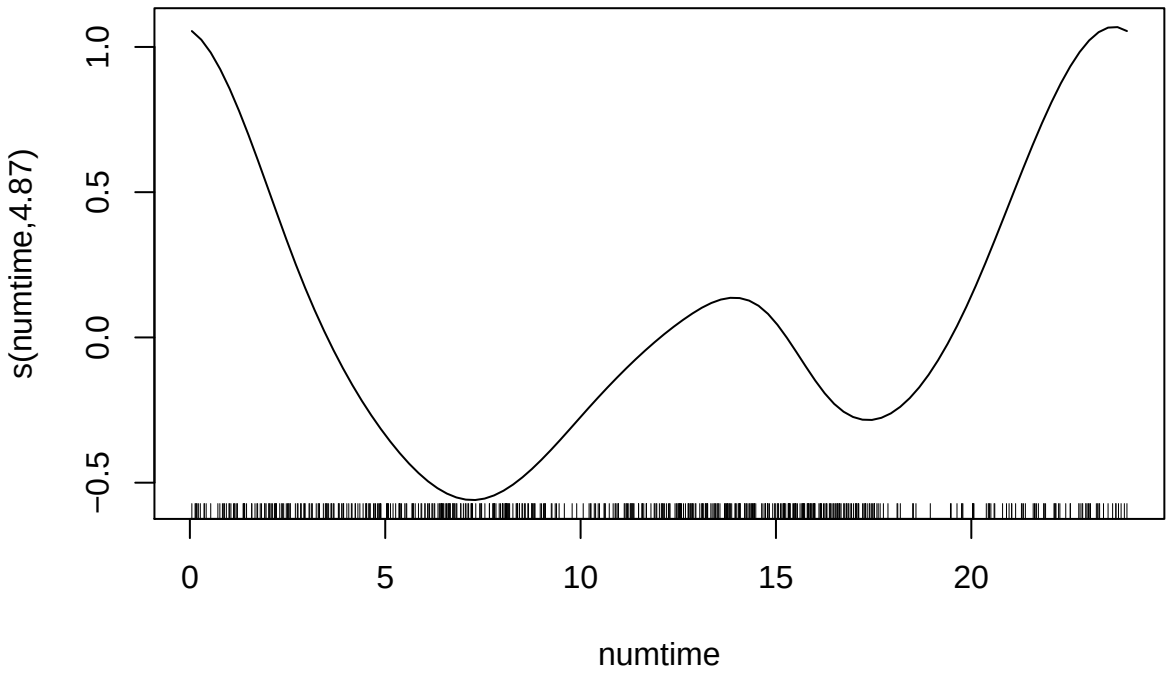
```
## buildBamboozle:Enduring:Spirit Fury:STBFL                0.564537   1.094631
## buildBamboozle:Enduring:Spirit Fury:Surge                0.885724   1.128352
## buildBamboozle:I'm All Ears:NOED:Sloppy Butcher         -0.006011   1.014749
## buildBBQ:Devour:Thrill:Undying                           2.869202   1.053828
## buildBBQ:Discordance:Pop:Surge                           1.251308   0.737813
## buildBBQ:Discordance:Ruin:Undying                        2.154048   0.905438
## buildBBQ:Enduring:Monitor:Whispers                       0.180128   1.027973
## buildBBQ:Enduring:Pop:Spirit Fury                        0.224097   0.942581
## buildBBQ:Monitor:Pop:Whispers                            0.136011   1.168955
## buildBBQ:Pop:Ruin:Surge                                  2.275452   0.846282
## buildBBQ:Pop:Stridor:Surge                               1.611052   1.111070
## buildBBQ:Ruin:Stridor:Surge                              1.848497   0.817796
## buildBrutal:Enduring:Monitor:Whispers                    0.966140   0.958346
## buildDevour:Discordance:Thanatophobia:Thrill             2.540551   1.348794
## buildDevour:Thanatophobia:Thrill:Undying                 1.934798   0.805890
## buildDiscordance:Pop:Sloppy Butcher:Surge                2.835471   1.322522
## buildEnduring:Franklin's Demise:NOED:Surge              -0.439039   0.922187
## buildEnduring:Monitor:Spirit Fury:Whispers               1.001975   1.185762
## buildI'm All Ears:NOED:Sloppy Butcher:Surge              2.131982   1.072187
## builduncommon build                                     0.522070   0.601542
## killerGhostface                                        -0.317093   0.350952
## killerPig                                               1.070986   0.439371
## killerSpirit                                            0.099899   0.490788
## platformPS4                                            -0.064362   0.543398
## crossplay1                                             -0.289917   0.316967
## dayofweek2                                             -0.345031   0.429751
## dayofweek3                                             -0.035375   0.483081
## dayofweek4                                             -0.708019   0.456762
## dayofweek5                                             -0.636355   0.426889
## dayofweek6                                             -0.547069   0.456811
## dayofweek7                                             -0.325694   0.450408
##                                                        z value Pr(>|z|)
## buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge          1.141  0.25407
## buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge  1.868  0.06175 .
## buildBamboozle:BBQ:Brutal:Enduring                      -0.369  0.71194
## buildBamboozle:BBQ:Enduring:Pop                          0.852  0.39438
## buildBamboozle:BBQ:Enduring:Spirit Fury                 -0.102  0.91891
## buildBamboozle:BBQ:Enduring:Whispers                     1.652  0.09859 .
## buildBamboozle:Brutal:Enduring:Spirit Fury               0.990  0.32228
## buildBamboozle:Brutal:Enduring:STBFL                     0.254  0.79928
## buildBamboozle:Enduring:Monitor:Whispers                -1.283  0.19966
## buildBamboozle:Enduring:Pop:Spirit Fury                  1.181  0.23759
## buildBamboozle:Enduring:Spirit Fury:STBFL                0.516  0.60604
## buildBamboozle:Enduring:Spirit Fury:Surge                0.785  0.43247
## buildBamboozle:I'm All Ears:NOED:Sloppy Butcher         -0.006  0.99527
## buildBBQ:Devour:Thrill:Undying                           2.723  0.00648 **
## buildBBQ:Discordance:Pop:Surge                           1.696  0.08989 .
## buildBBQ:Discordance:Ruin:Undying                        2.379  0.01736 *
## buildBBQ:Enduring:Monitor:Whispers                       0.175  0.86090
## buildBBQ:Enduring:Pop:Spirit Fury                        0.238  0.81208
## buildBBQ:Monitor:Pop:Whispers                            0.116  0.90737
## buildBBQ:Pop:Ruin:Surge                                  2.689  0.00717 **
## buildBBQ:Pop:Stridor:Surge                               1.450  0.14706
## buildBBQ:Ruin:Stridor:Surge                              2.260  0.02380 *
```

```
## buildBrutal:Enduring:Monitor:Whispers                      1.008  0.31339
## buildDevour:Discordance:Thanatophobia:Thrill               1.884  0.05962 .
## buildDevour:Thanatophobia:Thrill:Undying                   2.401  0.01636 *
## buildDiscordance:Pop:Sloppy Butcher:Surge                  2.144  0.03203 *
## buildEnduring:Franklin's Demise:NOED:Surge                -0.476  0.63401
## buildEnduring:Monitor:Spirit Fury:Whispers                 0.845  0.39811
## buildI'm All Ears:NOED:Sloppy Butcher:Surge                1.988  0.04676 *
## builduncommon build                                       0.868  0.38546
## killerGhostface                                           -0.904  0.36625
## killerPig                                                  2.438  0.01479 *
## killerSpirit                                               0.204  0.83871
## platformPS4                                               -0.118  0.90572
## crossplay1                                                -0.915  0.36037
## dayofweek2                                                -0.803  0.42205
## dayofweek3                                                -0.073  0.94163
## dayofweek4                                                -1.550  0.12112
## dayofweek5                                                -1.491  0.13605
## dayofweek6                                                -1.198  0.23108
## dayofweek7                                                -0.723  0.46961
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##              edf Ref.df Chi.sq  p-value
## s(numtime) 4.871  8.000 19.057 0.000706 ***
## s(gamenum) 1.000  1.001  0.279 0.597651
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.0886   Deviance explained =   13%
## UBRE = 0.32247  Scale est. = 1         n = 596
```

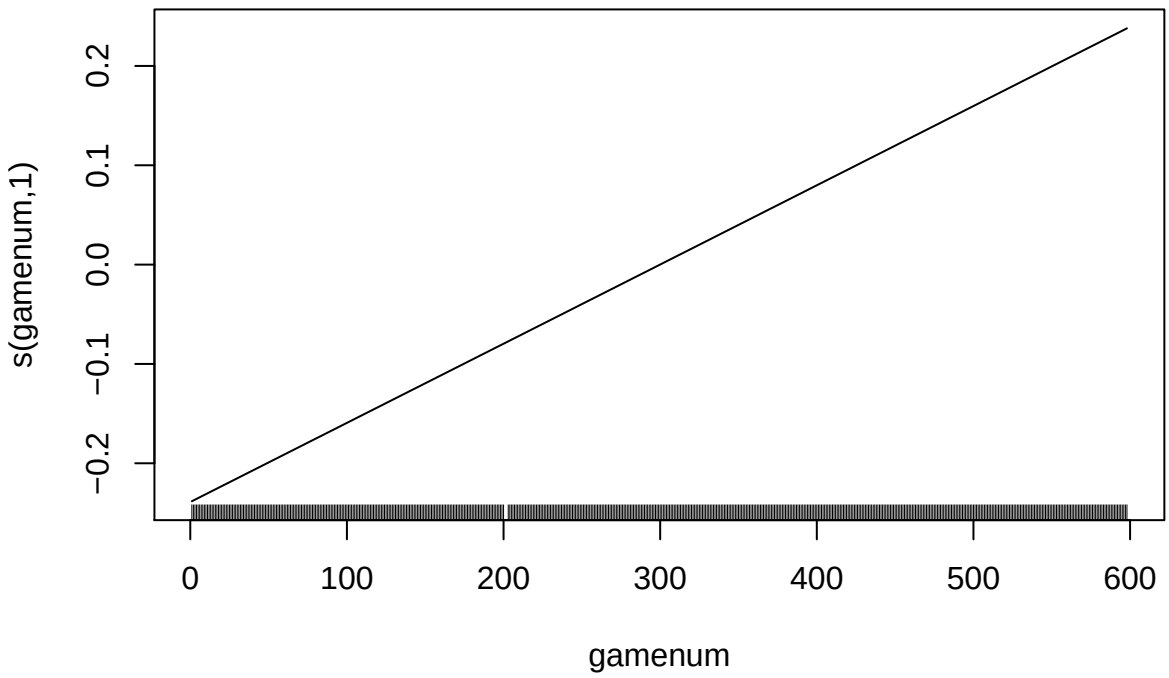
```
anova(winmodel)
```

```
##
## Family: binomial
## Link function: logit
##
## Formula:
## win ~ 0 + build + killer + platform + crossplay + dayofweek +
##     s(numtime, bs = "cc") + s(gamenum)
##
## Parametric Terms:
##           df Chi.sq p-value
## build     30 46.839  0.0258
## killer     3 10.621  0.0140
## platform   1  0.014  0.9057
## crossplay  1  0.837  0.3604
## dayofweek  6  5.008  0.5428
##
## Approximate significance of smooth terms:
##              edf Ref.df Chi.sq  p-value
## s(numtime) 4.871  8.000 19.057 0.000706
## s(gamenum) 1.000  1.001  0.279 0.597651
```

```
plot.gam(winmodel, se=FALSE, scale=0, select=1)
```




```
plot.gam(winmodel, se=FALSE, scale=0, select=2)
```




```
wincoefs <- as.data.frame(coef(winmodel))
wincoefs$variable <- rownames(wincoefs)
names(wincoefs) <- c("est", "var")
wincoefs <- wincoefs[grep(x=wincoefs$var,
                          pattern="build",
                          fixed=TRUE),]
rownames(wincoefs) <- 1:nrow(wincoefs)
wincoefs[order(wincoefs$est),]
```

```
##            est                                                 var
## 9  -1.282931275               buildBamboozle:Enduring:Monitor:Whispers
## 27 -0.439038512             buildEnduring:Franklin's Demise:NOED:Surge
## 3  -0.391914752                     buildBamboozle:BBQ:Brutal:Enduring
## 5  -0.084010330                  buildBamboozle:BBQ:Enduring:Spirit Fury
## 13 -0.006010893         buildBamboozle:I'm All Ears:NOED:Sloppy Butcher
## 19  0.136011290                        buildBBQ:Monitor:Pop:Whispers
## 17  0.180127578                     buildBBQ:Enduring:Monitor:Whispers
## 8   0.219367748                   buildBamboozle:Brutal:Enduring:STBFL
## 18  0.224096760                      buildBBQ:Enduring:Pop:Spirit Fury
## 30  0.522069669                                  builduncommon build
## 11  0.564537012               buildBamboozle:Enduring:Spirit Fury:STBFL
## 7   0.734197269              buildBamboozle:Brutal:Enduring:Spirit Fury
## 4   0.773782595                        buildBamboozle:BBQ:Enduring:Pop
## 12  0.885723650               buildBamboozle:Enduring:Spirit Fury:Surge
## 23  0.966139596                   buildBrutal:Enduring:Monitor:Whispers
```

```
## 28  1.001975296              buildEnduring:Monitor:Spirit Fury:Whispers
## 1   1.082007306         buildA Nurse's Calling:BBQ:Sloppy Butcher:Surge
## 15  1.251308468                           buildBBQ:Discordance:Pop:Surge
## 10  1.266426454                 buildBamboozle:Enduring:Pop:Spirit Fury
## 2   1.598866373 buildA Nurse's Calling:Discordance:Sloppy Butcher:Surge
## 21  1.611052002                                buildBBQ:Pop:Stridor:Surge
## 22  1.848496601                               buildBBQ:Ruin:Stridor:Surge
## 25  1.934797842               buildDevour:Thanatophobia:Thrill:Undying
## 6   2.110894901                   buildBamboozle:BBQ:Enduring:Whispers
## 29  2.131981857             buildI'm All Ears:NOED:Sloppy Butcher:Surge
## 16  2.154048090                     buildBBQ:Discordance:Ruin:Undying
## 20  2.275451603                                  buildBBQ:Pop:Ruin:Surge
## 24  2.540551068           buildDevour:Discordance:Thanatophobia:Thrill
## 26  2.835470703              buildDiscordance:Pop:Sloppy Butcher:Surge
## 14  2.869201815                           buildBBQ:Devour:Thrill:Undying
```

```
table(kpm$build, kpm$killer)
```

```
##
##                                                 _otherkiller Ghostface Pig
##   A Nurse's Calling:BBQ:Sloppy Butcher:Surge                0         9   0
##   A Nurse's Calling:Discordance:Sloppy Butcher:Surge        0        15   1
##   Bamboozle:BBQ:Brutal:Enduring                             0         0   8
##   Bamboozle:BBQ:Enduring:Pop                                1         4   6
##   Bamboozle:BBQ:Enduring:Spirit Fury                        6         0  14
##   Bamboozle:BBQ:Enduring:Whispers                           0         0   9
##   Bamboozle:Brutal:Enduring:Spirit Fury                     1        25   2
##   Bamboozle:Brutal:Enduring:STBFL                           0         2  17
##   Bamboozle:Enduring:Monitor:Whispers                       0         0  12
##   Bamboozle:Enduring:Pop:Spirit Fury                        0         1   9
##   Bamboozle:Enduring:Spirit Fury:STBFL                      0         0  11
##   Bamboozle:Enduring:Spirit Fury:Surge                      3         3   0
##   Bamboozle:I'm All Ears:NOED:Sloppy Butcher                0         9   0
##   BBQ:Devour:Thrill:Undying                                 0        16   0
##   BBQ:Discordance:Pop:Surge                                 7        27   4
##   BBQ:Discordance:Ruin:Undying                              0        16   0
##   BBQ:Enduring:Monitor:Whispers                             0         0   9
##   BBQ:Enduring:Pop:Spirit Fury                              5         1   3
##   BBQ:Monitor:Pop:Whispers                                  0         0   6
##   BBQ:Pop:Ruin:Surge                                        1        16   0
##   BBQ:Pop:Stridor:Surge                                     0         0   0
##   BBQ:Ruin:Stridor:Surge                                    0         0   0
##   Brutal:Enduring:Monitor:Whispers                          0         0  20
##   Devour:Discordance:Thanatophobia:Thrill                   0         6   0
##   Devour:Thanatophobia:Thrill:Undying                       0        39   0
##   Discordance:Pop:Sloppy Butcher:Surge                      0         4   0
##   Enduring:Franklin's Demise:NOED:Surge                     0         0   8
##   Enduring:Monitor:Spirit Fury:Whispers                     0         0   7
##   I'm All Ears:NOED:Sloppy Butcher:Surge                    0        10   0
##   uncommon build                                           43        71  26
##
##                                                 Spirit
##   A Nurse's Calling:BBQ:Sloppy Butcher:Surge             0
##   A Nurse's Calling:Discordance:Sloppy Butcher:Surge     0
```

```
##   Bamboozle:BBQ:Brutal:Enduring                          0
##   Bamboozle:BBQ:Enduring:Pop                             0
##   Bamboozle:BBQ:Enduring:Spirit Fury                     0
##   Bamboozle:BBQ:Enduring:Whispers                        0
##   Bamboozle:Brutal:Enduring:Spirit Fury                  0
##   Bamboozle:Brutal:Enduring:STBFL                        0
##   Bamboozle:Enduring:Monitor:Whispers                    0
##   Bamboozle:Enduring:Pop:Spirit Fury                     0
##   Bamboozle:Enduring:Spirit Fury:STBFL                   0
##   Bamboozle:Enduring:Spirit Fury:Surge                   0
##   Bamboozle:I'm All Ears:NOED:Sloppy Butcher             0
##   BBQ:Devour:Thrill:Undying                              0
##   BBQ:Discordance:Pop:Surge                             15
##   BBQ:Discordance:Ruin:Undying                           0
##   BBQ:Enduring:Monitor:Whispers                          0
##   BBQ:Enduring:Pop:Spirit Fury                           0
##   BBQ:Monitor:Pop:Whispers                               0
##   BBQ:Pop:Ruin:Surge                                     1
##   BBQ:Pop:Stridor:Surge                                  7
##   BBQ:Ruin:Stridor:Surge                                46
##   Brutal:Enduring:Monitor:Whispers                       0
##   Devour:Discordance:Thanatophobia:Thrill                0
##   Devour:Thanatophobia:Thrill:Undying                    4
##   Discordance:Pop:Sloppy Butcher:Surge                   1
##   Enduring:Franklin's Demise:NOED:Surge                  0
##   Enduring:Monitor:Spirit Fury:Whispers                  0
##   I'm All Ears:NOED:Sloppy Butcher:Surge                 0
##   uncommon build                                        12
```

```
tempdf <- dplyr::summarise(group_by(kpm, build),
                           meanbp = mean(bloodpoints, na.rm=TRUE),
                           meankills = mean(kills, na.rm=TRUE))

print(tempdf[order(tempdf$meankills),], n=nrow(tempdf))
```

```
## # A tibble: 30 x 3
##    build                                              meanbp meankills
##    <fct>                                               <dbl>     <dbl>
##  1 Bamboozle:Enduring:Monitor:Whispers                22606.      1.83
##  2 Bamboozle:I'm All Ears:NOED:Sloppy Butcher         22525       2
##  3 uncommon build                                     25068.      2.13
##  4 Bamboozle:Enduring:Spirit Fury:Surge               25126.      2.17
##  5 BBQ:Enduring:Pop:Spirit Fury                       25154.      2.33
##  6 Bamboozle:Brutal:Enduring:Spirit Fury              24381.      2.36
##  7 Bamboozle:BBQ:Enduring:Spirit Fury                 25136       2.5
##  8 BBQ:Enduring:Monitor:Whispers                      20095.      2.56
##  9 A Nurse's Calling:Discordance:Sloppy Butcher:Surge 25488.      2.56
## 10 Bamboozle:BBQ:Brutal:Enduring                      22707.      2.57
## 11 BBQ:Discordance:Pop:Surge                          26269.      2.60
## 12 A Nurse's Calling:BBQ:Sloppy Butcher:Surge         22915.      2.67
## 13 BBQ:Monitor:Pop:Whispers                           22076.      2.67
## 14 Bamboozle:Brutal:Enduring:STBFL                    25370.      2.74
## 15 Enduring:Franklin's Demise:NOED:Surge              23576.      2.75
## 16 BBQ:Pop:Stridor:Surge                              28959.      2.86
```

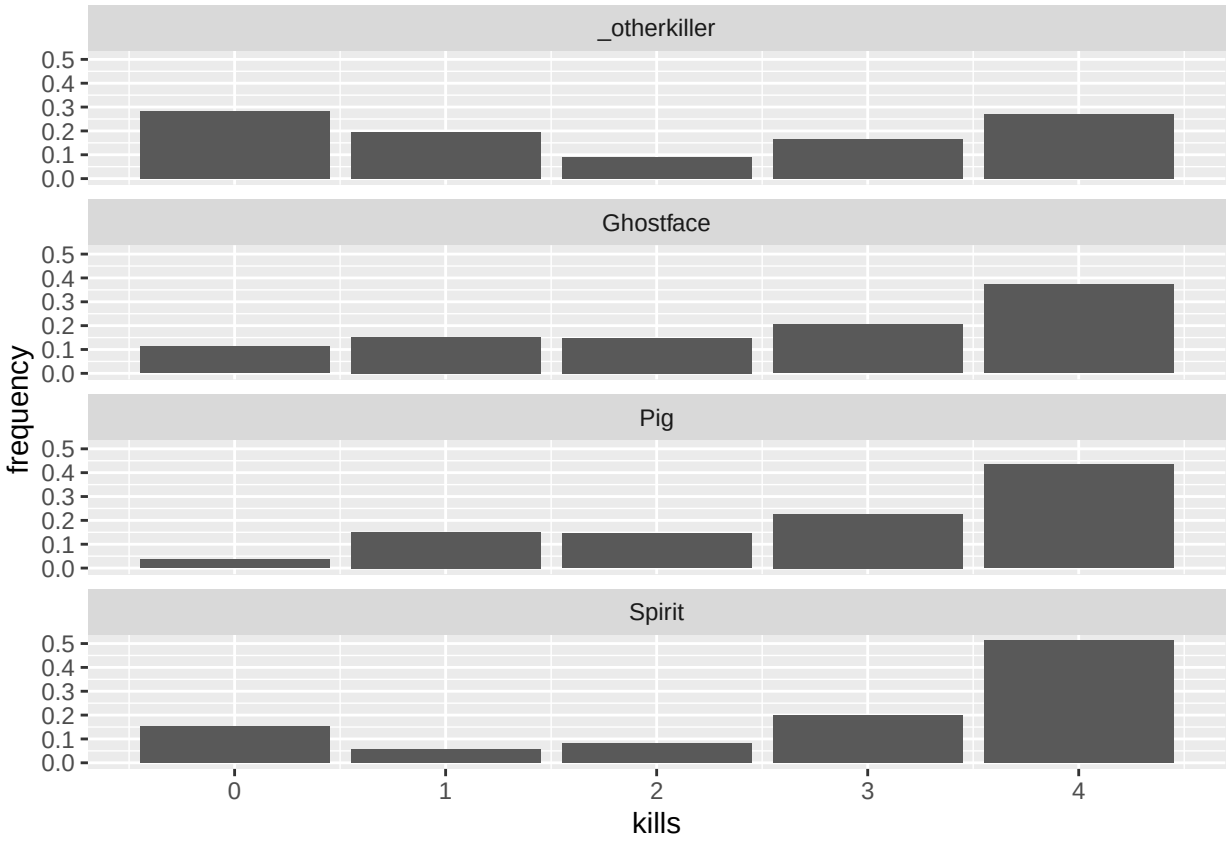
```
## 17 BBQ:Discordance:Ruin:Undying                          27424.      2.88
## 18 I'm All Ears:NOED:Sloppy Butcher:Surge                25350.      2.9
## 19 Bamboozle:BBQ:Enduring:Pop                            24764.      2.91
## 20 BBQ:Pop:Ruin:Surge                                    26201.      2.94
## 21 Enduring:Monitor:Spirit Fury:Whispers                 23297.      3
## 22 Devour:Thanatophobia:Thrill:Undying                   24491.      3.02
## 23 Brutal:Enduring:Monitor:Whispers                      22851.      3.1
## 24 BBQ:Ruin:Stridor:Surge                                28072.      3.15
## 25 Bamboozle:Enduring:Pop:Spirit Fury                    26794.      3.2
## 26 Discordance:Pop:Sloppy Butcher:Surge                  27166       3.2
## 27 BBQ:Devour:Thrill:Undying                             24338.      3.31
## 28 Bamboozle:BBQ:Enduring:Whispers                       23705.      3.33
## 29 Devour:Discordance:Thanatophobia:Thrill               26685       3.33
## 30 Bamboozle:Enduring:Spirit Fury:STBFL                  24397       3.36
```

```
# myplots <- plot.gam(winmodel, se=FALSE, select=0)
# tempdf1 <- data.frame(x = myplots[[1]]$x,
#                       y = myplots[[1]]$fit,
#                       weekend=myplots[[1]]$ylab)
# tempdf2 <- data.frame(x = myplots[[2]]$x,
#                       y = myplots[[2]]$fit,
#                       weekend=myplots[[2]]$ylab)
# tempdf <- bind_rows(tempdf1, tempdf2)
# ggplot(tempdf) + geom_line(aes(x=x, y=y, group=weekend, color=weekend)) +
#   ggtitle("win rate model, cyclical term")

# # do a quick plot on win rates per deci
# kpm$decnumtime <- round_any(kpm$numtime, 0.10)
# decsummary <- dplyr::summarize(group_by(kpm, decnumtime),
#                                win=mean(win, na.rm=TRUE))
# ggplot(decsummary) + geom_line(aes(x=decnumtime, win))
killsbykiller <- dplyr::summarize(group_by(kpm, killer, kills),
                                  killcount=n())
```

```
## `summarise()` has grouped output by 'killer'. You can override using the `.groups` argument.
```

```
tempdf <- dplyr::summarise(group_by(kpm, killer),
                           totalkills=n())
killsbykiller <- left_join(killsbykiller, tempdf, by="killer")
killsbykiller$killfreq <- killsbykiller$killcount / killsbykiller$totalkills

ggplot(killsbykiller) + geom_bar(aes(x=kills, y=killfreq), stat="identity") +
  facet_wrap(~killer, ncol=1) +
  ylab("frequency")
```

```
## Warning: Removed 2 rows containing missing values (position_stack).
```

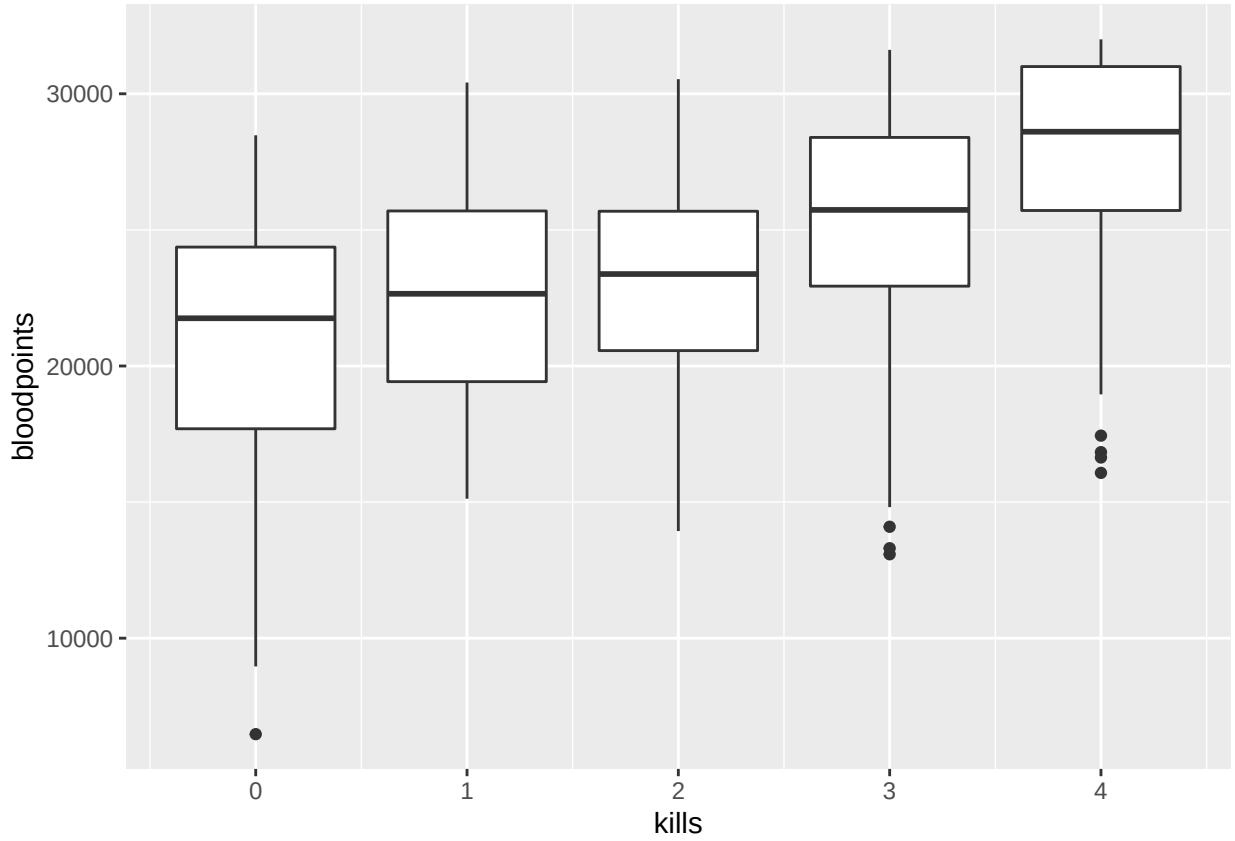



```
kbk2 <- dplyr::summarize(group_by(kpm, killer),
                         meankills = mean(kills, na.rm=TRUE),
                         meanwins  = mean(win, na.rm=TRUE),
                         n=n())
kbk2
```

```
## # A tibble: 4 x 4
##   killer       meankills meanwins     n
##   <fct>            <dbl>    <dbl> <int>
## 1 _otherkiller      1.94    0.433    67
## 2 Ghostface         2.57    0.581   274
## 3 Pig               2.88    0.667   172
## 4 Spirit            2.86    0.709    86
```

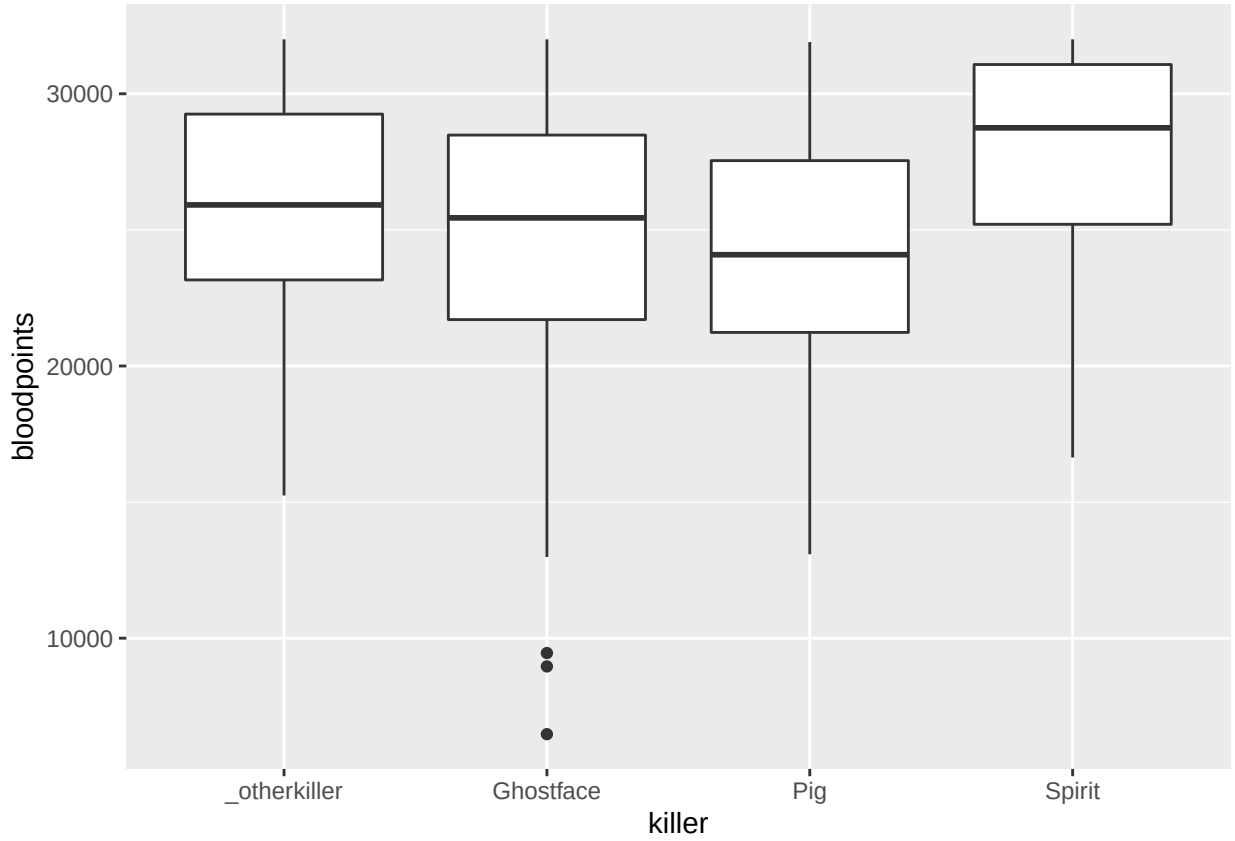
```
ggplot(kpm) + geom_boxplot(aes(x=kills, y=bloodpoints, group=kills))
```

```
## Warning: Removed 3 rows containing missing values (stat_boxplot).
```




```
ggplot(kpm) + geom_boxplot(aes(x=killer, y=bloodpoints, group=killer))
```

```
## Warning: Removed 3 rows containing non-finite values (stat_boxplot).
```




```
# # view princomp loadings for interpretation
# princoefs <- as.data.frame(coef(winmodel))
# princoefs$coef <- rownames(princoefs)
# princoefs <- princoefs[grep(x=princoefs$coef,
#                             pattern="perkprincomp",
#                             fixed=TRUE),]
# names(princoefs) <- c("est","coef")
# perkprincomp$loadings %*% princoefs$est

# perform a salt model
kpm$anysalt <- 1*(kpm$salt > 0)
saltmodel <- gam(anysalt ~ kills + crossplay + NOED + s(numtime, bs="cc"),
                 family=binomial(),
                 data=kpm)
summary(saltmodel)
```

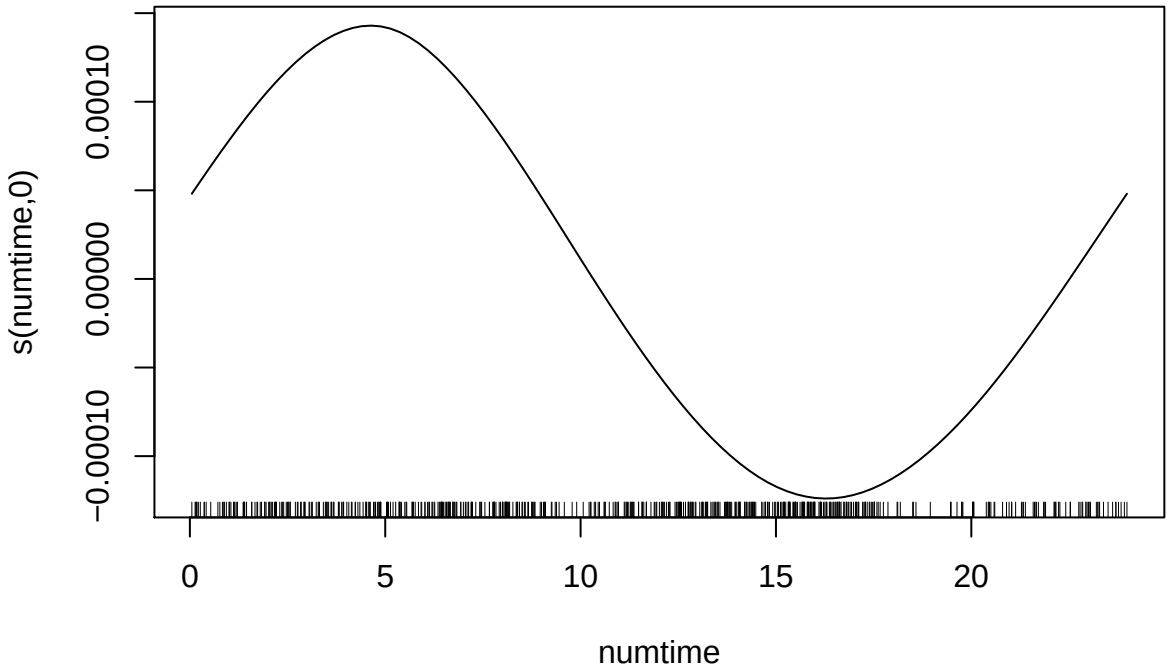
```
##
## Family: binomial
## Link function: logit
##
## Formula:
## anysalt ~ kills + crossplay + NOED + s(numtime, bs = "cc")
##
## Parametric coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept) -2.43530    0.48142  -5.059 4.22e-07 ***
```

```
## kills        0.01517    0.10197   0.149    0.882
## crossplay1   0.07154    0.42555   0.168    0.866
## NOED         0.08991    0.54834   0.164    0.870
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                edf Ref.df Chi.sq p-value
## s(numtime) 0.001017      8  0.001   0.419
##
## R-sq.(adj) =  -0.00497   Deviance explained = 0.021%
## UBRE = -0.38661  Scale est. = 1         n = 596
```

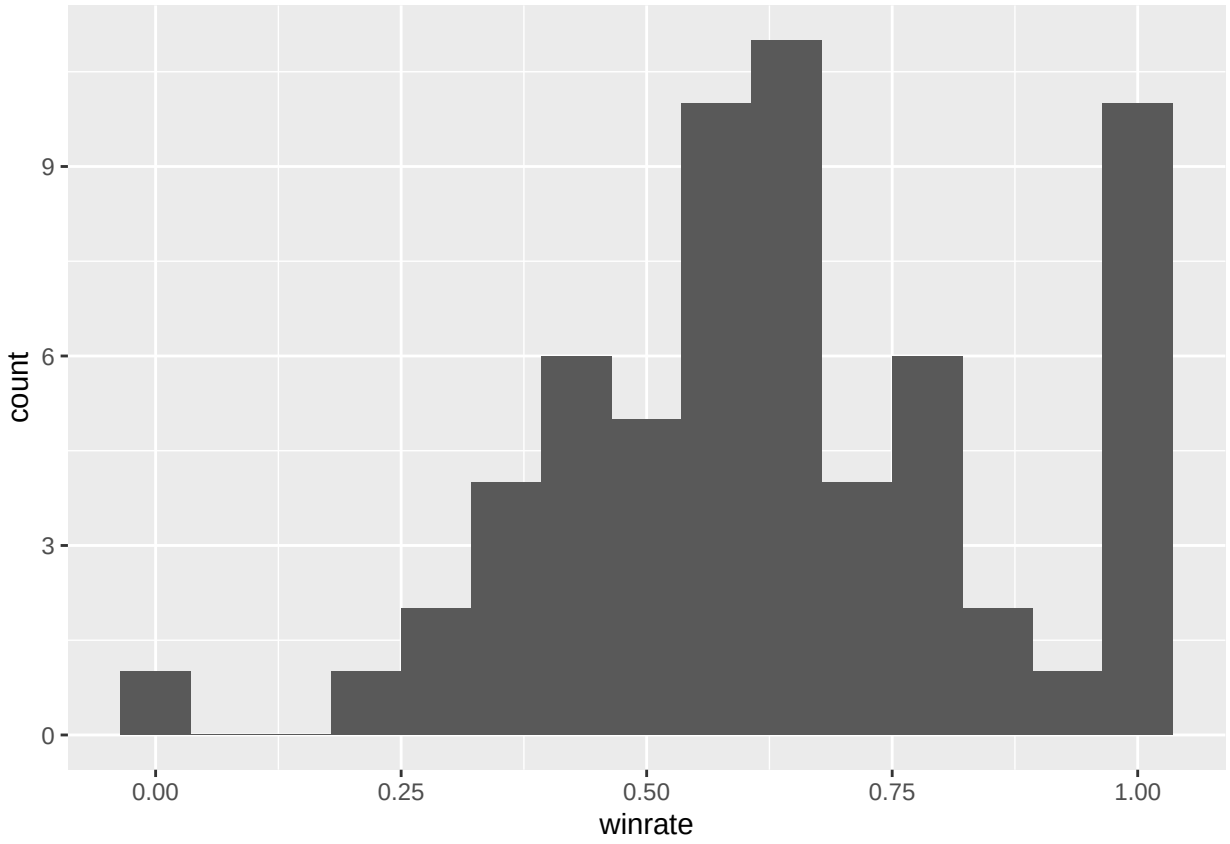
```
dplyr::summarise(group_by(kpm, crossplay),
                 meansalt = mean(salt, na.rm=TRUE))
```

```
## # A tibble: 2 x 2
##   crossplay meansalt
##   <fct>        <dbl>
## 1 0            0.118
## 2 1            0.117
```

```
plot.gam(saltmodel, se=FALSE, select=1)
```



```
winbydate <- as.data.frame(dplyr::summarize(group_by(kpm, date),
                                            winrate=mean(win, na.rm=TRUE)))
ggplot(winbydate) + geom_histogram(aes(x=winrate), bins=15)
```




```
# analyze runs
kpm$winrun <- 1
kpm$lossrun <- 1
for (currow in 2:nrow(kpm)) {

  if (is.na(kpm$win[currow])) {

    kpm$winrun[currow] <- kpm$winrun[currow-1]
    kpm$lossrun[currow] <- kpm$lossrun[currow-1]

  } else {

    if (kpm$win[currow] == 1) {

      kpm$winrun[currow] <- kpm$winrun[currow-1] + 1
      kpm$lossrun[currow] <- 0

    } else {

      kpm$winrun[currow] <- 0
      kpm$lossrun[currow] <- kpm$lossrun[currow-1] + 1
```

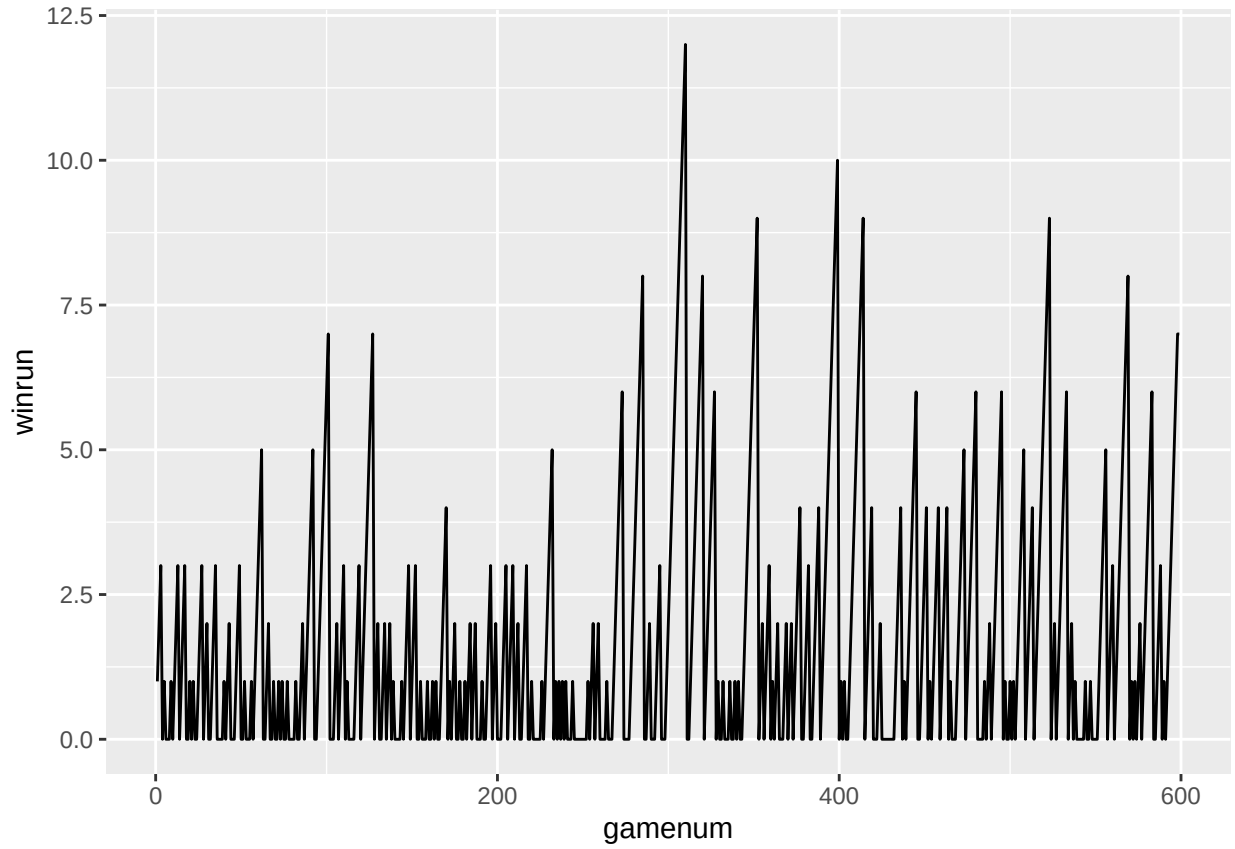
```
    }

  }

}
max(kpm$winrun)
```

```
## [1] 12
```

```
max(kpm$lossrun)
```

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

```
kpm$gamenum <- 1:nrow(kpm)
ggplot(kpm) + geom_line(aes(x=gamenum, y=winrun))
```




```
kpm$movingwin <- NA
for (currow in 31:nrow(kpm)) {

  kpm$movingwin[currow] <- mean(kpm$win[(currow-30):currow], na.rm=TRUE)

}
ggplot(kpm) + geom_line(aes(x=gamenum, y=movingwin)) +
```

```
  ggtitle("moving window win rate (>2K)") +
  xlab("game number") + ylab("win rate")
```

```
## Warning: Removed 30 row(s) containing missing values (geom_path).
```