The Life of Eli

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Contents

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This document can be found at https://github.com/darwinanddavis/Eli

Overview

Activity data for Eli for his first year, including time spent feeding, sleeping, in leisure and values for growth and other behavioural traits.

TO DO

* ~~separate activity states~~
* separate hour and mins, then convert time to hours

Install dependencies

```
packages <- c("stringi","tidyr","sp","RColorBrewer","ggplot2","ggthemes")
if (require(packages)) {
    install.packages(packages,dependencies = T)
    require(packages)
}
lapply(packages,library,character.only=T)
```

Set plotting function

```
# plotting function (plot for MS or not, set bg color, set color palette from RColorBrewer, set alpha v
plot_it <- function(manuscript,bg,cp,alpha,family){
  graphics.off()
  if(manuscript==0){
    if(bg=="black"){
      colvec<-magma(200,1)
      par(bg = colvec[1],col.axis="white",col.lab="white",col.main="white",
          fg="white",bty="n",las=1,mar=c(5,6,4,2),family=family) #mono
      border=adjustcolor("purple",alpha=0.5)
    }else{
      colvec<-bpy.colors(200)
      par(bg = colvec[1],col.axis="white",col.lab="white",col.main="white",
          fg="white",bty="n",las=1,mar=c(5,6,4,2),family=family)
      border=adjustcolor("blue",alpha=0.5)
    }
  }else{
#    graphics.off()
    par(bty="n",las=1,family=family)
  }
  # color palettes
  # ifelse(manuscript==1,colvec<-adjustcolor(brewer.pal(9,cp)[9], alpha = alpha),colvec <- adjustcolor(
   # colfunc <<- colorRampPalette(brewer.pal(9,cp),alpha=alpha)
  colfunc <<- adjustcolor(brewer.pal(9,cp),alpha=alpha) # USES <<- OPERATOR
}
```

```
# Setting ggplot theme graphics
plot_it_gg <- function(bg){ # bg = colour to plot bg, family = font family
  if(bg=="white"){
    bg <- "white"
    fg <- "black"
  theme_tufte(base_family = "HersheySans") +
```

```
    theme(panel.border = element_blank(),panel.grid.major = element_blank(),panel.grid.minor = element_
    theme(axis.line = element_line(color = fg)) +theme(axis.ticks = element_line(color = fg)) + theme(pl
}
  }# end gg

# define colours
col1 <- "light blue"
col2 <- "orange"

# Set global plotting parameters
print("1/0, set colour, set colour palette 'display.brewer.all()',set alpha for col,set font")
plot_it(0,"blue","YlOrRd",1,"HersheySans") # set col function params
plot_it_gg("white") # same as above
```

Load and clean data

```
setwd(params$dir) # set wd
list.files()
```

```
 [1] "april.csv" "eli_cache" "eli_files" "eli.html"  "eli.pdf"   "eli.R"     "eli.Rmd"   "Eli.Rproj"
 [9] "eli.tex"   "feb.csv"   "march.csv" "may.csv"
```

```
d <- "may" # choose month or total period

data <- read.csv(paste0(d,".csv"),header=T,sep=",", stringsAsFactors=FALSE)
colnames(data) <- c("Activity","Trait","Start","Finish","Value")
data[c("Activity", "Trait")] <- sapply(data[c("Activity", "Trait")],as.character)
head(data)
```

```
# A tibble: 6 x 5
  Activity Trait        Start                 Finish                Value
* <chr>    <chr>        <chr>                 <chr>                 <chr>
1 Growth   Head         16-Feb.-2018 8:06 pm  16-Feb.-2018 8:06 pm  35cm
2 Growth   Height       16-Feb.-2018 8:06 pm  16-Feb.-2018 8:06 pm  53cm
3 Growth   Weight       16-Feb.-2018 11:59 pm 16-Feb.-2018 11:59 pm 3.61kg
4 Feeding  Right Breast 18-Feb.-2018 1:25 am  18-Feb.-2018 1:35 am  ""
5 Feeding  Left Breast  18-Feb.-2018 1:35 am  18-Feb.-2018 1:44 am  ""
6 Feeding  Right Breast 18-Feb.-2018 3:24 am  18-Feb.-2018 3:45 am  ""
```

Subset activities

```
unique(data$Activity)
```

```
[1] "Growth"    "Feeding"   "Sleep"     "Diapering" "Health"    "Leisure"   "Pumping"
```

```
grow <- subset(data,subset=Activity=="Growth");head(grow)
```

```
# A tibble: 6 x 5
  Activity Trait  Start                 Finish                Value
* <chr>    <chr>  <chr>                 <chr>                 <chr>
1 Growth   Head   16-Feb.-2018 8:06 pm  16-Feb.-2018 8:06 pm  35cm
2 Growth   Height 16-Feb.-2018 8:06 pm  16-Feb.-2018 8:06 pm  53cm
3 Growth   Weight 16-Feb.-2018 11:59 pm 16-Feb.-2018 11:59 pm 3.61kg
```

```
4 Growth   Weight 27-Feb.-2018 12:00 pm 27-Feb.-2018 12:00 pm 3.67kg
5 Growth   Weight 07-Mar.-2018 1:08 pm  07-Mar.-2018 1:08 pm  4.01kg
6 Growth   Height 07-Mar.-2018 1:08 pm  07-Mar.-2018 1:08 pm  55cm
```

```
feed <- subset(data,subset=Activity=="Feeding");head(feed)
```

```
# A tibble: 6 x 5
  Activity Trait        Start                 Finish                Value
* <chr>    <chr>        <chr>                 <chr>                 <chr>
1 Feeding  Right Breast 18-Feb.-2018 1:25 am  18-Feb.-2018 1:35 am  ""
2 Feeding  Left Breast  18-Feb.-2018 1:35 am  18-Feb.-2018 1:44 am  ""
3 Feeding  Right Breast 18-Feb.-2018 3:24 am  18-Feb.-2018 3:45 am  ""
4 Feeding  Left Breast  18-Feb.-2018 7:39 am  18-Feb.-2018 8:05 am  ""
5 Feeding  Right Breast 18-Feb.-2018 10:12 am 18-Feb.-2018 10:45 am ""
6 Feeding  Left Breast  18-Feb.-2018 10:48 am 18-Feb.-2018 11:35 am ""
```

```
sleep <- subset(data,subset=Activity=="Sleep");head(sleep)
```

```
# A tibble: 6 x 5
  Activity Trait Start                 Finish                Value
* <chr>    <chr> <chr>                 <chr>                 <chr>
1 Sleep    ""    18-Feb.-2018 8:53 am  18-Feb.-2018 9:41 am  ""
2 Sleep    ""    18-Feb.-2018 11:32 am 18-Feb.-2018 3:16 pm  ""
3 Sleep    ""    18-Feb.-2018 10:24 pm 18-Feb.-2018 10:52 pm ""
4 Sleep    ""    19-Feb.-2018 1:40 am  19-Feb.-2018 3:00 am  ""
5 Sleep    ""    19-Feb.-2018 3:36 am  19-Feb.-2018 3:38 am  ""
6 Sleep    ""    19-Feb.-2018 5:15 pm  19-Feb.-2018 6:05 pm  ""
```

```
diaper <- subset(data,subset=Activity=="Diapering");head(diaper)
```

```
# A tibble: 6 x 5
  Activity  Trait     Start                 Finish                Value
* <chr>     <chr>     <chr>                 <chr>                 <chr>
1 Diapering Pee & Poo 18-Feb.-2018 10:01 am 18-Feb.-2018 10:01 am olive
2 Diapering Poo       18-Feb.-2018 6:42 pm  18-Feb.-2018 6:42 pm  licorice, shiny
3 Diapering Poo       18-Feb.-2018 10:00 pm 18-Feb.-2018 10:00 pm small like earlier, olive green
4 Diapering Pee       20-Feb.-2018 2:46 am  20-Feb.-2018 2:46 am  ""
5 Diapering Poo       20-Feb.-2018 2:47 am  20-Feb.-2018 2:47 am  Fresh. Olive/brown
6 Diapering Pee & Poo 20-Feb.-2018 3:54 am  20-Feb.-2018 3:54 am  ""
```

```
leisure <- subset(data,subset=Activity=="Leisure");head(leisure)
```

```
# A tibble: 6 x 5
  Activity Trait      Start                 Finish                Value
* <chr>    <chr>      <chr>                 <chr>                 <chr>
1 Leisure  Bath time  13-Mar.-2018 10:15 pm 13-Mar.-2018 10:30 pm ""
2 Leisure  Bath time  15-Mar.-2018 9:15 pm  15-Mar.-2018 9:30 pm  ""
3 Leisure  Tummy time 17-Mar.-2018 8:00 pm  17-Mar.-2018 8:02 pm  ""
4 Leisure  Bath time  17-Mar.-2018 9:10 pm  17-Mar.-2018 9:30 pm  ""
5 Leisure  Tummy time 18-Mar.-2018 6:40 pm  18-Mar.-2018 6:45 pm  ""
6 Leisure  Tummy time 20-Mar.-2018 12:09 am 20-Mar.-2018 12:14 am ""
```

Subset traits

```
# activity states with traits: grow,feed,diaper,leisure
```

```r
# grow
head <- subset(grow,subset=Trait=="Head");head
```

```
# A tibble: 3 x 5
  Activity Trait Start                 Finish                Value
* <chr>    <chr> <chr>                 <chr>                 <chr>
1 Growth   Head  16-Feb.-2018 8:06 pm  16-Feb.-2018 8:06 pm  35cm
2 Growth   Head  07-Mar.-2018 1:08 pm  07-Mar.-2018 1:08 pm  37.5cm
3 Growth   Head  24-Apr.-2018 10:16 pm 24-Apr.-2018 10:16 pm 40cm
```

```r
height <- subset(grow,subset=Trait=="Height");height
```

```
# A tibble: 4 x 5
  Activity Trait  Start                 Finish                Value
* <chr>    <chr>  <chr>                 <chr>                 <chr>
1 Growth   Height 16-Feb.-2018 8:06 pm  16-Feb.-2018 8:06 pm  53cm
2 Growth   Height 07-Mar.-2018 1:08 pm  07-Mar.-2018 1:08 pm  55cm
3 Growth   Height 24-Apr.-2018 10:15 pm 24-Apr.-2018 10:15 pm 61.5cm
4 Growth   Height 23/05/18 20:20        23/05/18 20:20        63cm
```

```r
weight <- subset(grow,subset=Trait=="Weight");weight
```

```
# A tibble: 9 x 5
  Activity Trait  Start                 Finish                Value
* <chr>    <chr>  <chr>                 <chr>                 <chr>
1 Growth   Weight 16-Feb.-2018 11:59 pm 16-Feb.-2018 11:59 pm 3.61kg
2 Growth   Weight 27-Feb.-2018 12:00 pm 27-Feb.-2018 12:00 pm 3.67kg
3 Growth   Weight 07-Mar.-2018 1:08 pm  07-Mar.-2018 1:08 pm  4.01kg
4 Growth   Weight 21-Mar.-2018 10:45 am 21-Mar.-2018 10:45 am 4.695kg
5 Growth   Weight 28-Mar.-2018 6:09 pm  28-Mar.-2018 6:09 pm  5.1kg
6 Growth   Weight 11-Apr.-2018 11:12 am 11-Apr.-2018 11:12 am 5.5kg
7 Growth   Weight 16-Apr.-2018 2:28 pm  16-Apr.-2018 2:28 pm  5.5kg, @ babybunting
8 Growth   Weight 24-Apr.-2018 10:14 pm 24-Apr.-2018 10:14 pm 5.73kg
9 Growth   Weight 10/05/18 12:14        10/05/18 12:14        6kg
```

```r
# feed
breast_l <- subset(feed,subset=Trait=="Left Breast");head(breast_l)
```

```
# A tibble: 6 x 5
  Activity Trait       Start                 Finish                Value
* <chr>    <chr>       <chr>                 <chr>                 <chr>
1 Feeding  Left Breast 18-Feb.-2018 1:35 am  18-Feb.-2018 1:44 am  ""
2 Feeding  Left Breast 18-Feb.-2018 7:39 am  18-Feb.-2018 8:05 am  ""
3 Feeding  Left Breast 18-Feb.-2018 10:48 am 18-Feb.-2018 11:35 am ""
4 Feeding  Left Breast 18-Feb.-2018 4:17 pm  18-Feb.-2018 4:17 pm  ""
5 Feeding  Left Breast 18-Feb.-2018 4:20 pm  18-Feb.-2018 4:20 pm  ""
6 Feeding  Left Breast 18-Feb.-2018 5:32 pm  18-Feb.-2018 5:40 pm  ""
```

```r
breast_r <- subset(feed,subset=Trait=="Right Breast");head(breast_r)
```

```
# A tibble: 6 x 5
  Activity Trait        Start                 Finish                Value
* <chr>    <chr>        <chr>                 <chr>                 <chr>
1 Feeding  Right Breast 18-Feb.-2018 1:25 am  18-Feb.-2018 1:35 am  ""
2 Feeding  Right Breast 18-Feb.-2018 3:24 am  18-Feb.-2018 3:45 am  ""
3 Feeding  Right Breast 18-Feb.-2018 10:12 am 18-Feb.-2018 10:45 am ""
4 Feeding  Right Breast 18-Feb.-2018 3:23 pm  18-Feb.-2018 3:56 pm  ""
```

```
5 Feeding  Right Breast 18-Feb.-2018 6:40 pm  18-Feb.-2018 6:52 pm  ""
6 Feeding  Right Breast 18-Feb.-2018 7:02 pm  18-Feb.-2018 7:30 pm  ""
```

```
bottle <- subset(feed,subset=Trait=="Bottle");head(bottle)
```

```
# A tibble: 5 x 5
  Activity Trait  Start                 Finish                Value
* <chr>    <chr>  <chr>                 <chr>                 <chr>
1 Feeding  Bottle 12-Mar.-2018 11:12 am 12-Mar.-2018 11:22 am 70ml, breast milk, expresd -L/B
2 Feeding  Bottle 19-Apr.-2018 1:10 pm  19-Apr.-2018 1:12 pm  30ml, breast milk
3 Feeding  Bottle 19-Apr.-2018 9:35 pm  19-Apr.-2018 9:42 pm  90ml, breast milk
4 Feeding  Bottle 21/05/18 11:47        21/05/18 11:55        30ml, breast milk
5 Feeding  Bottle 25/05/18 19:12        25/05/18 19:21        125ml, breast milk
```

```
# sleep
# no traits

# diaper
pee <- subset(diaper,subset=Trait=="Pee");head(pee)
```

```
# A tibble: 6 x 5
  Activity  Trait Start                 Finish                Value
* <chr>     <chr> <chr>                 <chr>                 <chr>
1 Diapering Pee   20-Feb.-2018 2:46 am  20-Feb.-2018 2:46 am  ""
2 Diapering Pee   20-Feb.-2018 11:20 am 20-Feb.-2018 11:20 am ""
3 Diapering Pee   20-Feb.-2018 4:29 pm  20-Feb.-2018 4:29 pm  ""
4 Diapering Pee   20-Feb.-2018 7:09 pm  20-Feb.-2018 7:09 pm  ""
5 Diapering Pee   20-Feb.-2018 8:30 pm  20-Feb.-2018 8:30 pm  ""
6 Diapering Pee   21-Feb.-2018 2:29 am  21-Feb.-2018 2:29 am  ""
```

```
poo <- subset(diaper,subset=Trait=="Poo");head(poo)
```

```
# A tibble: 6 x 5
  Activity  Trait Start                 Finish                Value
* <chr>     <chr> <chr>                 <chr>                 <chr>
1 Diapering Poo   18-Feb.-2018 6:42 pm  18-Feb.-2018 6:42 pm  licorice, shiny
2 Diapering Poo   18-Feb.-2018 10:00 pm 18-Feb.-2018 10:00 pm small like earlier, olive green
3 Diapering Poo   20-Feb.-2018 2:47 am  20-Feb.-2018 2:47 am  Fresh. Olive/brown
4 Diapering Poo   20-Feb.-2018 4:31 pm  20-Feb.-2018 4:31 pm  ""
5 Diapering Poo   21-Feb.-2018 12:45 am 21-Feb.-2018 12:45 am ""
6 Diapering Poo   21-Feb.-2018 1:51 pm  21-Feb.-2018 1:51 pm  ""
```

```
both <- subset(diaper,subset=Trait==unique(diaper$Trait)[1]);head(both)
```

```
# A tibble: 6 x 5
  Activity  Trait     Start                 Finish                Value
* <chr>     <chr>     <chr>                 <chr>                 <chr>
1 Diapering Pee & Poo 18-Feb.-2018 10:01 am 18-Feb.-2018 10:01 am olive
2 Diapering Pee & Poo 20-Feb.-2018 3:54 am  20-Feb.-2018 3:54 am  ""
3 Diapering Pee & Poo 20-Feb.-2018 11:42 pm 20-Feb.-2018 11:42 pm ""
4 Diapering Pee & Poo 21-Feb.-2018 4:53 am  21-Feb.-2018 4:53 am  ""
5 Diapering Pee & Poo 22-Feb.-2018 10:20 pm 22-Feb.-2018 10:20 pm ""
6 Diapering Pee & Poo 23-Feb.-2018 4:55 am  23-Feb.-2018 4:55 am  ""
```

```
# leisure
# no values
unique(data$Activity)
```

```
[1] "Growth"    "Feeding"   "Sleep"     "Diapering" "Health"    "Leisure"   "Pumping"
```

```
bath <- subset(leisure,subset=Trait=="Bath time");head(bath)
```

```
# A tibble: 6 x 5
  Activity Trait     Start                 Finish                Value
* <chr>    <chr>     <chr>                 <chr>                 <chr>
1 Leisure  Bath time 13-Mar.-2018 10:15 pm 13-Mar.-2018 10:30 pm ""
2 Leisure  Bath time 15-Mar.-2018 9:15 pm  15-Mar.-2018 9:30 pm  ""
3 Leisure  Bath time 17-Mar.-2018 9:10 pm  17-Mar.-2018 9:30 pm  ""
4 Leisure  Bath time 22-Mar.-2018 11:05 pm 22-Mar.-2018 11:29 pm ""
5 Leisure  Bath time 24-Mar.-2018 9:10 pm  24-Mar.-2018 9:34 pm  ""
6 Leisure  Bath time 27-Mar.-2018 9:10 pm  27-Mar.-2018 9:30 pm  ""
```

```
tummy <- subset(leisure,subset=Trait=="Tummy time");head(tummy)
```

```
# A tibble: 6 x 5
  Activity Trait      Start                 Finish                Value
* <chr>    <chr>      <chr>                 <chr>                 <chr>
1 Leisure  Tummy time 17-Mar.-2018 8:00 pm  17-Mar.-2018 8:02 pm  ""
2 Leisure  Tummy time 18-Mar.-2018 6:40 pm  18-Mar.-2018 6:45 pm  ""
3 Leisure  Tummy time 20-Mar.-2018 12:09 am 20-Mar.-2018 12:14 am ""
4 Leisure  Tummy time 21-Mar.-2018 10:52 pm 21-Mar.-2018 10:54 pm ""
5 Leisure  Tummy time 24-Mar.-2018 9:37 pm  24-Mar.-2018 9:40 pm  ""
6 Leisure  Tummy time 27-Mar.-2018 1:53 pm  27-Mar.-2018 2:00 pm  ""
```

```
outdoors <- subset(leisure,subset=Trait=="Outdoors");outdoors
```

```
# A tibble: 4 x 5
  Activity Trait    Start          Finish         Value
* <chr>    <chr>    <chr>          <chr>          <chr>
1 Leisure  Outdoors 5/05/18 15:37  5/05/18 16:11  ""
2 Leisure  Outdoors 6/05/18 13:46  6/05/18 14:46  ""
3 Leisure  Outdoors 8/05/18 15:10  8/05/18 16:16  ""
4 Leisure  Outdoors 25/05/18 14:03 25/05/18 16:03 ""
```

```
play <- subset(leisure,subset=Trait=="Play time");head(play)
```

```
# A tibble: 6 x 5
  Activity Trait     Start          Finish         Value
* <chr>    <chr>     <chr>          <chr>          <chr>
1 Leisure  Play time 7/05/18 10:35  7/05/18 11:16  ""
2 Leisure  Play time 8/05/18 10:03  8/05/18 10:13  ""
3 Leisure  Play time 9/05/18 22:25  9/05/18 22:35  ""
4 Leisure  Play time 10/05/18 20:57 10/05/18 21:03 ""
5 Leisure  Play time 15/05/18 12:41 15/05/18 13:11 ""
6 Leisure  Play time 16/05/18 6:58  16/05/18 7:10  With mum
```

unique(data$Activity)

Growth

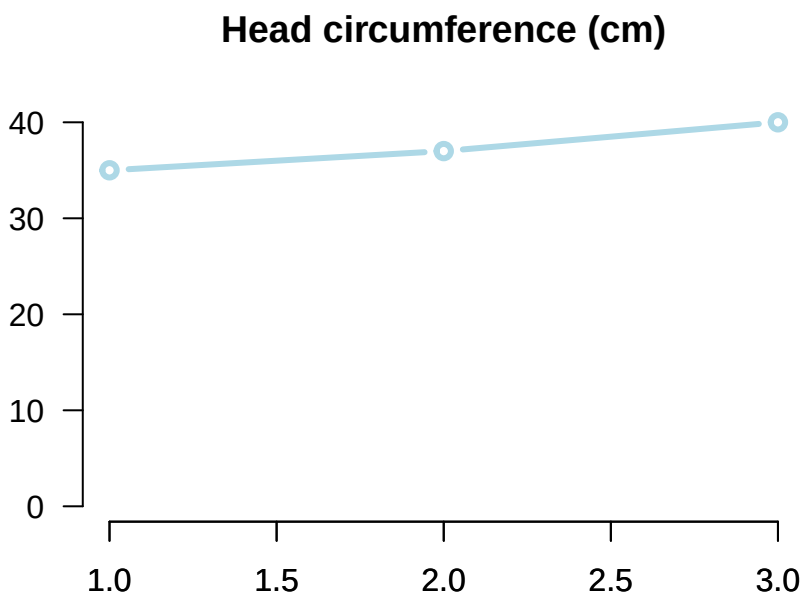
Head

```
require("stringi")
require("tidyr")
```

```
hv <- gsub("[^[:digit:]]", "", head$Value) # get just integers
stri_sub(hv,3) <- ".";hv # insert the decimal point in the correct place
```

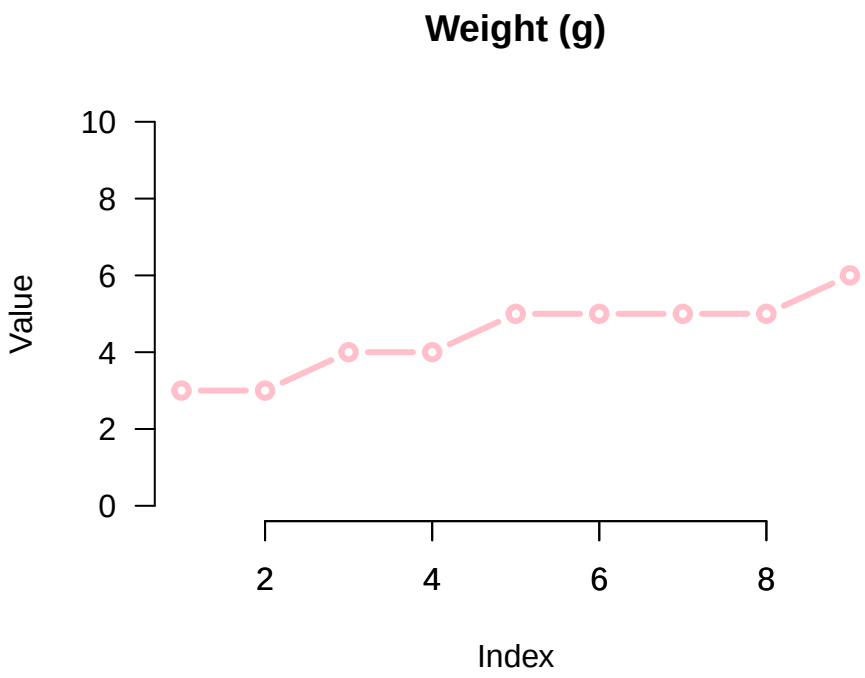
```
[1] "35." "37." "40."
```

```
head$Value <- hv %>% as.numeric() # make numeric

par(las=1,bty="n")
ylim <- round(max(head$Value,10))
with(head,plot(Value,
                 col=col1,type="b",lwd=3,
                 ylim=c(0,ylim),
                 xlab="",ylab=""
))
axis(1,xlab=month.name[length(head$Value)])
title("Head circumference (cm)")
```



Weight

```
wv <- gsub("[^[:digit:]]", "", weight$Value) # get just integers
stri_sub(wv,2) <- "." # insert the decimal point in the correct place
weight$Value <- wv %>% as.numeric() # make numeric

par(las=1,bty="n")
ylim <- round(max(weight$Value,10))
with(weight,plot(Value,
                 col="pink",type="b",lwd=3,
                 ylim=c(0,ylim)
))
axis(1,xlab=month.name[length(head$Value)])
title("Weight (g)")
```

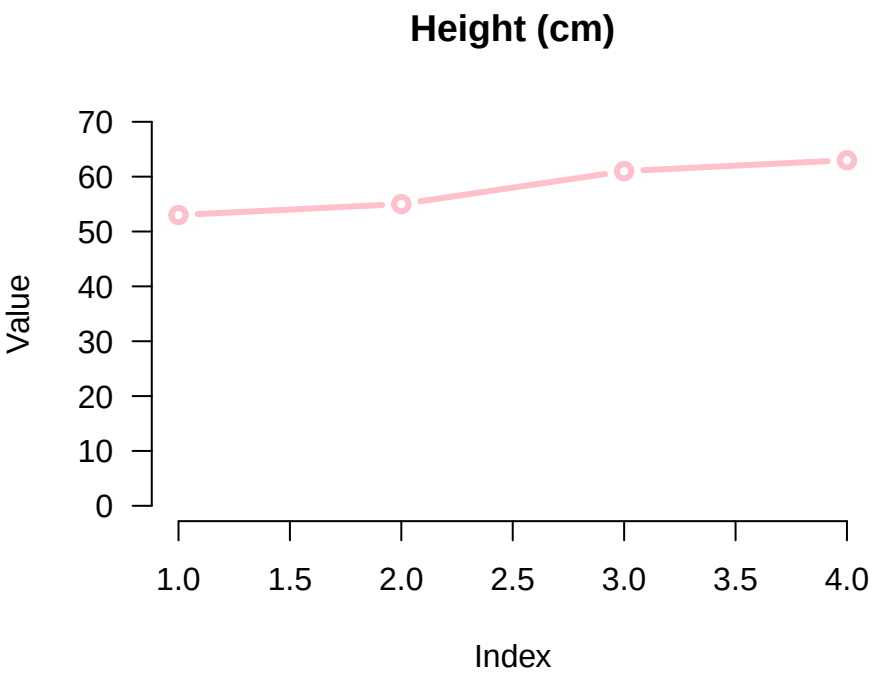


Height

```
hhv <- gsub("[^[:digit:]]", "", height$Value) # get just integers
stri_sub(hhv,3) <- "." ;hhv # insert the decimal point in the correct place
```

```
[1] "53." "55." "61." "63."
```

```
height$Value <- hhv %>% as.numeric() # make numeric

par(las=1,bty="n")
with(height,plot(Value,
                 col="pink",type="b",lwd=3,
                 ylim=c(0,70)
))
# axis(1,xlab=month.name[length(head$Value)])
title("Height (cm)")
```



Feeding

Left breast

Right breast

Diaper

```
unique(diaper$Trait)
```

```
[1] "Pee & Poo" "Poo"       "Pee"
```

Pee

```
unique(diaper$Trait)
```

```
[1] "Pee & Poo" "Poo"       "Pee"
```

Poo

```
unique(diaper$Trait)
```

```
[1] "Pee & Poo" "Poo"       "Pee"
```

Both

```
unique(diaper$Trait)
```

```
[1] "Pee & Poo" "Poo"       "Pee"
```

Leisure

Bath

Tummy

Outdoors

Play

Lab