

Blueberries in My Salad

Amit Arora

2020-09-10

Contents

Preface	13
How it began...	15
My tryst with a protein based diet	15
A new begining	16
Clean Eating	19
A clean breakfast	20
A lunch we really love	21
The 4pm snack	25
The grand finale a.k.a the dinner	26
The results	26
Is the 30 day challenge hard?	38
What happens after the 30 day challenge?	39
Exercise: Putting in the hard yards	41
What we accomplished	43
Do I Need a Trainer?	45
Time Restricted Eating	47
Other Topics	49


```
library(xts)
library(zoo)
library(dplyr)
library(tidyr)
library(glue)
library(ggplot2)
library(stringr)
library(ggthemes)
library(lubridate)
library(tidyverse)
library(futile.logger)

source("globals.R")

df_P1 <- read_csv(P1_DATA_URL) %>%
  mutate(Date=ymd(Date))

## Parsed with column specification:
## cols(
##   Date = col_character(),
##   Weight = col_character(),
##   BMI = col_character(),
##   `Body Fat` = col_character(),
##   `Lean Mass` = col_character(),
##   `Muscle Percentage` = col_character(),
##   `Water Percentage` = col_character()
## )

## Warning: Problem with `mutate()`'s input `Date` .
## i 2 failed to parse.
## i Input `Date` is `ymd(Date)` .

## Warning: 2 failed to parse.

df_P2 <- read_csv(P2_DATA_URL) %>%
  mutate(Date=ymd(Date))

## Parsed with column specification:
## cols(
##   Date = col_character(),
##   Weight = col_character(),
##   BMI = col_character(),
##   `Body Fat` = col_character(),
##   `Lean Mass` = col_character(),
##   `Muscle Percentage` = col_character(),
##   `Water Percentage` = col_character()
```

```

## )

## Warning: Problem with `mutate()`` input `Date`.
## i 2 failed to parse.
## i Input `Date` is `ymd(Date)`.

## Warning: 2 failed to parse.

df_p1_starting_weight <- df_P1 %>% filter(Date == min(Date, na.rm=TRUE)) %>% pull(Weight)
df_p2_starting_weight <- df_P2 %>% filter(Date == min(Date, na.rm=TRUE)) %>% pull(Weight)

df_starting_and_target_weights <- data.frame(name=c(P1_NAME, P2_NAME),
                                              Starting=c(df_p1_starting_weight, df_p2_starting_weight),
                                              Target=c(P1_TARGET_WEIGHT, P2_TARGET_WEIGHT),
                                              Ideal=c(P1_IDEAL_WEIGHT, P2_IDEAL_WEIGHT))

df_starting_and_target_weights <- df_starting_and_target_weights %>%
  gather(metric, value, -name) %>%
  mutate(metric = paste0(metric, " Weight"),
         value = as.numeric(value))

# in this section of the code we will do all our data reading, cleaning, wrangling...basically
# everything except the timeseries forecasting bit so that the rest of the sections simply
# charts based on the data analysis done here. The forecasting is left to its own section
# because it is based on user input and so it needs to be done redone whenever the input changes
# setup logging so that traces are shown on the console and in a log file as well
flog.append(flog.append(tee(LOG_FILE), name=LOGGER))

```

```

## NULL

# print the parameters used
flog.info(glue("params used:
                START_DATE={START_DATE},
                DATA_DIR={DATA_DIR},
                P1_NAME={P1_NAME},
                P2_NAME={P2_NAME},
                P1_DATA_FPATH={P1_DATA_FPATH},
                P2_DATA_FPATH={P2_DATA_FPATH},
                CAPTION={CAPTION},
                IMPORTANT_DATES_FNAME={IMPORTANT_DATES_FNAME},
                IMPORTANT_DATES_FPATH={IMPORTANT_DATES_FPATH},
                NUDGE_X={NUDGE_X},
                NUDGE_Y={NUDGE_Y},
                P1_TARGET_WEIGHT={P1_TARGET_WEIGHT},
                P1_WEIGHT_CAP={P1_WEIGHT_CAP},
                P1_WEIGHT_FLOOR={P1_WEIGHT_FLOOR},
                P2_TARGET_WEIGHT={P2_TARGET_WEIGHT},"))

```

```
P2_WEIGHT_CAP={P2_WEIGHT_CAP},
P2_WEIGHT_FLOOR={P2_WEIGHT_FLOOR}" ), name=LOGGER)
```

```
## INFO [2020-09-10 04:07:43] params used:
## START_DATE=2020-02-17,
## DATA_DIR=data,
## P1_NAME=Nidhi,
## P2_NAME=Amit,
## P1_DATA_FPATH=data/Nidhi.csv,
## P2_DATA_FPATH=data/Amit.csv,
## CAPTION=Source: Daily measurements done @home,
## IMPORTANT_DATES_FNAME=important_dates.csv,
## IMPORTANT_DATES_FPATH=https://raw.githubusercontent.com/aarora79/biomettracker/master/data/imp
## NUDGE_X=1,
## NUDGE_Y=5,
## P1_TARGET_WEIGHT=128,
## P1_WEIGHT_CAP=160,
## P1_WEIGHT_FLOOR=120,
## P2_TARGET_WEIGHT=190,
## P2_WEIGHT_CAP=260,
## P2_WEIGHT_FLOOR=180

# read the raw data for person 1, print basic summary and metadata
df_P1 <- read_csv(P1_DATA_URL) %>%
  mutate(name=P1_NAME) %>%
  arrange(Date) %>%
  mutate(Date=ymd(Date)) %>%
  filter(Date >= START_DATE)

## Parsed with column specification:
## cols(
##   Date = col_character(),
##   Weight = col_character(),
##   BMI = col_character(),
##   `Body Fat` = col_character(),
##   `Lean Mass` = col_character(),
##   `Muscle Percentage` = col_character(),
##   `Water Percentage` = col_character()
## )

## Warning: Problem with `mutate()` input `Date`.
## i 2 failed to parse.
## i Input `Date` is `ymd(Date)`.

## Warning: 2 failed to parse.
```

```
flog.info(glue("read data for {P1_NAME} from {P1_DATA_FPATH}, shape of dataframe={nrow  
## INFO [2020-09-10 04:07:43] read data for Nidhi from data/Nidhi.csv, shape of datafram  
flog.info(head(df_P1), name=LOGGER)  
  
## INFO [2020-09-10 04:07:43] c(18309, 18310, 18311, 18312, 18313, 18315)  
## INFO [2020-09-10 04:07:43] c("151.9", "150.36", "149.69", "148.81", "147.49", "148.  
## INFO [2020-09-10 04:07:43] c("28.0", "27.7", "27.5", "27.4", "27.1", "27.3")  
## INFO [2020-09-10 04:07:43] c("32.3", "32.0", "31.8", "31.7", "31.4", "31.5")  
## INFO [2020-09-10 04:07:43] c("102.84", "102.24", "102.09", "101.64", "101.18", "101.  
## INFO [2020-09-10 04:07:43] c("32.0", "32.1", "32.1", "32.1", "32.2", "32.2")  
## INFO [2020-09-10 04:07:43] c("49.4", "49.7", "49.8", "49.9", "50.1", "50.0")  
## INFO [2020-09-10 04:07:43] c("Nidhi", "Nidhi", "Nidhi", "Nidhi", "Nidhi", "Nidhi")  
flog.info(summary(df_P1), name=LOGGER)  
  
## INFO [2020-09-10 04:07:43] Min.    :2020-02-17  
## INFO [2020-09-10 04:07:43] 1st Qu.:2020-04-10  
## INFO [2020-09-10 04:07:43] Median   :2020-06-03  
## INFO [2020-09-10 04:07:43] Mean     :2020-05-31  
## INFO [2020-09-10 04:07:43] 3rd Qu.:2020-07-23  
## INFO [2020-09-10 04:07:43] Max.     :2020-09-08  
## INFO [2020-09-10 04:07:43] Length:240  
## INFO [2020-09-10 04:07:43] Class  :character  
## INFO [2020-09-10 04:07:43] Mode   :character  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] Length:240  
## INFO [2020-09-10 04:07:43] Class  :character  
## INFO [2020-09-10 04:07:43] Mode   :character  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] Length:240  
## INFO [2020-09-10 04:07:43] Class  :character  
## INFO [2020-09-10 04:07:43] Mode   :character  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] Length:240  
## INFO [2020-09-10 04:07:43] Class  :character  
## INFO [2020-09-10 04:07:43] Mode   :character  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA  
## INFO [2020-09-10 04:07:43] NA
```

```
## INFO [2020-09-10 04:07:43] Length:240
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode  :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:240
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode  :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:240
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode  :character
## INFO [2020-09-10 04:07:43] NA

# read the raw data for person 2, ultimately we want to have this dashboard work the same way
# even if there was only person 1 so put the following in an if check
if(!is.na(P2_NAME)) {
  df_P2 <- read_csv(P2_DATA_URL) %>%
    mutate(name=P2_NAME) %>%
    arrange(Date) %>%
    mutate(Date=ymd(Date)) %>%
    filter(Date >= START_DATE)
  flog.info(glue("read data for {P2_NAME} from {P2_DATA_FPATH}, shape of dataframe={nrow(df_P2)}"))
  flog.info(head(df_P2), name=LOGGER)
  flog.info(summary(df_P2), name=LOGGER)
}

## Parsed with column specification:
## cols(
##   Date = col_character(),
##   Weight = col_character(),
##   BMI = col_character(),
##   `Body Fat` = col_character(),
##   `Lean Mass` = col_character(),
##   `Muscle Percentage` = col_character(),
##   `Water Percentage` = col_character()
## )

## Warning: Problem with `mutate()` input `Date`.
## i 2 failed to parse.
## i Input `Date` is `ymd(Date)`.
```

```
## Warning: 2 failed to parse.
```

```
## INFO [2020-09-10 04:07:43] read data for Amit from data/Amit.csv, shape of datafram
## INFO [2020-09-10 04:07:43] c(18309, 18310, 18311, 18312, 18313, 18314)
## INFO [2020-09-10 04:07:43] c("251.33", "248.02", "247.36", "246.48", "246.03", "245
## INFO [2020-09-10 04:07:43] c("38.1", "37.6", "37.5", "37.4", "37.3", "37.2")
## INFO [2020-09-10 04:07:43] c("35.9", "35.5", "35.5", "35.4", "35.3", "35.3")
## INFO [2020-09-10 04:07:43] c("161.1", "159.97", "159.55", "159.22", "159.18", "158.
## INFO [2020-09-10 04:07:43] c("35.6", "35.8", "35.8", "35.8", "35.8", "35.9")
## INFO [2020-09-10 04:07:43] c("46.8", "47.1", "47.1", "47.2", "47.2", "47.2")
## INFO [2020-09-10 04:07:43] c("Amit", "Amit", "Amit", "Amit", "Amit", "Amit")
## INFO [2020-09-10 04:07:43] Min. :2020-02-17
## INFO [2020-09-10 04:07:43] 1st Qu.:2020-04-09
## INFO [2020-09-10 04:07:43] Median :2020-05-30
## INFO [2020-09-10 04:07:43] Mean :2020-05-28
## INFO [2020-09-10 04:07:43] 3rd Qu.:2020-07-15
## INFO [2020-09-10 04:07:43] Max. :2020-09-08
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
```

```

## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Length:220
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA

# read the important dates csv file. This is needed because we would like to annotate this journe
# so that we can say oh right there was an increase in weight for these days and it followed a bi
if(!is.na(IMPORTANT_DATES_FNAME)) {
  important_dates <- read_csv(IMPORTANT_DATES_FPATH)
  flog.info(glue("read data for important dates from {IMPORTANT_DATES_FNAME}",
    shape_of_dataframe={nrow(important_dates)}x{ncol(important_dates)}"), name=LOGGER)
  flog.info(head(important_dates), name=LOGGER)
  flog.info(summary(important_dates), name=LOGGER)
}

## Parsed with column specification:
## cols(
##   label = col_character(),
##   Date = col_date(format = ""),
##   include = col_logical(),
##   name = col_character()
## )

## INFO [2020-09-10 04:07:43] read data for important dates from important_dates.csv,
## shape of dataframe=17x4
## INFO [2020-09-10 04:07:43] c("Nidhi's Birthday", "Aadit's Birthday", "Nidhi's Birthday", "Aadi
## INFO [2020-09-10 04:07:43] c(18380, 18409, 18380, 18409, 18382, 18382)
## INFO [2020-09-10 04:07:43] c(FALSE, FALSE, TRUE, FALSE, TRUE, TRUE)
## INFO [2020-09-10 04:07:43] c("Amit", "Amit", "Nidhi", "Nidhi", "Amit", "Nidhi")
## INFO [2020-09-10 04:07:43] Length:17
## INFO [2020-09-10 04:07:43] Class :character
## INFO [2020-09-10 04:07:43] Mode :character
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] NA
## INFO [2020-09-10 04:07:43] Min. :2020-02-17
## INFO [2020-09-10 04:07:43] 1st Qu.:2020-03-17
## INFO [2020-09-10 04:07:43] Median :2020-04-30

```

```

## [2020-09-10 04:07:43] Mean      :2020-05-10
## [2020-09-10 04:07:43] 3rd Qu.:2020-07-06
## [2020-09-10 04:07:43] Max.     :2020-08-26
## [2020-09-10 04:07:43] Mode  :logical
## [2020-09-10 04:07:43] FALSE:3
## [2020-09-10 04:07:43] TRUE  :14
## [2020-09-10 04:07:43] NA
## [2020-09-10 04:07:43] NA
## [2020-09-10 04:07:43] NA
## [2020-09-10 04:07:43] Length:17
## [2020-09-10 04:07:43] Class  :character
## [2020-09-10 04:07:43] Mode   :character
## [2020-09-10 04:07:43] NA
## [2020-09-10 04:07:43] NA
## [2020-09-10 04:07:43] NA

# combine the dataframes, we want to do a side by side analysis for both people
if(!is.na(df_P2)) {
  df <- bind_rows(df_P1, df_P2)
  (df) %>%
    sample_n(5)
  flog.info(glue("combined data for {P1_NAME} and {P2_NAME}, shape of data is {nrow(df)}"))
} else {
  flog.info(glue("only {P1_NAME} specified, only analyzing data for one person"), name=LOGGER)
  df <- df_P1
}

## Warning in if (!is.na(df_P2)) {: the condition has length > 1 and only the first element is used
## [2020-09-10 04:07:43] combined data for Nidhi and Amit, shape of data is 460x8

# get the data in tidy format i.e. Each variable must have its own column.
# Each observation must have its own row.
# Each value must have its own cell.
# see https://r4ds.had.co.nz/tidy-data.html
flog.info("converting the data to tidy format", name=LOGGER)

## [2020-09-10 04:07:43] converting the data to tidy format

df_tidy <- df %>%
  gather(metric, value, -Date, -name) %>%
  mutate(value=as.numeric(value))
df_tidy %>%
  sample_n(5)

## # A tibble: 5 x 4
##   Date       name metric  value
##   <date>     <chr> <chr>   <dbl>

```

```

## 1 2020-02-20 Amit BMI      37.4
## 2 2020-08-10 Amit Weight   208.
## 3 2020-08-14 Nidhi Lean Mass 95.3
## 4 2020-05-11 Nidhi Weight   137.
## 5 2020-09-07 Nidhi Weight   131.

flog.info(glue("shape of the tidy dataframe is {nrow(df_tidy)}x{ncol(df_tidy)}"), name=LOGGER)

## INFO [2020-09-10 04:07:43] shape of the tidy dataframe is 2760x4
# determine the per day weight loss dataframe by
# calculating loss as weight - the one previous value of weight
# this is done by first grouping the dataframe by name since it has
# data for two people and then arranging by date while maintaining
# the grouping (NOTE: .by_group=TRUE)
df_wt_loss <- df_tidy %>%
  filter(metric=="Weight") %>%
  select(name, Date, value) %>%
  group_by(name) %>%
  arrange(Date, .by_group=TRUE) %>%
  mutate(loss_per_day = -1*(value-lag(value, 1))) %>%
  mutate(loss_per_day_7_day_ma=rollapply(loss_per_day, 7, mean, align='right', fill=NA))
# is the curse of the weekend real? Assign the day to each date so that we can determine
# if say the weight loss eventually after the weekend was very less or maybe not even there...
df_wt_loss <- df_wt_loss %>%
  mutate(day = weekdays(as.Date(Date)))
# determine how much of the weight loss target has been achieved, this is done by finding the stan
# weight (configured), target weight (configured) and seeing how far each person has reached base
# what their current weight is. This percentage is used to display a gauge (like the needle of a
p1_starting_weight <- df_tidy %>% filter(name==P1_NAME & metric=="Weight") %>% head(1) %>% pull(v
p1_latest_weight <- df_tidy %>% filter(name==P1_NAME & metric=="Weight") %>% tail(1) %>% pull(val
# weight loss would be negative when calculated so multiply by -1
p1_wt_lost_as_pct <- -1*100*((p1_latest_weight-p1_starting_weight)/p1_starting_weight)
p2_starting_weight <- df_tidy %>% filter(name==P2_NAME & metric=="Weight") %>% head(1) %>% pull(v
p2_latest_weight <- df_tidy %>% filter(name==P2_NAME & metric=="Weight") %>% tail(1) %>% pull(val
p2_wt_lost_as_pct <- -1*100*((p2_latest_weight-p2_starting_weight)/p2_starting_weight)
p1_target_achieved_pct <- (p1_starting_weight-p1_latest_weight)/(p1_starting_weight-P1_TARGET_WEI
p2_target_achieved_pct <- (p2_starting_weight-p2_latest_weight)/(p2_starting_weight-P2_TARGET_WEI
flog.info(glue("p1_starting_weight={p1_starting_weight}, p1_latest_weight={p1_latest_weight},
                p2_starting_weight={p2_starting_weight}, p2_latest_weight={p2_latest_weight},
                p1_target_achieved_pct={p1_target_achieved_pct}, p2_target_achieved_pct={p2_target_achieved_pct}"))

## INFO [2020-09-10 04:07:43] p1_starting_weight=151.9, p1_latest_weight=130.07,
## p2_starting_weight=251.33, p2_latest_weight=203.49,
## p1_target_achieved_pct=91.3389121338912, p2_target_achieved_pct=78.0042393608348

```

```

# daily weight loss, this is important for a lot of charts and tables
# not the use of group by (name) and then lag. The datafram is already sorted
# in asc order of time, so if the weight is reducing the daily_wt_loss would be a
# -ve number, for several charts and tables this is multiplied with -1 so provide
# the absolute loss
df_daily_wt_loss <- df_tidy %>%
  filter(metric == "Weight") %>%
  group_by(name) %>%
  mutate(daily_wt_loss = value - lag(value))
# how many days did it take for each pound to drop? This is found by finding the max date
# on which each weight (as a whole number, so 230, 229 etc) was seen and then subtracting
# the last date of the previous highest weight. So if 230 was say the 20th pound to drop
# then the number of days between 231 and 230 becomes the number of days it took to lose
df_days_to_next_drop <- df_daily_wt_loss %>%
  mutate(value = floor(value)) %>%
  ungroup() %>%
  group_by(name, value) %>%
  summarize(Date=max(Date)) %>%
  arrange(desc(Date)) %>%
  mutate(value_diff=value-lag(value), days=abs(as.numeric(Date-lag(Date)))) %>%
  replace_na(list(value_diff = 0, days = 0)) %>%
  mutate(value=value-min(value)) %>%
  filter(value != 0)

## `summarise()` regrouping output by 'name' (override with `groups` argument)
# read the precalculated forecasts and target achievement data
# this is needed because shinyapps.io does not support Prophet (in the sense there are no
df_forecast_p1 <- read_csv(P1_FORECAST_FPATH) %>%
  select(y, yhat, yhat_lower, yhat_upper, ds)

## Parsed with column specification:
## cols(
##   ds = col_datetime(format = ""),
##   trend = col_double(),
##   cap = col_double(),
##   floor = col_double(),
##   additive_terms = col_double(),
##   additive_terms_lower = col_double(),
##   additive_terms_upper = col_double(),
##   weekly = col_double(),
##   weekly_lower = col_double(),
##   weekly_upper = col_double(),
##   multiplicative_terms = col_double(),
##   multiplicative_terms_lower = col_double(),
##   multiplicative_terms_upper = col_double(),

```

```

##   yhat_lower = col_double(),
##   yhat_upper = col_double(),
##   trend_lower = col_double(),
##   trend_upper = col_double(),
##   yhat = col_double(),
##   y = col_double()
## )

# convert to xts as that is why dygraph likes
df_forecast_p1 <- xts(df_forecast_p1 %>%
                         select(-ds),
                         order.by = df_forecast_p1$ds)
df_target_achieved_p1 <- read_csv(P1_TARGET_ACHIEVED_FPATH)

## Parsed with column specification:
## cols(
##   date = col_date(format = ""),
##   target = col_double()
## )

df_forecast_p2 <- read_csv(P2_FORECAST_FPATH) %>%
  select(y, yhat, yhat_lower, yhat_upper, ds)

## Parsed with column specification:
## cols(
##   ds = col_datetime(format = ""),
##   trend = col_double(),
##   cap = col_double(),
##   floor = col_double(),
##   additive_terms = col_double(),
##   additive_terms_lower = col_double(),
##   additive_terms_upper = col_double(),
##   weekly = col_double(),
##   weekly_lower = col_double(),
##   weekly_upper = col_double(),
##   multiplicative_terms = col_double(),
##   multiplicative_terms_lower = col_double(),
##   multiplicative_terms_upper = col_double(),
##   yhat_lower = col_double(),
##   yhat_upper = col_double(),
##   trend_lower = col_double(),
##   trend_upper = col_double(),
##   yhat = col_double(),
##   y = col_double()
## )

```

```
df_forecast_p2 <- xts(df_forecast_p2 %>%
                        select(-ds),
                        order.by = df_forecast_p2$ds)
df_target_achieved_p2 <- read_csv(P2_TARGET_ACHIEVED_FPATH)

## Parsed with column specification:
## cols(
##   date = col_date(format = ""),
##   target = col_double()
## )
# read body measurements file
df_measurements <- read_csv(MEASUREMENTS_FPATH)

## Parsed with column specification:
## cols(
##   date = col_date(format = ""),
##   name = col_character(),
##   measurement = col_character(),
##   value = col_double()
## )
df_measurements <- df_measurements %>%
  filter(measurement %in% MEASUREMENTS_TO_KEEP)
flog.info("all done with the initial data read and wrangling", name=LOGGER)

## INFO [2020-09-10 04:07:44] all done with the initial data read and wrangling
```

Preface

This is neither a book on salads, nor a commentary on life. What it is, is a journal of experiences that my wife and me had in our journey towards being fit and strong. Like a salad, day to day life may not be the most appealing lunch option, but just like a good salad if you can keep finding the blueberries every now and again, it is both rewarding and fulfilling. The small and big milestones we achieved during our journey kept us going, just like the blueberries in our salad.

I wanted to write a book documenting our (would be more appropriate to say my) fat to fit journey on a day to day or at least a week by week basis. As things progressed, and I looked around, I realized that we were probably the million'th couple in the world doing this and the Internet was filled with blogs and YouTube videos that document in great detail very successful, inspiring and transformational stories. Why was I wanting to reinvent the wheel by writing our story on the same lines? I realized that while a daily or weekly journal was not something i could do but definitely there were "topics" on which i would like to pen down my thoughts. For example, the most often asked question, "what diet are we following?", "do I really need a trainer?", "just tell me how long would it take to lose 10 pounds" and so on. Therefore I decided to write this book as a collection of essays on these and other related topics.

It has been more than 6 months since we started this journey and I feel that we have learnt so much that it is important to document this first and foremost for our own selves and then also for anyone who might be interested (i hope someone is). After all, it is one thing to see someone famous transform and another thing to see someone you know or could relate to (middle aged Punjabi NRI couple anyone?) do the same and then realize "if they could do it, so can I".

We took daily measurements for our weight and other biometrics and they were automatically synced via an app on our phone. This is huge, daily tracking enables, even forces, conversations around progress (or lack thereof) towards your targets. It keeps you honest and on track. What it also enables is to see the big picture over time, such as are you slowing down, do you need to make adjustments to your routine, how much that elaborate weekend dinner set you back? For me personally, as a data scientist it was fascinating to collect the raw

data, find patterns, gain insights and also get some forecasts done (when would we reach our target weight?).

Over time I understood that while the desire for weight loss was what got me here, but what i was really gaining was good health and strength. To reduce the benefits of what we were doing to just burning calories and losing tens of pounds now seems like a terrible underselling of the idea of fitness. The human body is a fascinating machine capable of wonderful things, good health is a state of both mind and body. Exercise and healthy eating habits help both mind and body. If you do not have any serious health issues there isn't really any excuse for not exercising regularly and eating healthy. As it is said i.e. the body is the instrument of all good deeds.

Finally, nothing in this book should be interpreted as me recommending anything, a written version of my musings is what this is. An experiment with a sample size of N=2 i.e. statistically irrelevant!

How it began. . .

About 3 years ago i.e. in the spring of 2017, I decided to go to the doctor and ask why do I wake up with severe dry mouth every morning? I knew I was grossly over-weight and the dry mouth had started happening a few years ago and the two could be related. I kept ignoring it for years, but it has become bad enough that I sometimes used to wake up very early in the morning because of it and had to rinse my mouth to go back to sleep. The doctor's visit was an eye opener, he said it is most certainly because you are grossly over-weight (i weighed 273 pounds) but asked a few more questions which led him to believe I had all the symptoms of sleep apnea.

TL;DR I did a home sleep apnea test and the results were very damning, he said it was so bad that I should be at the stage of losing short term memory i.e. because the sleep is so disrupted because of lack of oxygen that the brain is not able to make new neural connections that it usually does when we are sleeping. This was happening when I had just joined a masters program in data science at Georgetown University and was now part time at school, 16 years after having completed my engineering degree. With my day job and school homework, my sleep time was anyway much reduced and not getting quality sleep was just bad in so many different ways.

My tryst with a protein based diet

Something had to be done, i got on a weight loss program called "ideal protein" and started sleeping with a CPAP machine. I count those two decisions among the top 5 best decisions of all time I ever took in my life. I followed the ideal protein diet very strictly, of course my dear wife Nidhi was with me in this and she did the diet as well. I started losing weight immediately, sleeping with the CPAP machine was what I would call a life changing experience. I no longer felt like dozing off while driving to college, even if I slept 5 hours (which was 4 days a week) i still woke up refreshed and did not experience the mid afternoon crash in energy. In a couple of months the weight loss, in both me and my wife, was very noticeable and friends and family started asking what are you folks doing.

Everyone is interested in the new diet which their friends are into, expected case of FOMO, i would say. In about 8 to 9 months, i had lost close to 70 pounds and my wife had lost close to 40 pounds, that is pretty drastic by any measure. It was expensive, effective and un-sustainable.

For about 10 months or so till I followed the diet, we were pretty strict about no or as little carbohydrates as possible, and ate a lot of those ideal protein supplements (bars, shakes, snacks etc.). Then came the festival season, new year parties and there it was, the dreaded phase where I thought ok we can get off this horse for a little bit and then get back on when this season is over. No prizes for guessing, it never happened. I still remember my weight had gone down to 202 pounds and I could see it rising back up day after day. I thought ok this is still less than 210, i can pull it back, no problem. Well, not really, soon it was past 210. I told myself, ok but it is not 220, I can pull this back, once it crossed 230 I gave up trying.

I was able to graduate two years later (in 2019), my weight at 240 pounds and the CPAP machine by my bed every night. I did not even go for a weekend getaway without it. The dry mouth was getting back, not as bad though, but it was back, there was no missing it. The sleep was not as good. By end of 2019, i was 250 pounds, the CPAP machine was broken, my wardrobe almost completely redone because none of the clothes fit me anymore and I had given away all the clothes from 2017.

A new begining

Cliched as it is, i made a new year resolution, Jan 2020, i need to fix myself, this cannot continue. Nidhi had also gained weight, not as much as me, but she gained 20 pounds out of the 40 she had lost. She had mentioned to me in Dec 2019 that there was this personal trainer who had dropped in to the Doctor's office (i conveniently skipped to mention that Nidhi became an ideal protein coach and started volunteering in the Doctor's office) and left her card if someone coming in for weight loss wanted to come for a trial class at her gym.

It is said, good things happen when the time is right (ok yes, no one says that, I just made that one up :)). Nidhi left the trainer a message, and we did not hear back from her until a few days later when she said sure we could stop by her gym for a free class. There we were, on January 17th, 2020, in her gym, for what I would call the start of a new chapter in our life.

The gym itself was pretty unassuming, in an extended by disjoint part of her house. I did not think much of it, but little did I know what we were getting into. It needs to be said that prior to this I had never seen the inside of a gym in real life and my only window into how fitness equipment looks like and what trainers do was through films and TV, meaning what I knew was far from reality. I remember asking before the training "so what do you think, how many calories

would we burn during the workout today?” and the answer I got was “oh I don’t know, we don’t count calories here :). “Ok, then” i remember saying to myself. The trainer seemed to be a pleasant person with an infectious smile, the training was good, tiring but not hard and I was like OK, this isn’t too bad.

We decided to enroll for two classes a week. Since we were just starting out and I needed individual attention, we decided why don’t we do a couples package where we would have classes for a month for just the two of us together. She also asked us to fill out a detailed log, as detailed as we could get, of everything we ate or drank for 3 consecutive days. It was not convenient but we scribbled something and gave it to her in the next class. The trainer had a small book that she and her husband had written about her journey with what they called (don’t know it might be a standard term) “clean eating”. There is a 30 day clean eating challenge in which you eat no processed food, no dairy, no pulses, no legumes, no hard drinks and no soft drinks either, only vegetables, fruits and meats are allowed. We decided to do the challenge and made a list of everything we thought we could eat during the challenge and got her to say Yay or Nay on each of those items. The list is in appendix A of this book. It had things commonly found in Indian kitchens like “spices”, “herbs”, different fruits etc. Now that I think about it, i am not sure what made me do the challenge, i just decided to do it just like I decided to workout in the gym twice a week, something that I had never done in almost my 41 years of life. To quote from a famous Hindi film which loosely translated means “when thoughts become deep, intentions become weak”. So there we were, working out twice a week in the gym and decided to go for clean eating in a few weeks time.

What endeared me to the workout sessions was that after a few weeks I noticed both in myself and my wife there was an unmistakable feeling of joy/elation/happiness as we completed a hard training session in the gym. We did loose some pounds but nothing very noticeable. What attracted me to the clean eating was that I could identify with it, it did not claim any magic results, did not ask to give up on the basics i.e. vegetables/fruits/meat in fact it embraced these and only said do not eat processed food. This was the same guidance I had grown up with during my childhood, this was what my grandmother used to say as well, surely this could not go wrong. Surely nothing bad could happen by not eating cakes and cookies, not drinking soft drinks or hard drinks and just basically saying good bye to processed sugar. Made total sense.

So here we were, ready to start and reminding ourselves **that the only way to reach the finish line is to start....** My target was simple i.e. “not to be obese” as per the NIH guidelines, provided <https://www.nhlbi.nih.gov/health-educational/healthdisp/pdf/tipsheets/Are-You-at-a-Healthy-Weight.pdf>. I do not remember the time I was at 158 pounds, i just wanted to be 190 or less so that I would not be adding to the “obese” population of the planet. Nidhi on the other hand was reasonably fit and her goal was pretty close to the NIH guidelines.



Clean Eating

Disclaimer: this is my interpretation of what i understood and did as part of clean eating. I am not aware if there is a standard definition for this and if there is one i do not wish to challenge whatever it is.

Clean eating is not a diet. This is the number one thing i find myself explaining to people when they say “you have lost so much, what diet are you following”. It is simply a decision of saying i am going to keep processed foods and sugars out of my body. Strictly speaking, only if you are eating something you have grown or you have hunted are you eating clean, but then let’s be real here, unless you are living on a farm, this is not feasible. The next best thing we could do is to keep processed food and especially processed sugars out of our body. I dont need to say more on this except that there is tonnes of research available proving why processed food and refined sugars are just plain bad, do yourself a favor stay away from these.

Appendix A contains a checklist of what we confirmed with our trainer was allowed during clean eating. This is pretty exhaustive list. Before i get into the details of exactly what we ate, i would like to address something upfront. Is clean eating hard? Yes it is hard, but only to the extent of saying that nothing that is worthwhile is ever easy. Not being able to eat ice-creams (substitute with your favorite unhealthy snack) is hard, i am not going to lie, but then it is for a fixed period of time and also, nobody ever became unhealthy because they did not eat ice-cream. At the same time, clean eating is also not that hard when i compare it to other diets. The key difference is that you are not counting calories, counting calories is not sustainable, you cannot survive on a 1000 calories a day for long (several months maybe, can you do it for your whole life). Think of it, if counting calories was the solution then some food company would have figured it out and the shelves would be full of some magic food.

The intent of clean eating is to reset your system, recaliberate your taste buds so that they begin to appreciate the natural tastes of different foods. I would know because i am the person who back in India would go (every now and then) for a late evening after dinner ice-cream (a fruit salad sunday to be precise) and then as if that was not sweet enough, go to a kulfi place right after that to top it off. 3 weeks into clean eating i found a papaya to be sweet, grapes to be just

too sweet and eating an orange or two as a 4pm snack seemed delightful.

Indulge me a little bit before we get into the details of breakfast/lunch/dinner. So, when we got married, we went to Europe for our honeymoon and one of the places we visited was the cite of Nice in south of France, absolutely beautiful place, however, we did not quite develop an appreciation for French food, so we were looking for some Indian food or anything that had some spices and was not cold and bland (my apologies to anyone reading and thinking these folks don't know the first thing about French food). We found this Pakistani restaurant by the beach and were delighted to eat some Butter Chicken there. It was not hard to notice that we were from India because Nidhi was still wearing some distinctly Indian (more appropriate to say Indian sub-continent) jewellery. The owner of the restaurant stopped by to talk to us and seeing we were Indian sat down for a conversation. He said, "you know, the French food is the best food in the world", we were listening but not quite agreeing, the butter chicken would not allow me to agree, he continued "back home, we put so much spices in our food, cook it for so long that we never get to know what the ingredients actually tasted like...". Months of eating relatively clean (not strictly, i mean i do eat my ice-cream sometimes, i have had a pizza once or twice in the last 6 months), have made me realize that while i still cannot compare the taste of the Indian cooking with anything else, i do see the point of the natural taste of food. Our elder son likes a green chilly with his dinner, but the younger one does not recognize that "bitter" can also be a taste.

A clean breakfast

Breakfast was mostly eggs, in every form. Egg fry (use Ghee or kerrygold butter), omlette (sometimes with tiny pieces of bacon thrown in), boiled eggs, scrambled eggs or any other variation you can think of. Along with coffee (for me, i am a coffee person) or tea (Nidhi is a tea person) with almond milk or an almond and coconut milk creamer. We do not eat eggs or meat on Tuesdays, so the eggs were replaced with bananas or almond flour pan cakes. Another thing we really enjoyed for breakfast was frozen Acai bowl (you can get them at Costco, just don't eat the granola that comes along with it).

Here are some pictures. I would note that everyday the omlette may not have looked as good but was pretty close. It is real hard work to make breakfast this good everyday and the credit for this is one person's and one person's alone i.e. Nidhi :).

```
# ! [Acai Bowl] ()  
# ! [Almond Flour Pancakes] ()
```



Figure 1: Humble ingredients for the everyday omlette

A lunch we really love

For lunch we used to have salads. I don't know about you but when i think of salads, i have two contrasting pictures in my head as reference (this is all prior to clean eating), one is a cold salad with raw vegetables and boiled eggs, along with some beans and chickpeas, maybe mushrooms as well and the other image is from a salad place like the one i visited often at Georgetown university, exquisite salads with all sorts of "woke" ingredients. The first one was something i just did not find palatable at all and the second one was what i would wait for the whole week so that i could eat it whenever i was at Georgetown for a class. Surely there was some middle ground here, i would think, and there is.

Costco has a bunch of good salad mixtures in their frozen section and they are all very good. We particularly liked the sweet kale salad. So we mixed the sweet kale, with additional ingredients such as spinach or other mixed greens and topped it with sunflower seeds, chia seeds, walnuts (sometimes cashews), some cranberries and my favorite, "blueberries". Used a home made dressing made of olive oil and TBD ingredients. Add a boiled egg, half an avocado and then either some grilled chicken or tuna. For Tuesdays' we substituted chicken/tuna with grilled tofu. Congratulations! you have just made yourself an awesome salad. I am still surprised then even after more than 6 months of eating variants of it (keeping the base receipe the same) 4 to 5 times a week, we are still not bored of it, in fact we seem to like it as much as we liked it before.

One of thoughts i had and i believe many people would have is that salad does not satiate me, it does not full me up. That is actually not true, or was not



Figure 2: The world famous boiled eggs



Figure 3: A workman's breakfast



Figure 4: The everyday salad



Figure 5: The Tuesday salad



Figure 6: The awesome tuna and salmon salad



Figure 7: The I want to eat something special shrimp salad

certainly true for me as i found out. Eating a bowl and a half of salad does indeed fill you up. The test for me was that after my lunch i usually liked to drink hot coffee just to, you know, wash it down, and that need did not go away after switching to salads for lunch. I still like a cup of hot coffee after lunch. What does happen is that after 2 to 3 hours i felt the need for a mid afternoon snack. Previously this could have been any unhealth options like chips, cookies, a diet soda, even a snickers bar, basically anything you would typically find in a vending machine. That had to go, and it did.

The 4pm snack

A couple of small oranges at 4pm felt delightful. They tasted good, and the sugar content provides the boost the brain needs to shake off any mid afternoon lethargy or drowsiness. At times i also ate maybe 4 to 5 apricots, maybe an apple, or even some nuts such as walnuts/cashew nuts/almonds (not those packaged snack pouches please, we want to stay away from any processed food, as much as possible).

I did not try this as much, but sometimes i did had a “tea” such as a earl gray or english breakfast, just a dip tea with hot water, no milk of any kind. It was nice, but me not being a tea person did not pursue it that much but it is certainly an option.

The grand finale a.k.a the dinner

If you try to stick to this routine, you would naturally find that you want to have your dinner early. What is early? For me, growing up, dinner was never before 7.30pm and then later in life as i got caught up with studies and then later at work and other things, it could be at 8 or 9pm or even later. That is not good, in fact, i would now say that is just absolutely unacceptable.

Now we really make an effort to wrap up dinner by 7.30pm, maybe 8pm at the latest. I start feeling hungry around 6pm, so a dinner around 7pm seems like the perfect fit. Eating dinner early helps to naturally avoid the urge for mindless snacking. As one of the people i happen to meet over the years who was into eating healthy said “you are not a goat, you dont have to keep munching all the time!”. One way to avoid munching all the time is to eat at fixed times and eat full meals so that you dont feel hungry anymore. Instead of trying to eat just a little bit and continue what you are doing (whether it is work or anything else around the house) and wait for dinner, which inevitably leads to repeated snacking while waiting for the full meal, it is much easier to just tell your brain, wait for the full meal and then make sure you don’t push off that meal to 2 hours later.

So, what did we have for dinner, lots of different types of food and i would happily say lots of tasty food. There is a lot of grilled food as you would notice. I did not realize this until i wrote this, a lot of our dinner is grilled either outside or in the oven. There are vegetarian options also in this and let me say it for the record the vegetarian options were as tasty as the meats.

The results

The following charts show our progress in terms of weight loss, with the clean eating periods highlighted. We did a clean eating in February-March and then another in July-August.

We saw very good results in both the iterations. The first iteration produced much better results because obviously there was just too much weight to lose, but surprisingly the second iteration was also very effective. The way we see this now is that if we ever hit a really long plateau in the journey to achieve the desired weight we could just toughen our minds and do this again. It cannot hurt.



Figure 8: Grilled Brussel Sprouts



Figure 9: Grilled Chicken Breast



Figure 10: Grilled Shrimp W Rosemerry



Figure 11: Grilled Tofu



Figure 12: Grilled Veggies Chicken Wings And Fish



Figure 13: Grilled Veggies

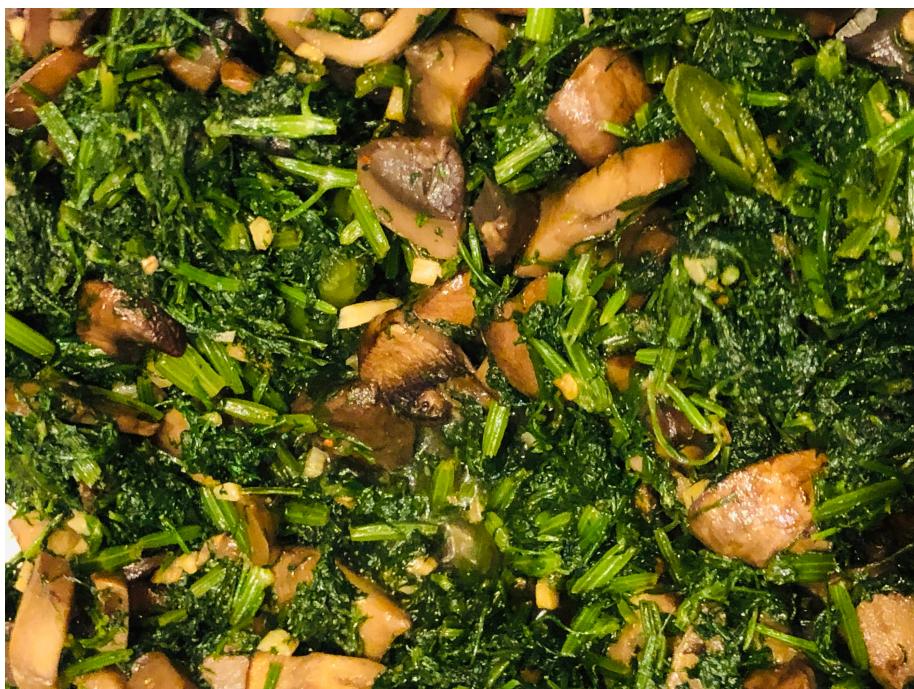


Figure 14: Mushroom W Dill



Figure 15: Potato Onion Tofu W Cauliflower Rice



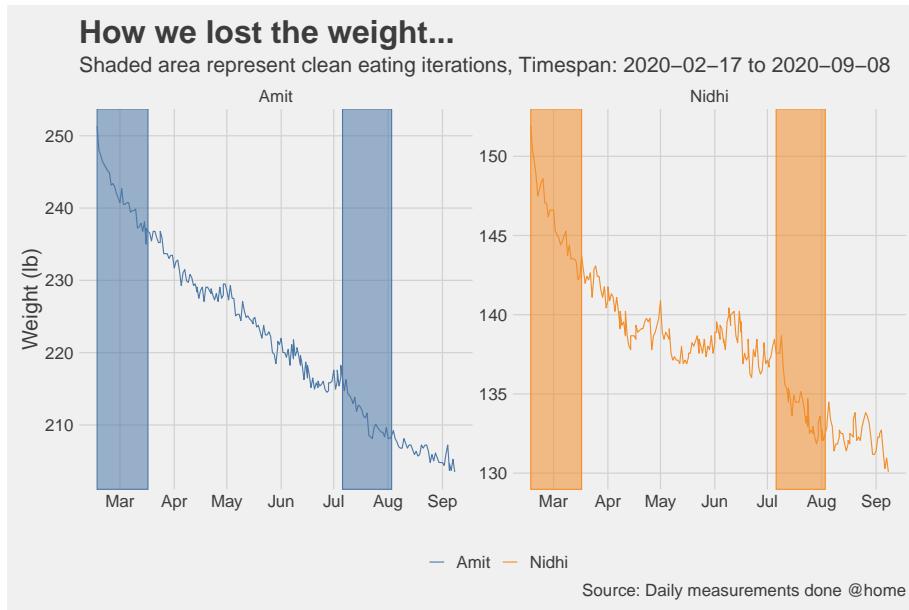
Figure 16: Salmon Fish Fry W Salad



Figure 17: Thai Stir Fry W Chicken

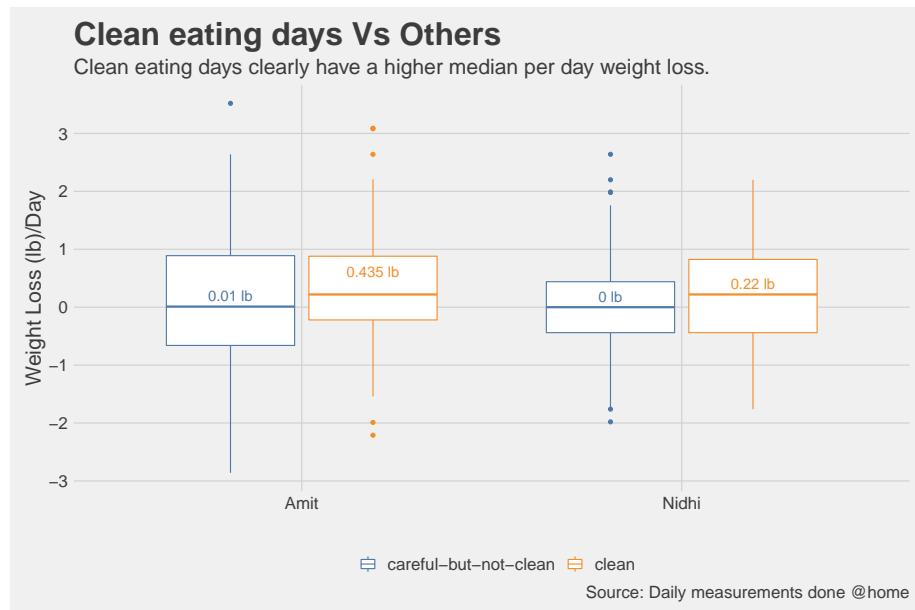


Figure 18: Veggies On The Grill



Here is another chart that compares the weight loss during clean eating and non-clean eating days. Note that even when we were not doing clean eating we were still careful about what we were eating (in other words we were not gorging on Pizzas and butter chicken, soft and hard drinks were still completely off limits).

The chart shows a boxplot representing the spread of the weight loss per day during clean eating periods and non-clean eating periods. The horizontal line inside the box represents the median value of the distribution. For example, I lost at least 0.435 lb per day on 50% of the days during clean eating whereas I only lost at least 0.005 lb on 50% of the days during non-clean eating period. The data for this chart includes both clean eating periods over a timespan from 2020–02–17 to 2020–09–08.



Is the 30 day challenge hard?

I will be blunt here, it is not as hard, certainly I did not feel it was, BUT tedious and tiresome is how i would describe it. The fact that there isn't a restriction on eating vegetables or fruits makes it easier than other diet programs that I know of. It is a given that you are not eating potato fries everyday for lunch or a mango for after dinner dessert every night. What makes it hard is that after the first few days the enthusiasm begins to wane and the new eating habits take some time to become friendly. Once you adjust, both body and mind, to the new eating regimen then it does not feel like a diet at all. It certainly helps to have a goal in mind and keep reminding yourself why are you doing this.

For me, I think after two weeks or so, I could certainly start feeling the benefits, I felt lighter, more energetic (no mid afternoon energy crashes), better quality of sleep, just overall lot of positives. While all this is happening, an interesting incident occurred. We had to be at a friend's place for a birthday dinner, the host was gracious enough to prepare some salads for us and we also took our own food with us. Midway through the party, I suddenly started feeling uncomfortable. The smell (aromas) of all the food and more so the alcoholic drinks made me feel nauseous, I felt like throwing up. Fortunately I did not throw up and we had a very enjoyable evening other than those 30 minutes. I reflected on that later, I was totally fine when we were back home, totally fine the next day as well. It must be that 3 weeks into clean eating the internal circuitry in my body had maybe begun to rewire itself, or so I thought.

Another thought that often came to my mind was that good food is a source of happiness, of joy. The sweet gulps of the mango lassi soothe the soul, the tangy and crisp Gol Gappe tickle the brain, a mooli or carrot or onion paratha satiate the stomach like nothing else, and what even comes close to a butter chicken? This is all true, however, food does not have to be the “only” source of happiness. There is happiness to be derived from good health, from feeling light, awake and agile throughout the day. A round of vigorous exercise resulting in a body drenched in sweat and a rush of endorphins is also happiness. Give it a chance, it will not disappoint you.

What happens after the 30 day challenge?

Several people have asked me, “like other diets, do you go back to your old weight after you stop clean eating?”. My answer is “yes, most certainly” and this should not be a surprise. While I would not call clean eating a “diet”, it is certainly accurate to say that there is no such thing as a “one time fix”. If you want the effects of good things to remain forever, than dont stop doing the good things. I have often heard in other contexts that being fit/healthy/strong requires a lifestyle change. It certainly does. Does it mean we can never eat unhealthy food, no it does not mean that, it means that you first become healthy enough to allow your body the occasional indiscretions and then the morning after you go back to eating healthy and doing excercise.

As our 30 day challenge was coming towards an end I was very much looking forward to eating a lot of fried Indian delicacies, all in one meal. I did that, probably having deprived myself a lot, went a tad bit overboard. The results were not pleasant. After about an hour, i started feeling miserable. I felt bloated, tired, lethargic and sleepy. For a moment I could not understand what was happening, sounds like an exaggeration but I had almost forgotten what it felt like to overeat. Nidhi then pointed out it was probably because of all the food i ate, that made total sense. I felt so full, i did not eat anything in the afternoon, nothing in the evening for dinner either. Next morning i felt much better. This was my body's way of telling me that you do this again and I am going to react to this as if there is an alien invasion and the planet is in danger. Make no mistake, I have not stopped eating that food, I just eat smaller portions of it because I realize that what follows after the 30 minutes of pleasure is 24 hours of unpleasantness.

Exercise: Putting in the hard yards

What we accomplished

Do I Need a Trainer?

Time Restricted Eating

Other Topics

