I've done an experiment regarding package downloads from CRAN (or the RStudio CRAN mirror at least) and now it's time to share the results.

```
library(dplyr)
library(ggplot2)
library(purrr)
library(dlstats)
library(flextable)

flextable_style <- function(x) {
  x %>%
    flextable() %>%
    bold(part = "header") %>% # bold header
    bg(bg = "#D3D3D3", part = "header") %>% # puts gray background
behind the header row
    align_nottext_col(align = "center", header = TRUE, footer = TRUE)
%>% # center alignment
    autofit()
}
```

Introduction

When the first version (0.0.1.0) of `SwimmeR` was released on CRAN in October of 2019 it had very few features – just a couple functions for formatting times and doing course conversions. It also had no web presence, no Swimming + Data Science blog, no particular way for anyone to find out what it was, or what it did, or even that it existed. So imagine my surprise when I checked the package download stats 6 months later and found out `SwimmeR v0.0.1.0` had been downloaded over 1700 times. `SwimmeR` was, and is, a fairly niche package – there just aren't that many people in the world interested in both swimming and `R`, so 1700 seemed like a lot. And remember, `SwimmeR v0.0.1.0` had very few features.

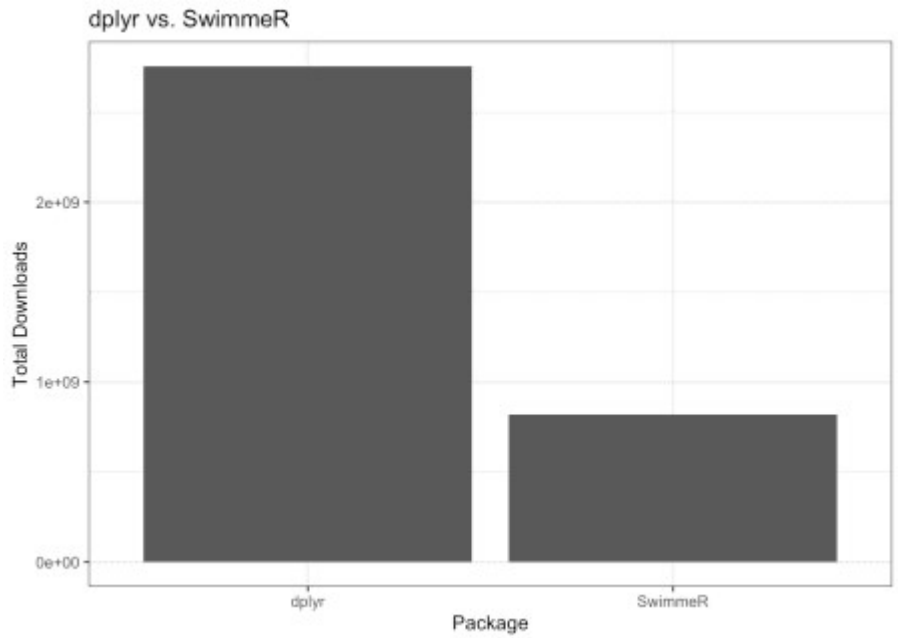
`SwimmeR` has been out for about a year now, has many more features, and a little over 6500 downloads. That's still not many in the grand scheme of things, but it's many more than I ever expected. For comparison here's how `SwimmeR` stacks up versus `dplyr`.

```
df <- cran_stats(c("SwimmeR", "ThreeWiseMonkeys", "dplyr"))

df <- df %>%
  group_by(package) %>%
  mutate(days = cumsum(as.numeric(end - start, units = "days")),
         total_downloads = cumsum(downloads),
         package = as.character(package))

df %>%
  filter(package != "ThreeWiseMonkeys") %>%
  group_by(package) %>%
  ggplot(aes(x = package, y = sum(downloads))) +
  geom_col() +
  labs(y = "Total Downloads",
       x = "Package",
```

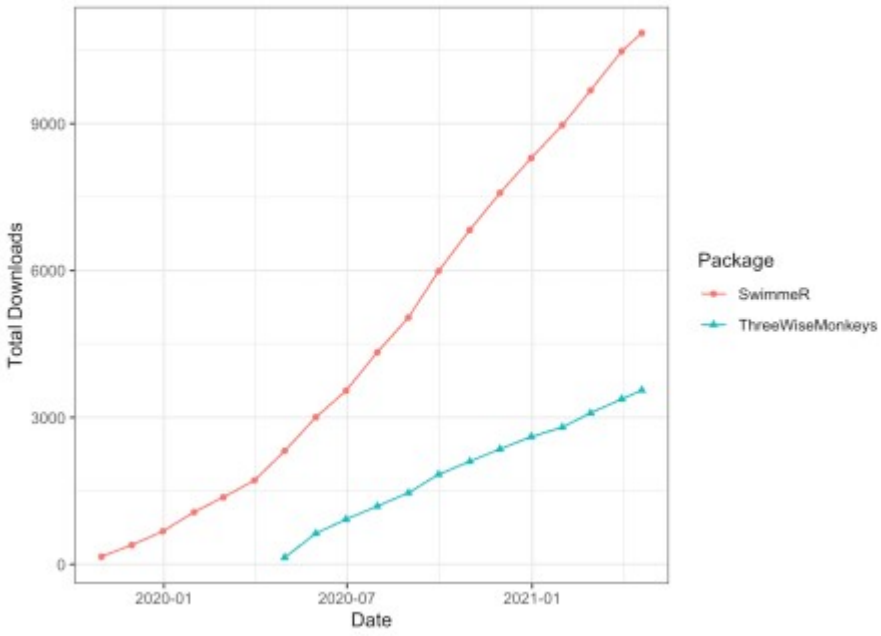
```
       title = "dplyr vs. SwimmeR") +
  theme_bw()
```



Too Many Downloads

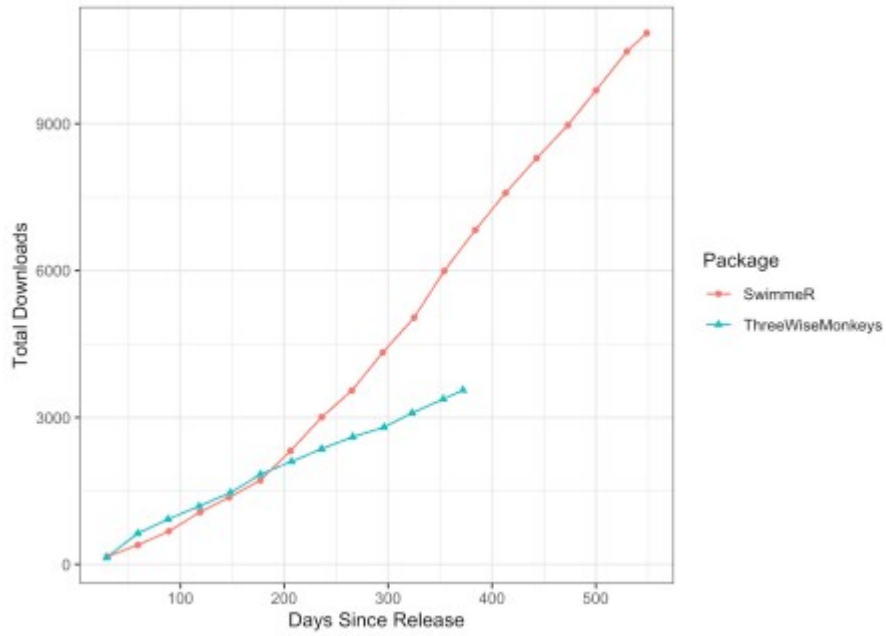
Those initial 1700 downloads for a minimally featured `SwimmeR v0.0.1.0` seemed so excessive that I got suspicious and decided to do an experiment. Allow me to introduce to the world the `ThreeWiseMonkeys` package. The documentation says "[`ThreeWiseMonkeys` d]oes nothing useful…", which is mostly, but not quite, true. The reality is that `ThreeWiseMonkeys` is intended to do nothing useful for its users – the people who download it. I wrote `ThreeWiseMonkeys` in April 2020, released it to CRAN and told no one. What `ThreeWiseMonkeys` has been doing since then is steadily accruing downloads at a rate I'm prepared to call baseline. That's what `ThreeWiseMonkeys` does – it marks out the CRAN downloads floor for me, the (supposedly) only person who knew or cared about it. It has about 2000 downloads as of this writing. Take a look versus `SwimmeR`:

```
df %>%
  filter(package != "dplyr") %>%
  ggplot(aes(
    x = end,
    y = total_downloads,
    group = package,
    color = package
  )) +
  geom_line() +
  geom_point(aes(shape = package)) +
  theme_bw() +
  labs(y = "Total Downloads",
       x = "Date",
       color = "Package",
       shape = "Package")
```



Now if we line up `SwimmeR` and `ThreeWiseMonkeys` by the number of says since their releases we can see something interesting:

```
df %>%
    filter(package != "dplyr") %>%
  ggplot(aes(
    x = days,
    y = total_downloads,
    group = package,
    color = package
  )) +
  geom_line() +
  geom_point(aes(shape = package)) +
  theme_bw() +
  labs(y = "Total Downloads",
       x = "Days Since Release",
       color = "Package",
       shape = "Package")
```



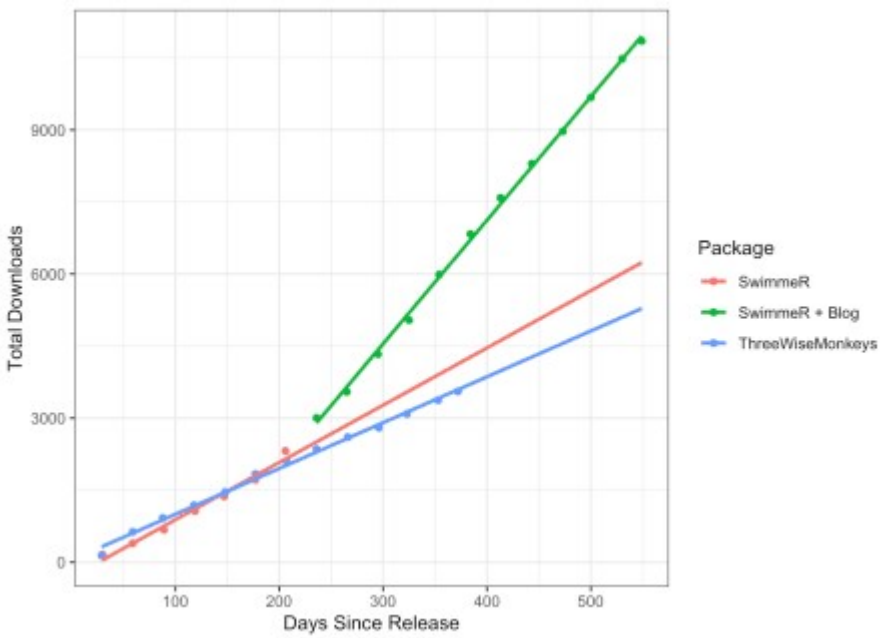
SwimmeR Gets Some PR

What happened around April of 2020, 200 days after `SwimmeR` was released? `SwimmeR` and `ThreeWiseMonkeys` had pretty much identical download rates until then, but all of a sudden `SwimmeR` started trending upward much faster. Well, COVID happened, and maybe folks took to `R` rather than socializing. That's possible but I'm going to set it aside for the moment, because it doesn't explain why `SwimmeR` jumped but `ThreeWiseMonkeys` didn't. As far as `SwimmeR` specific changes in that time range `SwimmeR v0.2.0` was released on April 10th, with many more features, effectively beginning its life as a useful package. Still further, the Swimming + Data Science blog launched and debuted on R-bloggers, introducing the world to `SwimmeR` more directly. Let's take a look at the difference in downloads, with the post April 2020 `SwimmeR` package renamed as `"SwimmeR + Blog"`.

```
df <- df %>%
  filter(package != "dplyr") %>% # don't need dplyr stats any more
  mutate(package = case_when(
    package == "SwimmeR" &
      start > as.Date("2020-04-01") ~ "SwimmeR + Blog", # rename
package for month of April
    TRUE ~ package
  ))

ggplot(data = df, aes(group = package, color = package)) +
  geom_point(aes(
    x = days,
    y = total_downloads
  )) +
  geom_smooth( # fit lines for SwimmeR and ThreeWiseMonkeys (want full
range)
    data = df %>%
      filter(package != "SwimmeR + Blog"),
    aes(x = days,
    y = total_downloads,
```

```
    group = package),
    method = "lm",
    fullrange = TRUE,
    se = FALSE
  ) +
    geom_smooth( # fit line for SwimmeR + Blog (don't want full range
on this one)
    data = df %>%
      filter(package == "SwimmeR + Blog"),
    aes(x = days,
    y = total_downloads,
    group = package),
    method = "lm",
    fullrange = FALSE,
    se = FALSE
  ) +
  scale_x_continuous(breaks = seq(0, 400, 25)) +
  scale_y_continuous(breaks = seq(0, 7000, 1000)) +
  labs(y = "Total Downloads",
       x = "Days Since Release",
       color = "Package") +
  theme_bw()
```



What this means is that of the 6500 downloads SwimmeR has as of October 28th, 2020, about 4000 can be provisionally attributed to whatever this CRAN baseline is. The other ~2500 are more likely to be the result of actual people who share my interests in swimming and `R` – thank you friends, I hope `SwimmeR` is helping you! Now lets get the slope (total downloads per day) for each package and compare download rates for `SwimmeR` before and after the launch of the Swimming + Data Science blog and `v0.2.0`.

```
df %>%
  group_split() %>% # breaks into separate dataframes for each group
(package)
  map(~lm(total_downloads ~ days, data = .x)) %>% # apply lm function
to each dataframe
```

```
  map_df(broom::tidy) %>% # clean up results by converting back to
single dataframe - broom heh heh
  filter(term == "days") %>% # only want the slope term
  mutate(package = unique(df$package)) %>% # add package names back in
  select(package, "download rate" = estimate) %>%
  mutate(slope = round(`download rate`, 2)) %>%
  arrange(desc(slope)) %>%
  flextable_style()
```

package	download rate	slope
SwimmeR + Blog	25.85800	25.86
SwimmeR	11.77588	11.78
ThreeWiseMonkeys	10.55745	10.56

The download rate for `SwimmeR` more than doubled (as of October 28th, 2020) after I started writing these articles and building out the package features – exactly what I was looking for! What's the deal with `ThreeWiseMonkeys` and its 2000 downloads though?

The Remaining Mystery

The `dlstats` package I used to collect download information queries the RStudio CRAN mirror. RStudio's mirror is the default for RStudio users when they download packages, but if anything the numbers from `dlstats` are an undercount for total package downloads. There are other mirrors, and other development environments for `R` and people can download packages using them rather than RStudio. That still leaves some questions.

1. Who are these 2000+ people who downloaded `ThreeWiseMonkeys` and are they the same as the 1700+ people who downloaded `SwimmeR v0.0.1.0`?
2. How did they even know `ThreeWiseMonkeys` existed? I know that CRAN lists it and all, but how would people know to look?
3. Why did they download `ThreeWiseMonkeys` even having found it? It's useless!

It seems possible that there's some kind of maintenance/testing/checks that goes on in the background at CRAN, but I'm not aware of anything that would require the same (useless) package to be re-downloaded 10 times a day, every day, for 6 months. If you have any insight into what's going on leave a comment or send me an email. I'm interested to know… Also don't go and download `ThreeWiseMonkeys` – that's not what it's about. It's useless – trust me.