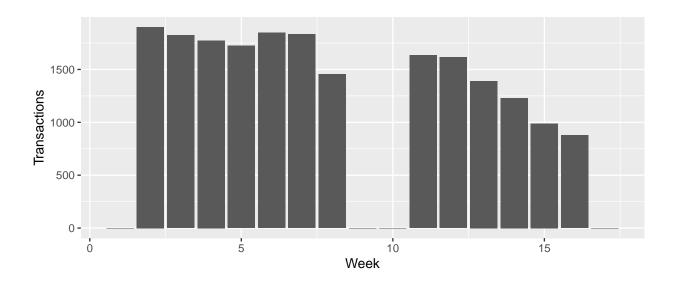
Mental Accounting in College: Students and 'Free Money'

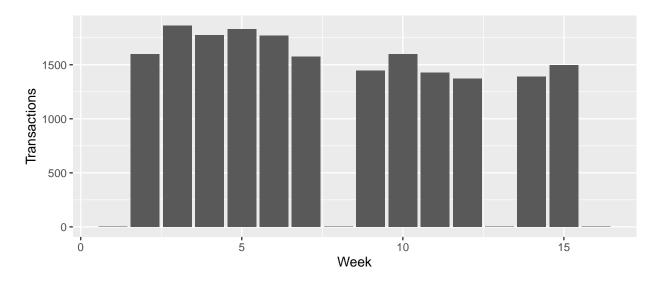
Connor Woods April 2, 2020

Spring Semester Dates Campus Open: 1/20/19, Start: 1/22/19, End: 5/8/19, Campus Closed: 5/20/19 Fall Semester Dates Campus Open: 8/31/19 Start: 9/3/19, End: 12/11/19, Campus Closed: 12/21/19

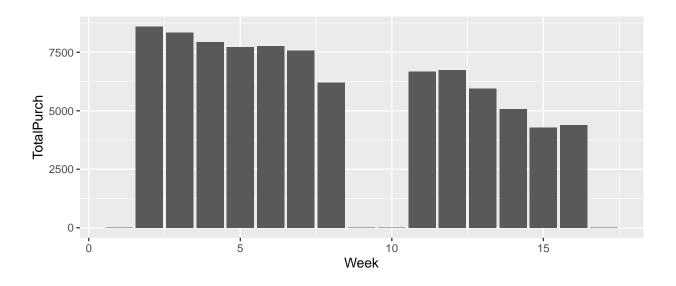
```
flex_data <- read_csv("flex_data.csv")
flex_data <- flex_data %>% mutate(Time = mdy_hm(Time)) %>% mutate(Week = epiweek(Time)) %>% rename(Amount flex_data <- flex_data %>% filter(Time >= '2019-01-20' & Time <= '2019-12-19') %>% filter(Amount Spent)
#Transactions by week
springtrans <- flex_data %>% filter(Time <= '2019-5-19') %>% mutate(Week = Week-3) %>% filter(Week!=1 & falltrans <- flex_data %>% filter(Time >= '2019-9-1') %>% mutate (Week = Week-35) %>% filter(Week!=1 & falltrans actions <- springtrans %>% group_by(Week) %>% summarize(Transactions = n()) %>% rbind(c(1,0))
falltransactions <- falltrans %>% group_by(Week) %>% summarize(Transactions = n()) %>% rbind(c(1,0)), c
ggplot(springtransactions) + geom_bar(aes(x=Week, y=Transactions), stat='identity')
```



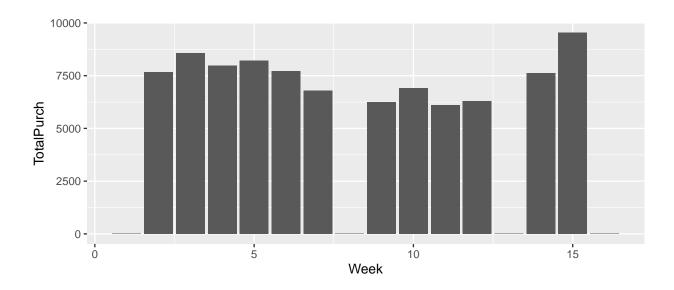
```
ggplot(falltransactions) + geom_bar(aes(x=Week, y=Transactions), stat='identity')
```



```
#Purchases by week
springpurchases <- springtrans %>% group_by(Week) %>% summarize(TotalPurch = sum(AmountSpent)) %>% rbin
fallpurchases <- falltrans %>% group_by(Week) %>% summarize(TotalPurch = sum(AmountSpent)) %>% rbind(c(
ggplot(springpurchases) + geom_bar(aes(x=Week, y=TotalPurch), stat='identity')
```

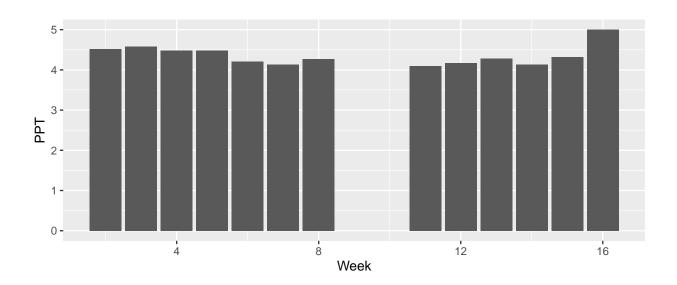


ggplot(fallpurchases) + geom_bar(aes(x=Week, y=TotalPurch), stat='identity')

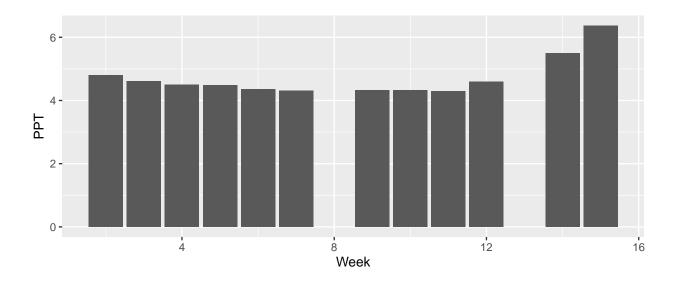


#Amount Spent Per Transaction

```
springppt <- springtrans %>% group_by(Week) %>% summarize(TotalTrans = n(), TotalPurch = sum(AmountSpent fallppt <- falltrans %>% group_by(Week) %>% summarize(TotalTrans = n(), TotalPurch = sum(AmountSpent)) '
ggplot(springppt) + geom_bar(aes(x=Week, y=PPT), stat='identity')
```

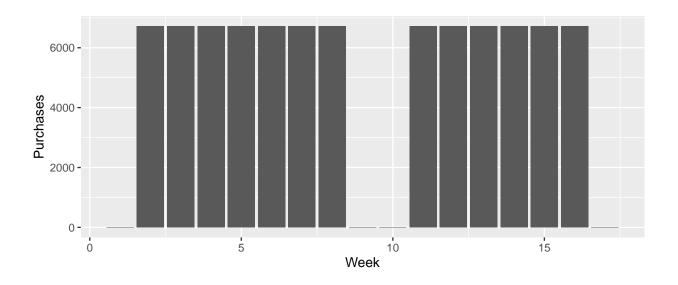


ggplot(fallppt) + geom_bar(aes(x=Week, y=PPT), stat='identity')

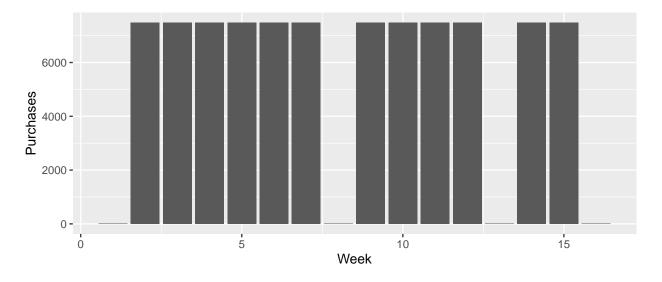


$\#Creation\ of\ consistent\ null\ dataframes$

```
sprnullconsistent <- data.frame("Week"=1:17, "Transactions"= c(0,sum(springppt$TotalTrans)/13,sum(springspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspringspri
```

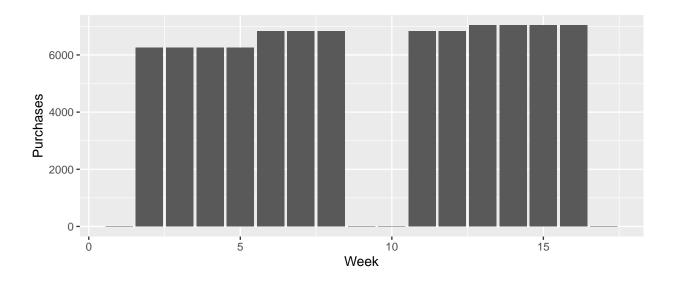


ggplot(fallnullconsistent) + geom_bar(aes(x=Week, y=Purchases), stat='identity')

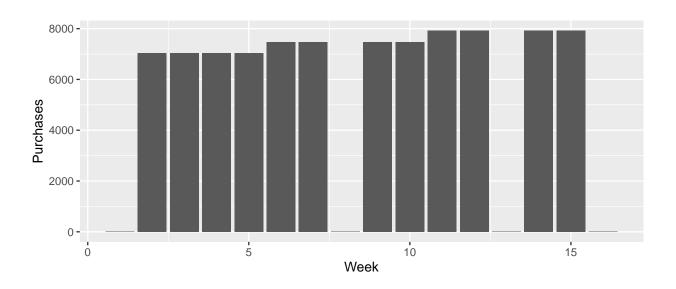


```
#285/518=55.02% of students believe they spend consistently (1/3 beginning, 1/3 middle, 1/3 end)
#86/518=16.60% of students believe they spend most in beginning (1/2 beginning, 1/3 middle, 1/6 end)
#147/518=28.38% of students believe they spend most at end (1/6 beginning, 1/3 middle, 1/2 end)
#Tested - Sums of spring/fall weighted expectation nulls add up to sum of purchases/transactions from s
#Note - each period represents total spending expected during that period, then divided by number of we
p1springtrans <- (.5502*sum(springppt$TotalTrans)*(1/3) + .1660*sum(springppt$TotalTrans)*(1/2) + .2838
p2springtrans <- (.5502*sum(springppt$TotalTrans)*(1/3) + .1660*sum(springppt$TotalTrans)*(1/3) + .2838
p3springtrans <- (.5502*sum(springppt$TotalTrans)*(1/3) + .1660*sum(springppt$TotalTrans)*(1/6) + .2838
p1springpurch <- (.5502*sum(springppt$TotalPurch)*(1/3) + .1660*sum(springppt$TotalPurch)*(1/2) + .2838
p2springpurch <- (.5502*sum(springppt$TotalPurch)*(1/3) + .1660*sum(springppt$TotalPurch)*(1/3) + .2838
p3springpurch <- (.5502*sum(springppt$TotalPurch)*(1/3) + .1660*sum(springppt$TotalPurch)*(1/6) + .2838
p1springprob <- (.5502*(1/3) + .1660*(1/2) + .2838*(1/6))*.913
p2springprob <- (.5502*(1/3) + .1660*(1/3) + .2838*(1/3))*1.174
p3springprob < (.5502*(1/3) + .1660*(1/6) + .2838*(1/2))*.913
sprnullweighted <- data.frame("Week"=1:17, "Transactions"= c(0,p1springtrans/4,p1springtrans/4,p1spring
sprnullweightedprob <- data.frame("Week"=1:17, "Probability"= c(0,p1springprob/4,p1springprob/4,p1springprob/4)
p1falltrans <- .5502*sum(fallppt$TotalTrans)*(1/3) + .1660*sum(fallppt$TotalTrans)*(1/2) + .2838*sum(fa
p2falltrans <- .5502*sum(fallppt\$TotalTrans)*(1/3) + .1660*sum(fallppt\$TotalTrans)*(1/3) + .2838*sum(fallppt\$TotalTrans)*(1/3) + .2838*sum(fallppt\$TotalTrans)*(1/3) + .2838*sum(fallppt\$TotalTrans)*(1/3) + .2838*sum(fallppt\$TotalTrans)*(1/3) + .2838*sum(fallppt\$TotalTrans)*(1/3) + .2838*sum(fallppt$TotalTrans)*(1/3) + .2838*sum(fallp
p3falltrans <- .5502*sum(fallppt$TotalTrans)*(1/3) + .1660*sum(fallppt$TotalTrans)*(1/6) + .2838*sum(fa
p1fallpurch <- .5502*sum(fallppt$TotalPurch)*(1/3) + .1660*sum(fallppt$TotalPurch)*(1/2) + .2838*sum(fallpurch)*(1/2) + .2838*sum(
p2fallpurch <- .5502*sum(fallppt\$TotalPurch)*(1/3) + .1660*sum(fallppt\$TotalPurch)*(1/3) + .2838*sum(fallppt\$TotalPurch)*(1/3) + .2838*sum(fallppt\takebbarket)*(1/3) + .2838*sum(fallppt\takebbarket)*(1
p3fallpurch <- .5502*sum(fallppt$TotalPurch)*(1/3) + .1660*sum(fallppt$TotalPurch)*(1/6) + .2838*sum(fallppt$TotalPurch)*(1/6) + .2838*sum(fallpurch)*(1/6) + .28
p1fallprob <- .5502*(1/3) + .1660*(1/2) + .2838*(1/6)
p2fallprob <- .5502*(1/3) + .1660*(1/3) + .2838*(1/3)
p3fallprob <- .5502*(1/3) + .1660*(1/6) + .2838*(1/2)
fallnullweighted <- data.frame("Week"=1:16, "Transactions"= c(0,p1falltrans/4,p1falltrans/4,p1falltrans
```

```
fallnullweightedprob <- data.frame("Week"=1:16, "Probability"= c(0,p1fallprob/4,p1fallprob/4,p1fallprob/ggplot(sprnullweighted) + geom_bar(aes(x=Week, y=Purchases), stat='identity')
```



ggplot(fallnullweighted) + geom_bar(aes(x=Week, y=Purchases), stat='identity')



Chi Squared Models

```
#Two Nulls Against One Another
chisq.test(sprnullweighted$Transactions, sprnullconsistentprob$Probability, simulate.p.value = TRUE)
```

##
Pearson's Chi-squared test with simulated p-value (based on 2000

```
## replicates)
##
## data: sprnullweighted$Transactions and sprnullconsistentprob$Probability
## X-squared = 17, df = NA, p-value = 0.0009995
chisq.test(sprnullweighted$Purchases, sprnullconsistentprob$Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: sprnullweighted$Purchases and sprnullconsistentprob$Probability
## X-squared = 17, df = NA, p-value = 0.002499
chisq.test(fallnullweighted$Transactions, fallnullconsistentprob$Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: fallnullweighted$Transactions and fallnullconsistentprob$Probability
## X-squared = 16, df = NA, p-value = 0.001499
chisq.test(fallnullweighted$Purchases, fallnullconsistentprob$Probability, simulate.p.value = TRUE)
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: fallnullweighted$Purchases and fallnullconsistentprob$Probability
## X-squared = 16, df = NA, p-value = 0.003998
#Spring Transactions Chi Squared
chisq.test(springtransactions $Transactions, sprnullconsistentprob $Probability, simulate.p.value = TRUE)
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: springtransactions$Transactions and sprnullconsistentprob$Probability
## X-squared = 17, df = NA, p-value = 0.3018
chisq.test(springtransactions $Transactions, sprnullweightedprob $Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: springtransactions$Transactions and sprnullweightedprob$Probability
## X-squared = 51, df = NA, p-value = 0.004498
```

```
#Spring Purchases Chi Squared
chisq.test(springpurchases$TotalPurch, sprnullconsistentprob$Probability, simulate.p.value = TRUE)
##
##
   Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: springpurchases$TotalPurch and sprnullconsistentprob$Probability
## X-squared = 17, df = NA, p-value = 0.2984
chisq.test(springpurchases$TotalPurch, sprnullweightedprob$Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
##
## data: springpurchases$TotalPurch and sprnullweightedprob$Probability
## X-squared = 51, df = NA, p-value = 0.004498
#Fall Transactions Chi Squared
chisq.test(falltransactions$Transactions, fallnullconsistentprob$Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
## data: falltransactions$Transactions and fallnullconsistentprob$Probability
## X-squared = 16, df = NA, p-value = 0.2679
chisq.test(falltransactions$Transactions, fallnullweightedprob$Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
##
## data: falltransactions$Transactions and fallnullweightedprob$Probability
## X-squared = 48, df = NA, p-value = 0.001499
#Fall Purchases Chi Squared
chisq.test(fallpurchases$TotalPurch, fallnullconsistentprob$Probability, simulate.p.value = TRUE)
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
##
## data: fallpurchases$TotalPurch and fallnullconsistentprob$Probability
## X-squared = 16, df = NA, p-value = 0.2724
```

chisq.test(fallpurchases\$TotalPurch, fallnullweightedprob\$Probability, simulate.p.value = TRUE)

```
##
## Pearson's Chi-squared test with simulated p-value (based on 2000
## replicates)
##
## data: fallpurchases$TotalPurch and fallnullweightedprob$Probability
## X-squared = 48, df = NA, p-value = 0.004498
```