Mental Accounting in College: Students and 'Free Money'

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Spring Semester Dates Campus Open: 1/20/19, Start: 1/22/19, End: 5/8/19, Campus Closed: 5/20/19

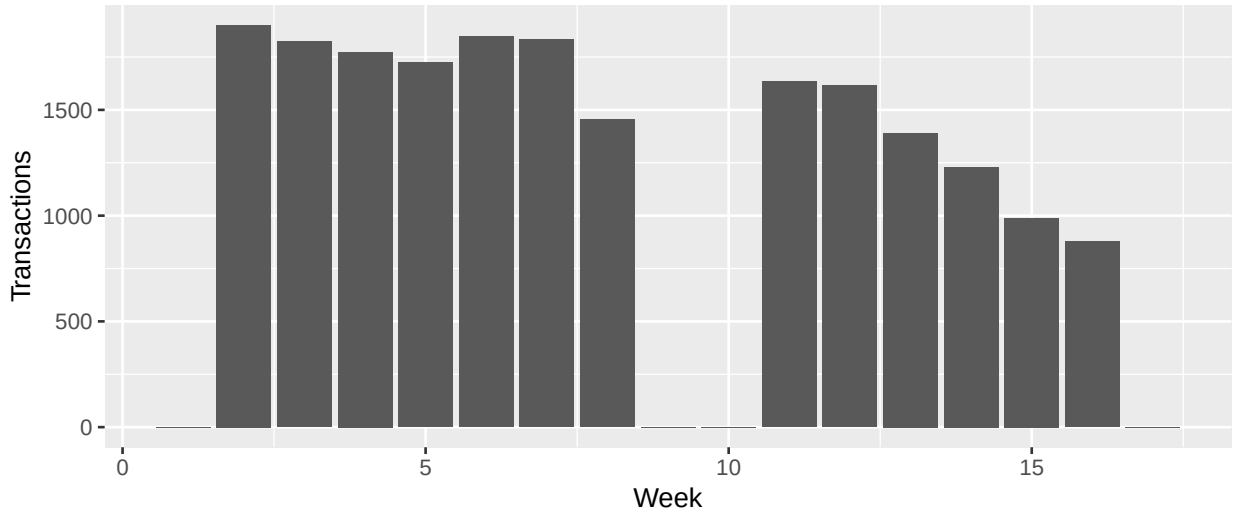
Fall Semester Dates Campus Open: 8/31/19 Start: 9/3/19, End: 12/11/19, Campus Closed: 12/21/19

```
flex_data <- read_csv("flex_data.csv")
flex_data <- flex_data %>% mutate(Time = mdy_hm(Time)) %>% mutate(Week = epiweek(Time)) %>% rename(Amou
flex_data <- flex_data %>% filter(Time >= '2019-01-20' & Time <= '2019-12-19') %>%  filter(AmountSpent
```

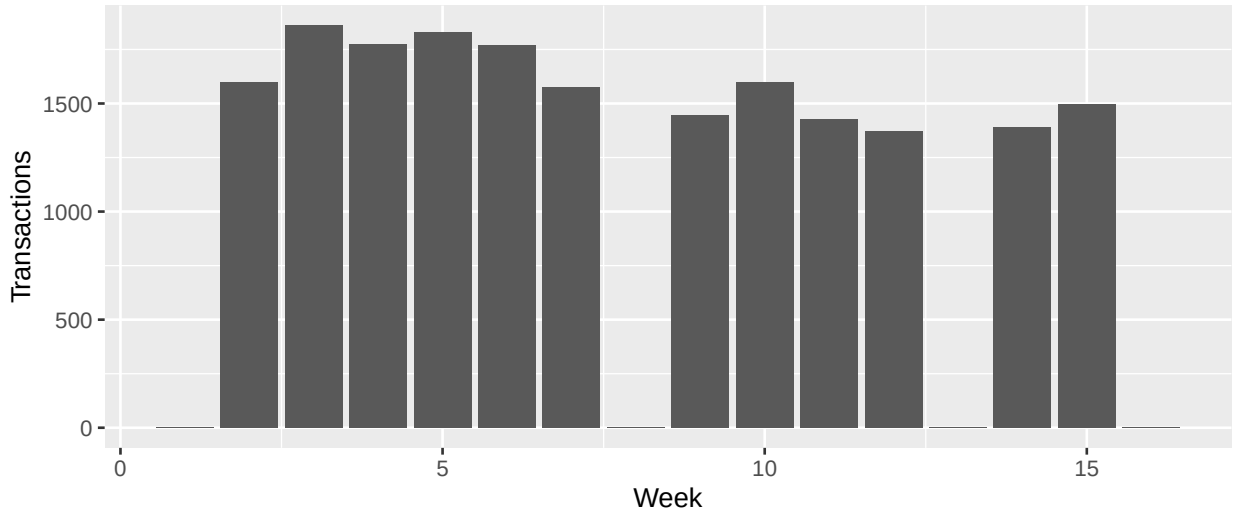
```
#Transactions by week
springtrans <- flex_data %>% filter(Time <= '2019-5-19') %>% mutate(Week = Week-3) %>% filter(Week!=1 &
falltrans <- flex_data %>% filter(Time >= '2019-9-1') %>% mutate (Week = Week-35) %>% filter(Week!=1 &

springtransactions <- 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')
```

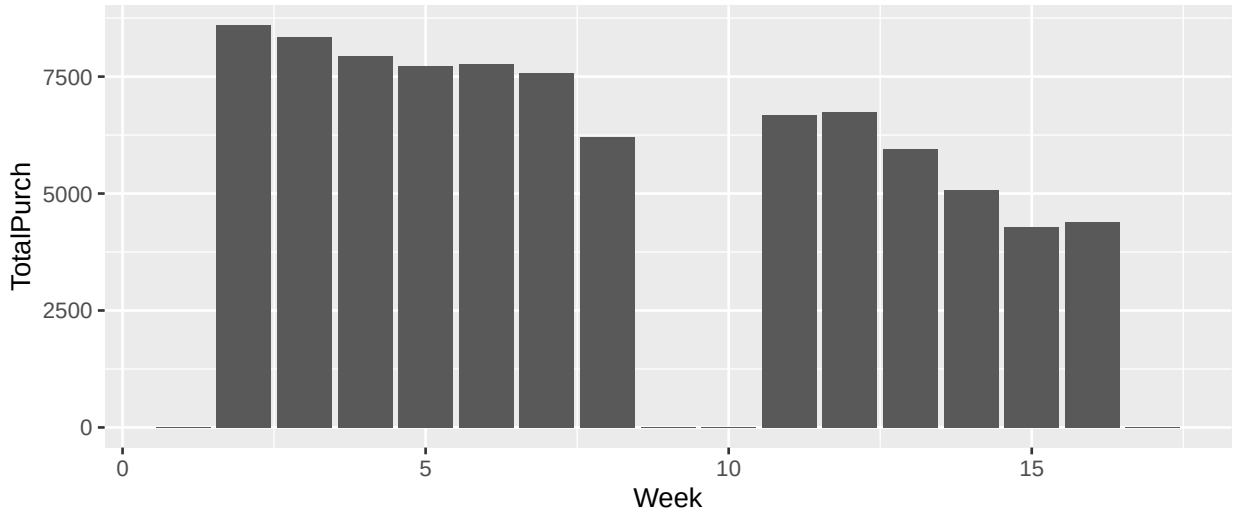



```
ggplot(falltransactions) + geom_bar(aes(x=Week, y=Transactions), stat='identity')
```

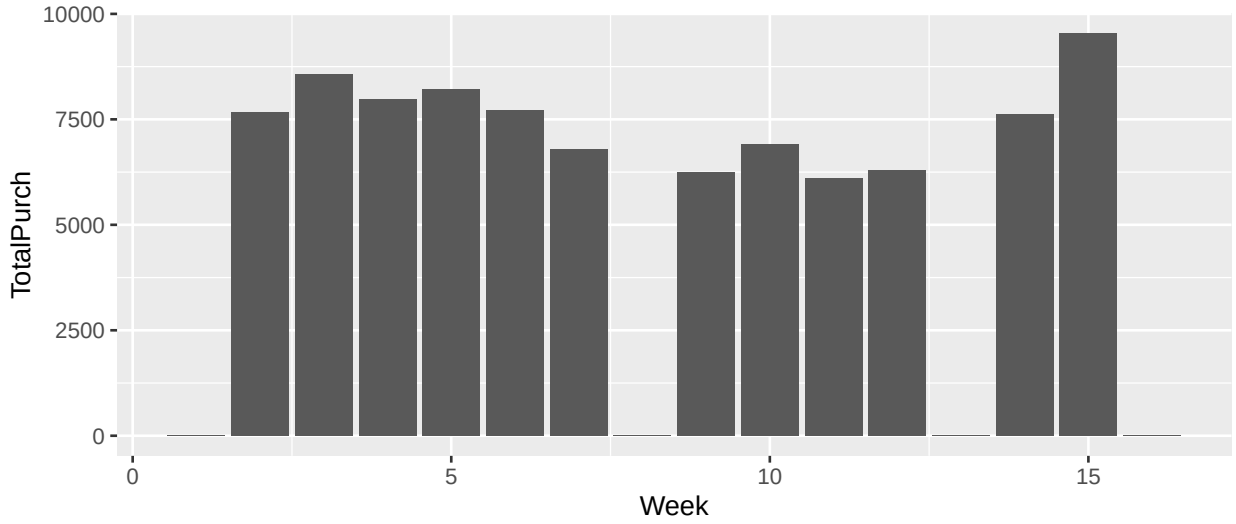



```
#Purchases by week
springpurchases <- springtrans %>% group_by(Week) %>% summarize(TotalPurch = sum(AmountSpent)) %>% rbin
fallpurchases <- falltrans %>% group_by(Week) %>% summarize(TotalPurch = sum(AmountSpent)) %>% rbind(c(

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

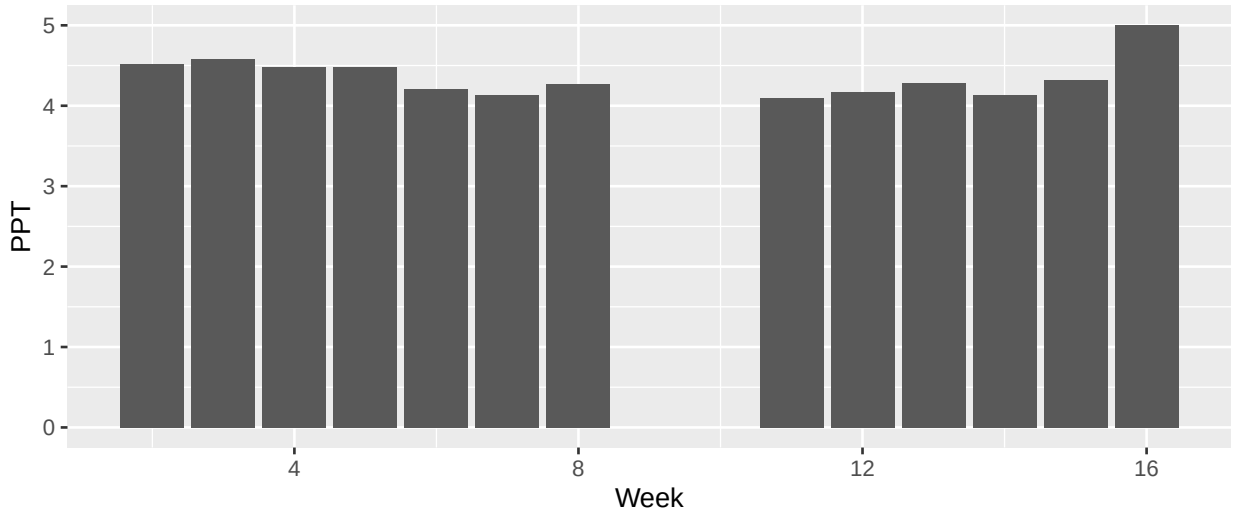



```
ggplot(fallpurchases) + geom_bar(aes(x=Week, y=TotalPurch), stat='identity')
```

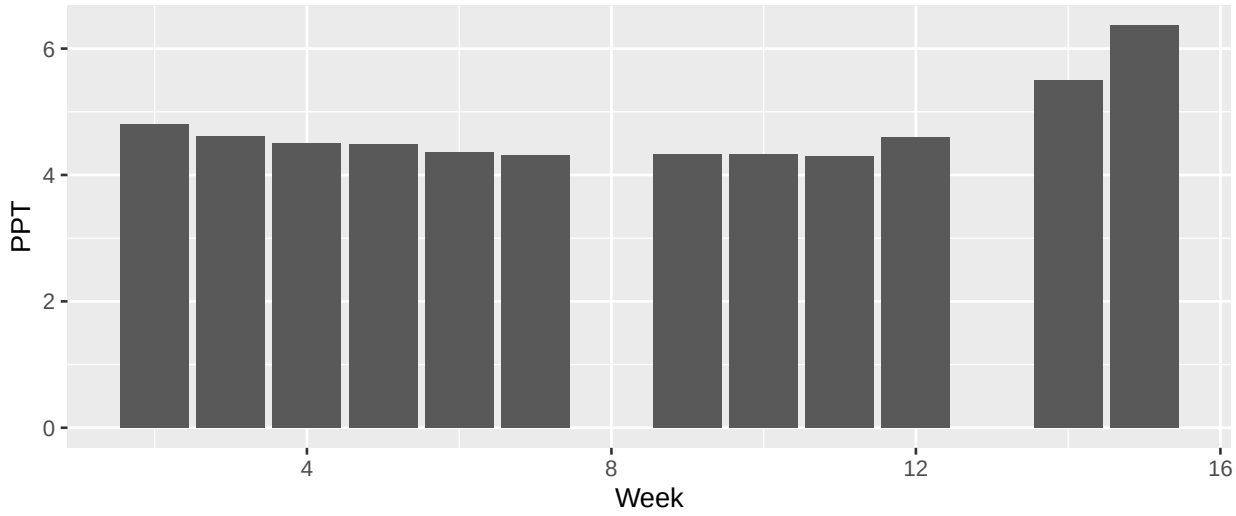



```
#Amount Spent Per Transaction
springppt <- springtrans %>% group_by(Week) %>% summarize(TotalTrans = n(), TotalPurch = sum(AmountSpen
fallppt <- falltrans %>% group_by(Week) %>% summarize(TotalTrans = n(), TotalPurch = sum(AmountSpent))

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(spri

sprnullconsistent <- data.frame("Week"=1:17, "Probability"=c(0,1/13,1/13,1/13,1/13,1/13,1/13,1/13,1/13,0,0,1,

#fallnullconsistent <- data.frame("Week"=1:16, "Transactions"= c(0,sum(fallppt$TotalTrans)/12,sum(fallp

fallnullconsistent <- data.frame("Week"=1:16, "Probability"=c(0,1/12,1/12,1/12,1/12,1/12,1/12,0,1/12,1/

#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,p1sprin

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(fa
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(fal
p2fallpurch <- .5502*sum(fallppt$TotalPurch)*(1/3) + .1660*sum(fallppt$TotalPurch)*(1/3) + .2838*sum(fal
p3fallpurch <- .5502*sum(fallppt$TotalPurch)*(1/3) + .1660*sum(fallppt$TotalPurch)*(1/6) + .2838*sum(fal

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,
```

Chi Squared Models

```
#Two Nulls Against One Another
sprnullweighted
```

```
##    Week Transactions Purchases
## 1     1        0.000     0.000
## 2     2     1438.556  6250.852
## 3     3     1438.556  6250.852
## 4     4     1438.556  6250.852
## 5     5     1438.556  6250.852
## 6     6     1572.456  6832.675
## 7     7     1572.456  6832.675
## 8     8     1572.456  6832.675
## 9     9        0.000     0.000
## 10   10        0.000     0.000
## 11   11     1572.456  6832.675
## 12   12     1572.456  6832.675
## 13   13     1618.624  7033.288
## 14   14     1618.624  7033.288
## 15   15     1618.624  7033.288
## 16   16     1618.624  7033.288
## 17   17        0.000     0.000
```

```
fallnullweighted
```

```
##    Week Transactions Purchases
## 1     1        0.000     0.000
## 2     2     1500.427  7035.479
## 3     3     1500.427  7035.479
## 4     4     1500.427  7035.479
## 5     5     1500.427  7035.479
## 6     6     1594.333  7475.803
## 7     7     1594.333  7475.803
## 8     8        0.000     0.000
## 9     9     1594.333  7475.803
## 10   10     1594.333  7475.803
## 11   11     1688.240  7916.128
## 12   12     1688.240  7916.128
## 13   13        0.000     0.000
```

```
## 14   14     1688.240  7916.128
## 15   15     1688.240  7916.128
## 16   16        0.000     0.000
```

```
chisq.test(sprnullweighted$Transactions, sprnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  sprnullweighted$Transactions and sprnullconsistent$Probability
## X-squared = 17, df = 3, p-value = 0.0007067
```

```
chisq.test(sprnullweighted$Purchases, sprnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  sprnullweighted$Purchases and sprnullconsistent$Probability
## X-squared = 17, df = 3, p-value = 0.0007067
```

```
chisq.test(fallnullweighted$Transactions, fallnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  fallnullweighted$Transactions and fallnullconsistent$Probability
## X-squared = 16, df = 3, p-value = 0.001134
```

```
chisq.test(fallnullweighted$Purchases, fallnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  fallnullweighted$Purchases and fallnullconsistent$Probability
## X-squared = 16, df = 3, p-value = 0.001134
```

```
#Spring Transactions Chi Squared
chisq.test(springtransactions$Transactions, sprnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  springtransactions$Transactions and sprnullconsistent$Probability
## X-squared = 17, df = 13, p-value = 0.1993
```

```
chisq.test(springtransactions$Transactions, sprnullweightedprob$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  springtransactions$Transactions and sprnullweightedprob$Probability
## X-squared = 51, df = 39, p-value = 0.09445
```

```r
#Spring Purchases Chi Squared
chisq.test(springpurchases$TotalPurch, sprnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  springpurchases$TotalPurch and sprnullconsistent$Probability
## X-squared = 17, df = 13, p-value = 0.1993
```

```r
chisq.test(springpurchases$TotalPurch, sprnullweightedprob$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  springpurchases$TotalPurch and sprnullweightedprob$Probability
## X-squared = 51, df = 39, p-value = 0.09445
```

```r
#Fall Transactions Chi Squared
chisq.test(falltransactions$Transactions, fallnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  falltransactions$Transactions and fallnullconsistent$Probability
## X-squared = 16, df = 12, p-value = 0.1912
```

```r
chisq.test(falltransactions$Transactions, fallnullweightedprob$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  falltransactions$Transactions and fallnullweightedprob$Probability
## X-squared = 48, df = 36, p-value = 0.08713
```

```r
#Fall Purchases Chi Squared
chisq.test(fallpurchases$TotalPurch, fallnullconsistent$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  fallpurchases$TotalPurch and fallnullconsistent$Probability
## X-squared = 16, df = 12, p-value = 0.1912
```

```r
chisq.test(fallpurchases$TotalPurch, fallnullweightedprob$Probability)
```

```
##
##  Pearson's Chi-squared test
##
## data:  fallpurchases$TotalPurch and fallnullweightedprob$Probability
## X-squared = 48, df = 36, p-value = 0.08713
```