

The Association of Self-Efficacy, Anxiety Sensitivity, and Self-Critical Perfectionism with Statistics and Math Anxiety

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2025-08-22

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr      1.1.4      v readr      2.1.5
## v forcats    1.0.0      v stringr   1.5.1
## v ggplot2    3.5.2      v tibble    3.2.1
## v lubridate  1.9.4      v tidyr     1.3.1
## v purrr      1.0.4
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(car)
```

```
## Loading required package: carData
##
## Attaching package: 'car'
##
## The following object is masked from 'package:dplyr':
##
##   recode
##
## The following object is masked from 'package:purrr':
##
##   some
```

```
library(stringr)
```

```
df <- read.csv("/Users/ethanchu/Downloads/anxiety.csv")
```

```
head(df)
```

```
##   program.type age ethnicity.r      major se.1 se.2 se.3 se.4 se.5 se.6
## 1           0  21         White Psychology    4    3    4    4    4    4
## 2           0  22 Middle Eastern  Biology    5    5    5    4    4    5
## 3           0  16          Black   Acting    4    5    5    5    5    5
```

## 4		0	19		White	Pharmacy	5	4	4	5	4	4	
## 5		0	18		White	Undecided	4	3	4	4	4	4	
## 6		0	19		White	neuroscience	4	4	3	5	5	5	
##	se.7	se.8	asi.1	asi.2	asi.3	asi.4	asi.5	asi.6	asi.7	asi.8	asi.9	asi.10	asi.11
## 1	3	3	4	3	5	2	3	5	5	4	5	5	2
## 2	5	3	3	4	4	4	5	4	1	1	3	4	1
## 3	4	5	5	3	5	5	3	5	3	1	5	1	3
## 4	3	3	5	1	3	1	1	2	2	1	1	1	1
## 5	4	4	4	4	3	2	3	4	4	2	4	4	4
## 6	4	4	5	5	5	3	3	5	2	2	2	2	4
##	asi.12	asi.13	asi.14	asi.15	asi.16	asi.17	asi.18	pc.1	pc.2	pc.3	psp.1	psp.2	
## 1	4	5	3	2	3	5	3	3	3	3	7	7	
## 2	1	1	2	1	4	5	2	3	3	3	7	7	
## 3	3	5	1	3	2	5	1	3	3	3	6	7	
## 4	1	3	1	2	1	4	1	4	3	3	6	3	
## 5	3	5	4	2	4	2	4	3	2	3	7	7	
## 6	4	4	4	4	3	3	3	4	4	4	7	7	
##	psp.3	frost.ps.1	frost.ps.2	frost.ps.3	frost.ps.4	frost.com.1	frost.com.2						
## 1	7	5	4	3	4	5	4						
## 2	7	4	4	4	4	2	1						
## 3	7	4	2	3	4	2	4						
## 4	4	4	4	3	4	4	2						
## 5	7	4	4	4	3	2	3						
## 6	7	5	5	5	5	4	2						
##	frost.com.3	frost.com.4	frost.com.5	frost.da.1	frost.da.2	frost.da.3							
## 1	4	5	4	4	3	3							
## 2	3	1	5	1	1	1							
## 3	2	2	2	4	4	4							
## 4	3	3	1	4	1	4							
## 5	2	4	3	4	4	2							
## 6	3	4	4	4	4	4							
##	frost.da.4	stat.anx.1	stat.anx.2	stat.anx.3	stat.anx.4	stat.anx.5	stat.anx.6						
## 1	3	4	5	4	5	5	3						
## 2	2	3	1	1	4	4	1						
## 3	4	3	1	3	5	5	3						
## 4	4	2	3	1	2	2	1						
## 5	3	4	4	3	5	5	3						
## 6	2	3	5	3	5	5	5						
##	stat.anx.7	stat.anx.8	stat.anx.9	stat.anx.10	stat.anx.11	stat.anx.12							
## 1	5	4	3	3	2	2							
## 2	1	1	1	1	1	1							
## 3	1	1	2	2	2	2							
## 4	2	2	2	2	2	1							
## 5	4	4	2	2	1	1							
## 6	2	4	3	2	2	3							
##	stat.anx.13	stat.anx.14	stat.anx.15	stat.anx.16	math.anx.1	math.anx.2							
## 1	4	4	4	4	3	5							
## 2	1	1	1	1	1	2							
## 3	2	2	2	2	1	1							
## 4	3	4	2	3	1	2							
## 5	2	3	2	2	2	4							
## 6	5	5	1	5	5	5							
##	math.anx.3	math.anx.4	math.anx.5	math.anx.6	math.anx.7	math.anx.8	math.anx.9						
## 1	4	5	5	3	4	5	3						

```
## 2      1      2      1      1      1      2      1
## 3      1      5      1      1      1      5      1
## 4      1      2      2      1      1      3      1
## 5      2      4      5      3      2      5      2
## 6      5      5      4      2      3      5      3
##  faculty stats stats.history gender.category self.efficacy asi.phys  asi.cog
## 1      0      0      1      1      3.625 3.666667 3.333333
## 2      1      0      1      1      4.500 2.000000 3.500000
## 3      0      0      0      0      4.750 3.333333 1.833333
## 4      1      0      0      0      4.000 1.666667 1.000000
## 5      1      1      0      1      3.875 2.666667 3.833333
## 6      1      1      0      1      4.250 3.333333 3.333333
##  asi.social      asi perf.cog  perf.sp frost.ps frost.com frost.da stat.anx.tc
## 1  4.333333 3.777778 3.000000 7.000000      4.00      4.4      3.25      4.666667
## 2  2.833333 2.777778 3.000000 7.000000      4.00      2.4      1.25      3.666667
## 3  4.666667 3.277778 3.000000 6.666667      3.25      2.4      4.00      4.333333
## 4  2.666667 1.777778 3.333333 4.333333      3.75      2.6      3.25      2.000000
## 5  3.833333 3.444444 2.666667 7.000000      3.75      2.8      3.25      4.666667
## 6  3.833333 3.500000 4.000000 7.000000      5.00      3.4      3.50      4.333333
##  stat.anx.i stat.anx.ah stat.anx.ws stat.anx.fst stat.anx.sc math.anx
## 1  3.666667      5.0      3.666667      3.666667      2.0 4.111111
## 2  1.000000      1.0      1.000000      1.000000      1.0 1.333333
## 3  2.333333      1.0      2.000000      2.000000      2.0 1.888889
## 4  1.333333      2.5      2.666667      2.666667      1.5 1.555556
## 5  3.333333      4.0      2.000000      2.333333      1.0 3.222222
## 6  4.000000      3.5      4.333333      2.666667      2.5 4.111111
```

Question 1: Does statistics anxiety differ by faculty (arts, science, other) and program level (undergrad vs grad)?

```
df <- rename(df,
  test_anxiety = stat.anx.tc,
  asking_for_help = stat.anx.ah)
```

```
glimpse(df)
```

```
## Rows: 452
## Columns: 95
## $ program.type      <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
## $ age               <int> 21, 22, 16, 19, 18, 19, 21, 19, 18, 28, 21, 18, 21, 21~
## $ ethnicity.r       <chr> "White", "Middle Eastern", "Black", "White", "White", ~
## $ major             <chr> "Psychology", "Biology", "Acting", "Pharmacy ", "Undec~
## $ se.1              <int> 4, 5, 4, 5, 4, 4, 4, 4, 4, 5, 4, 4, 5, 5, 4, 5, 5, 3, ~
## $ se.2              <int> 3, 5, 5, 4, 3, 4, 4, 4, 3, 5, 4, 3, 5, 5, 4, 4, 5, 2, ~
## $ se.3              <int> 4, 5, 5, 4, 4, 3, 4, 5, 4, 5, 4, 4, 4, 5, 4, 5, 5, 2, ~
## $ se.4              <int> 4, 4, 5, 5, 4, 5, 4, 4, 4, 5, 4, 5, 4, 5, 4, 5, 5, 2, ~
## $ se.5              <int> 4, 4, 5, 4, 4, 5, 5, 5, 4, 5, 4, 3, 4, 5, 4, 5, 5, 4, ~
## $ se.6              <int> 4, 5, 5, 4, 4, 5, 5, 4, 4, 5, 3, 2, 5, 5, 4, 4, 5, 3, ~
## $ se.7              <int> 3, 5, 4, 3, 4, 4, 5, 5, 4, 5, 3, 2, 4, 4, 3, 4, 5, 2, ~
## $ se.8              <int> 3, 3, 5, 3, 4, 4, 3, 5, 3, 5, 4, 2, 5, 5, 4, 4, 5, 2, ~
```

```

## $ asi.1      <int> 4, 3, 5, 5, 4, 5, 3, 2, 4, 4, 1, 3, 2, 3, 5, 4, 3, 3, ~
## $ asi.2      <int> 3, 4, 3, 1, 4, 5, 5, 1, 2, 2, 3, 2, 1, 2, 3, 3, 1, 1, ~
## $ asi.3      <int> 5, 4, 5, 3, 3, 5, 4, 2, 4, 2, 5, 2, 1, 1, 3, 1, 1, 1, ~
## $ asi.4      <int> 2, 4, 5, 1, 2, 3, 1, 2, 2, 3, 4, 3, 1, 1, 2, 1, 2, 1, ~
## $ asi.5      <int> 3, 5, 3, 1, 3, 3, 4, 1, 2, 3, 3, 1, 2, 1, 3, 5, 1, 1, ~
## $ asi.6      <int> 5, 4, 5, 2, 4, 5, 1, 1, 1, 1, 1, 2, 1, 2, 1, 1, 1, 2, ~
## $ asi.7      <int> 5, 1, 3, 2, 4, 2, 2, 3, 1, 2, 5, 1, 2, 1, 1, 2, 2, 2, ~
## $ asi.8      <int> 4, 1, 1, 1, 2, 2, 1, 2, 3, 2, 5, 1, 3, 2, 1, 5, 1, 1, ~
## $ asi.9      <int> 5, 3, 5, 1, 4, 2, 1, 3, 2, 1, 1, 3, 2, 2, 2, 5, 1, 2, ~
## $ asi.10     <int> 5, 4, 1, 1, 4, 2, 1, 5, 1, 1, 3, 1, 2, 1, 2, 1, 1, 2, ~
## $ asi.11     <int> 2, 1, 3, 1, 4, 4, 3, 4, 2, 1, 1, 3, 1, 1, 2, 1, 1, 1, ~
## $ asi.12     <int> 4, 1, 3, 1, 3, 4, 1, 3, 2, 1, 5, 1, 1, 1, 3, 1, 1, 1, ~
## $ asi.13     <int> 5, 1, 5, 3, 5, 4, 1, 4, 2, 1, 1, 4, 1, 2, 2, 4, 1, 2, ~
## $ asi.14     <int> 3, 2, 1, 1, 4, 4, 1, 2, 2, 1, 4, 1, 2, 1, 1, 4, 1, 1, ~
## $ asi.15     <int> 2, 1, 3, 2, 2, 4, 1, 3, 2, 1, 4, 1, 2, 1, 1, 1, 1, 1, ~
## $ asi.16     <int> 3, 4, 2, 1, 4, 3, 3, 3, 3, 1, 4, 1, 2, 1, 2, 5, 1, 1, ~
## $ asi.17     <int> 5, 5, 5, 4, 2, 3, 1, 5, 3, 2, 2, 4, 2, 2, 2, 5, 2, 5, ~
## $ asi.18     <int> 3, 2, 1, 1, 4, 3, 1, 4, 4, 1, 3, 1, 1, 1, 2, 3, 1, 1, ~
## $ pc.1       <int> 3, 3, 3, 4, 3, 4, 4, 2, 2, NA, NA, 1, 2, 2, 1, 4, 4, 2~
## $ pc.2       <int> 3, 3, 3, 3, 2, 4, 4, 2, 1, NA, NA, 1, NA, 1, NA, 4, 2,~
## $ pc.3       <int> 3, 3, 3, 3, 3, 4, 4, 2, 2, 2, NA, 2, 1, 2, 1, 4, 4, 3,~
## $ psp.1      <int> 7, 7, 6, 6, 7, 7, 7, 5, 4, 1, 2, 5, 5, 5, 2, 7, 5, 7, ~
## $ psp.2      <int> 7, 7, 7, 3, 7, 7, 7, 5, 3, 1, 2, 4, 3, 6, 2, 5, 4, 7, ~
## $ psp.3      <int> 7, 7, 7, 4, 7, 7, 6, 5, 6, 1, 2, 5, 5, 5, 2, 6, 4, 7, ~
## $ frost.ps.1 <int> 5, 4, 4, 4, 4, 5, 4, 2, 2, 1, 1, 2, 3, 3, 1, 5, 4, 4, ~
## $ frost.ps.2 <int> 4, 4, 2, 4, 4, 5, 5, 2, 3, 2, 4, 3, 4, 4, 2, 5, 4, 3, ~
## $ frost.ps.3 <int> 3, 4, 3, 3, 4, 5, 5, 2, 2, 3, 3, 3, 2, 3, 2, 4, 5, 2, ~
## $ frost.ps.4 <int> 4, 4, 4, 4, 3, 5, 3, 2, 2, 3, 2, 3, 4, 3, 2, 4, 4, 2, ~
## $ frost.com.1 <int> 5, 2, 2, 4, 2, 4, 4, 3, 3, 1, 2, 3, 1, 2, 1, 5, 4, 4, ~
## $ frost.com.2 <int> 4, 1, 4, 2, 3, 2, 4, 2, 3, 1, 2, 4, 2, 2, 1, 3, 1, 4, ~
## $ frost.com.3 <int> 4, 3, 2, 3, 2, 3, 2, 2, 2, 1, 2, 4, 2, 1, 1, 3, 2, 4, ~
## $ frost.com.4 <int> 5, 1, 2, 3, 4, 4, 5, 2, 3, 1, 2, 4, 1, 1, 1, 5, 1, 4, ~
## $ frost.com.5 <int> 4, 5, 2, 1, 3, 4, 3, 3, 2, 1, 1, 2, 2, 3, 2, 3, 2, 4, ~
## $ frost.da.1 <int> 4, 1, 4, 4, 4, 4, 3, 3, 3, 1, 3, 4, 4, 4, 2, 3, 3, 4, ~
## $ frost.da.2 <int> 3, 1, 4, 1, 4, 4, 4, 2, 4, 3, 2, 4, 4, 4, 1, 4, 3, 3, ~
## $ frost.da.3 <int> 3, 1, 4, 4, 2, 4, 5, 1, 2, 2, 2, 3, 3, 2, 1, 3, 2, 4, ~
## $ frost.da.4 <int> 3, 2, 4, 4, 3, 2, 3, 1, 2, 1, 2, 4, 2, 2, 1, 4, 2, 5, ~
## $ stat.anx.1 <int> 4, 3, 3, 2, 4, 3, 4, NA, 4, 4, 2, 4, 1, 1, 3, 4, 3, 4,~
## $ stat.anx.2 <int> 5, 1, 1, 3, 4, 5, 5, NA, 3, 1, 4, 5, 1, 1, 3, 3, 2, 5,~
## $ stat.anx.3 <int> 4, 1, 3, 1, 3, 3, 3, NA, 4, 2, 3, 3, 1, 1, 4, 3, 2, 3,~
## $ stat.anx.4 <int> 5, 4, 5, 2, 5, 5, 4, NA, 3, 5, 4, 5, 1, 1, 4, 5, 4, 5,~
## $ stat.anx.5 <int> 5, 4, 5, 2, 5, 5, 5, NA, 4, 5, 4, 4, 1, 1, 4, 5, 4, 4,~
## $ stat.anx.6 <int> 3, 1, 3, 1, 3, 5, 2, NA, 4, 2, 2, 2, 1, 1, 1, 3, 2, 2,~
## $ stat.anx.7 <int> 5, 1, 1, 2, 4, 2, 5, 3, 3, 1, 4, 2, 1, 1, 2, 3, 2, 5, ~
## $ stat.anx.8 <int> 4, 1, 1, 2, 4, 4, 5, NA, 2, 1, 2, 4, 2, 2, 3, 4, 2, 3,~
## $ stat.anx.9 <int> 3, 1, 2, 2, 2, 3, 1, 2, 3, 1, 3, 2, 2, 2, 3, 2, 1, 1, ~
## $ stat.anx.10 <int> 3, 1, 2, 2, 2, 2, 1, NA, 3, 1, 3, 2, 3, 4, 2, 2, 1, 2,~
## $ stat.anx.11 <int> 2, 1, 2, 2, 1, 2, 1, 3, 4, 1, 2, 4, 2, 2, 4, 2, 1, 4, ~
## $ stat.anx.12 <int> 2, 1, 2, 1, 1, 3, 1, 2, 3, 1, 2, 3, 1, 1, 4, 3, 1, 3, ~
## $ stat.anx.13 <int> 4, 1, 2, 3, 2, 5, 1, 3, 3, 1, 2, 2, 1, 1, 3, 1, 1, 1, ~
## $ stat.anx.14 <int> 4, 1, 2, 4, 3, 5, 1, 2, 4, 1, 3, 2, 4, 4, 3, 1, 1, 4, ~
## $ stat.anx.15 <int> 4, 1, 2, 2, 2, 1, 1, 2, 3, 1, 3, 2, 3, 4, 3, 1, 1, 3, ~
## $ stat.anx.16 <int> 4, 1, 2, 3, 2, 5, 1, 2, 3, 1, 2, 3, 1, 1, 4, 1, 1, 2, ~
## $ math.anx.1 <int> 3, 1, 1, 1, 2, 5, 1, 1, 1, 1, 1, 1, 1, 1, 3, 2, 1, 2, ~

```

```
## $ math.anx.2      <int> 5, 2, 1, 2, 4, 5, 4, 1, 4, 3, 2, 4, 2, 2, 4, 4, 4, 4, ~
## $ math.anx.3      <int> 4, 1, 1, 1, 2, 5, 3, 1, 3, 1, 1, 1, 1, 1, 2, 3, 1, 2, ~
## $ math.anx.4      <int> 5, 2, 5, 2, 4, 5, 4, 4, 5, 4, 2, 5, 1, 1, 3, 5, 3, 5, ~
## $ math.anx.5      <int> 5, 1, 1, 2, 5, 4, 2, 3, 5, 3, 2, 3, 2, 3, 3, 3, 2, 5, ~
## $ math.anx.6      <int> 3, 1, 1, 1, 3, 2, 3, 1, 3, 1, 1, 1, 1, 1, 1, 1, 2, 3, ~
## $ math.anx.7      <int> 4, 1, 1, 1, 2, 3, 3, 1, 4, 1, 1, 2, 1, 1, 2, 1, 1, 1, ~
## $ math.anx.8      <int> 5, 2, 5, 3, 5, 5, 5, 4, 5, 3, 3, 5, 2, 2, 4, 5, 4, 5, ~
## $ math.anx.9      <int> 3, 1, 1, 1, 2, 3, 3, 3, 2, 1, 1, 3, 1, 1, 1, 1, 1, 3, ~
## $ faculty         <int> 0, 1, 0, 1, 1, 1, 1, 0, 1, 1, 0, 0, 1, 1, 0, 1, 1, 1, ~
## $ stats           <int> 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, ~
## $ stats.history   <int> 1, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1, ~
## $ gender.category <int> 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1, 1, ~
## $ self.efficacy   <dbl> 3.625, 4.500, 4.750, 4.000, 3.875, 4.250, 4.250, 4.500~
## $ asi.phys        <dbl> 3.666667, 2.000000, 3.333333, 1.666667, 2.666667, 3.33~
## $ asi.cog         <dbl> 3.333333, 3.500000, 1.833333, 1.000000, 3.833333, 3.33~
## $ asi.social      <dbl> 4.333333, 2.833333, 4.666667, 2.666667, 3.833333, 3.83~
## $ asi             <dbl> 3.777778, 2.777778, 3.277778, 1.777778, 3.444444, 3.50~
## $ perf.cog        <dbl> 3.000000, 3.000000, 3.000000, 3.333333, 2.666667, 4.00~
## $ perf.sp         <dbl> 7.000000, 7.000000, 6.666667, 4.333333, 7.000000, 7.00~
## $ frost.ps        <dbl> 4.00, 4.00, 3.25, 3.75, 3.75, 5.00, 4.25, 2.00, 2.25, ~
## $ frost.com       <dbl> 4.4, 2.4, 2.4, 2.6, 2.8, 3.4, 3.6, 2.4, 2.6, 1.0, 1.8,~
## $ frost.da        <dbl> 3.25, 1.25, 4.00, 3.25, 3.25, 3.50, 3.75, 1.75, 2.75, ~
## $ test_anxiety    <dbl> 4.666667, 3.666667, 4.333333, 2.000000, 4.666667, 4.33~
## $ stat.anx.i      <dbl> 3.666667, 1.000000, 2.333333, 1.333333, 3.333333, 4.00~
## $ asking_for_help <dbl> 5.0, 1.0, 1.0, 2.5, 4.0, 3.5, 5.0, 3.0, 3.0, 1.0, 4.0,~
## $ stat.anx.ws     <dbl> 3.666667, 1.000000, 2.000000, 2.666667, 2.000000, 4.33~
## $ stat.anx.fst    <dbl> 3.666667, 1.000000, 2.000000, 2.666667, 2.333333, 2.66~
## $ stat.anx.sc     <dbl> 2.0, 1.0, 2.0, 1.5, 1.0, 2.5, 1.0, 2.5, 3.5, 1.0, 2.0,~
## $ math.anx        <dbl> 4.111111, 1.333333, 1.888889, 1.555556, 3.222222, 4.11~
```

```
anova = aov(df$test_anxiety ~ factor(df$faculty) * factor(df$program.type)) # Test anxiety
summary(anova)
```

```
##               Df Sum Sq Mean Sq F value    Pr(>F)
## factor(df$faculty)      2      7.9   3.959    4.467    0.012
## factor(df$program.type)  1     17.6  17.581   19.839 1.07e-05
## factor(df$faculty):factor(df$program.type)  2      0.2   0.122    0.138    0.871
## Residuals              443    392.6   0.886
##
## factor(df$faculty)      *
## factor(df$program.type) ***
## factor(df$faculty):factor(df$program.type)
## Residuals
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 3 observations deleted due to missingness
```

```
shapiro.test(residuals(anova)) # Normality of residuals met
```

```
##
## Shapiro-Wilk normality test
##
## data:  residuals(anova)
## W = 0.94458, p-value = 6.591e-12
```

```
leveneTest(df$test_anxiety ~ factor(df$faculty) * factor(df$program.type)) # Homogeneity of variance me
```

```
## Levene's Test for Homogeneity of Variance (center = median)
##      Df F value Pr(>F)
## group  5  0.2712 0.9288
##      443
```

```
anova2 = aov(df$asking_for_help ~ factor(df$faculty) * factor(df$program.type)) # Asking for help
summary(anova2)
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## factor(df$faculty)      2   12.8    6.382    4.137 0.0166 *
## factor(df$program.type)  1    1.7    1.664    1.079 0.2996
## factor(df$faculty):factor(df$program.type)  2    6.2    3.091    2.004 0.1360
## Residuals              445   686.5    1.543
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness
```

```
shapiro.test(residuals(anova2)) # Normality of residuals met
```

```
##
## Shapiro-Wilk normality test
##
## data: residuals(anova2)
## W = 0.95941, p-value = 8.077e-10
```

```
leveneTest(df$asking_for_help ~ factor(df$faculty) * factor(df$program.type)) # Test for homogeneity no
```

```
## Levene's Test for Homogeneity of Variance (center = median)
##      Df F value  Pr(>F)
## group  5  3.9567 0.001604 **
##      445
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Question 2: Can signs of self-efficacy, anxiety sensitivity, and self-critical perfectionism be used to predict anxiety in Statistics?

```
reg1 <- lm(df$test_anxiety ~ df$self.efficacy + df$perf.cog + df$asi + df$perf.sp + df$frost.da + df$fr
summary(reg1)
```

```
##
## Call:
## lm(formula = df$test_anxiety ~ df$self.efficacy + df$perf.cog +
##     df$asi + df$perf.sp + df$frost.da + df$frost.ps + df$frost.com)
##
```

```
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.15241 -0.52040  0.08974  0.63928  2.13701
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.76326    0.38835   7.115 4.64e-12 ***
## df$self.efficacy -0.11890    0.07906  -1.504   0.1333
## df$perf.cog     -0.03364    0.05734  -0.587   0.5578
## df$asi          0.11591    0.06708   1.728   0.0847 .
## df$perf.sp      0.09019    0.03814   2.365   0.0185 *
## df$frost.da     0.08967    0.05432   1.651   0.0995 .
## df$frost.ps     0.05919    0.06958   0.851   0.3954
## df$frost.com    0.07719    0.06256   1.234   0.2179
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9113 on 434 degrees of freedom
## (10 observations deleted due to missingness)
## Multiple R-squared:  0.1162, Adjusted R-squared:  0.1019
## F-statistic:  8.15 on 7 and 434 DF,  p-value: 2.455e-09
```

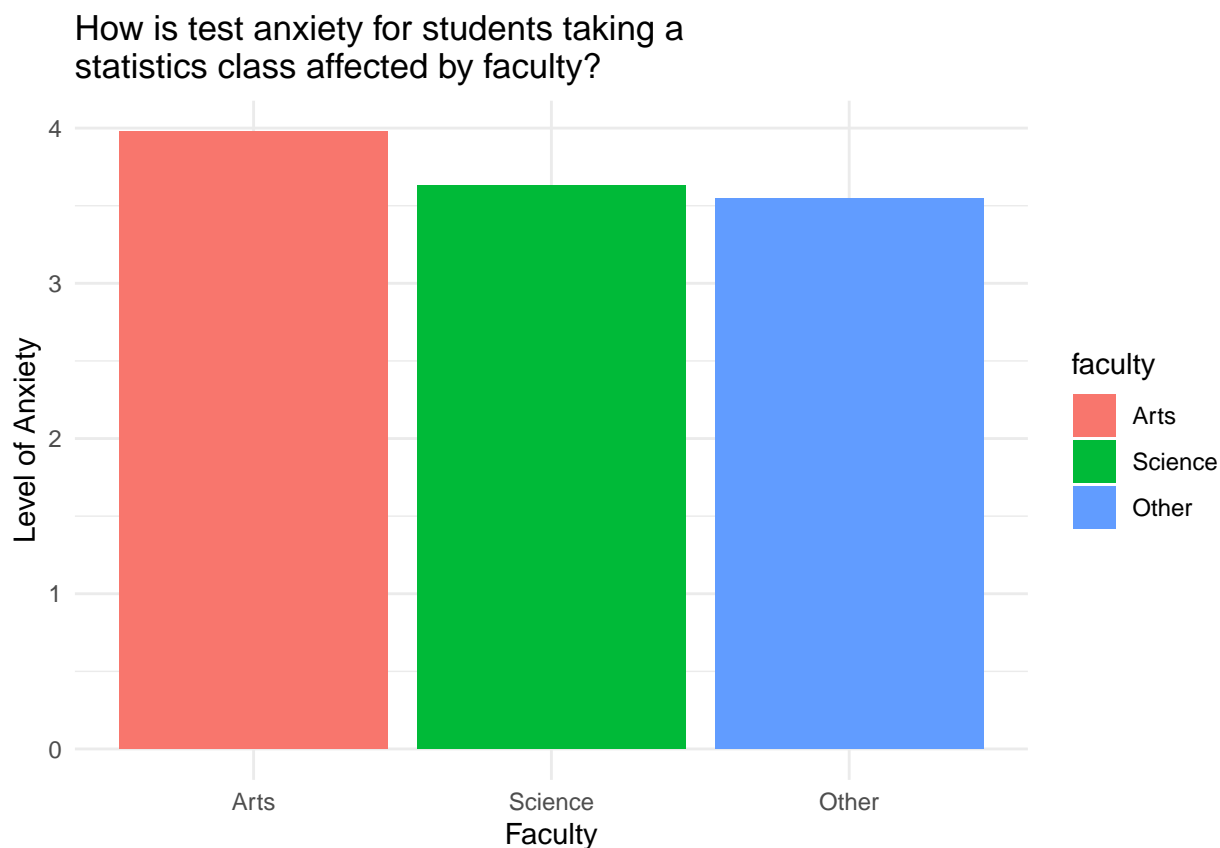
```
reg2 <- lm(df$asking_for_help ~ df$self.efficacy + df$perf.cog + df$asi + df$perf.sp + df$frost.da + df$
summary(reg2)
```

```
##
## Call:
## lm(formula = df$asking_for_help ~ df$self.efficacy + df$perf.cog +
##      df$asi + df$perf.sp + df$frost.da + df$frost.ps + df$frost.com)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.2943 -0.7214 -0.0088  0.7745  3.4502
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.47341    0.46808   5.284   2e-07 ***
## df$self.efficacy -0.30719    0.09461  -3.247 0.001257 **
## df$perf.cog     -0.10329    0.06922  -1.492 0.136350
## df$asi          0.19117    0.08084   2.365 0.018478 *
## df$perf.sp      0.17494    0.04603   3.801 0.000165 ***
## df$frost.da     0.06719    0.06540   1.027 0.304838
## df$frost.ps     -0.02528    0.08339  -0.303 0.761881
## df$frost.com    0.24745    0.07540   3.282 0.001114 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.1 on 436 degrees of freedom
## (8 observations deleted due to missingness)
## Multiple R-squared:  0.2439, Adjusted R-squared:  0.2318
## F-statistic: 20.1 on 7 and 436 DF,  p-value: < 2.2e-16
```

Question 3: How does test anxiety differ by faculty and program type?

```
df %>%  
  mutate(faculty = factor(faculty,  
                           levels = c(0, 1, 2),  
                           labels = c("Arts", "Science", "Other")))  
  ) %>%  
  ggplot(aes(x = faculty, y = test_anxiety, fill = faculty)) +  
  stat_summary(geom = "bar", fun = mean) +  
  labs(title = str_wrap("How is test anxiety for students taking a statistics class affected by faculty"),  
       x = "Faculty",  
       y = "Level of Anxiety",  
       ) +  
  theme_minimal()
```

```
## Warning: Removed 3 rows containing non-finite outside the scale range  
## ('stat_summary()').
```



```
df %>%  
  mutate(program.type = factor(program.type,  
                                levels = c(0, 1),  
                                labels = c("Undergraduate", "Graduate"))
```



```

    ) %>%
  ggplot(aes(x = program.type, y = test_anxiety, fill = program.type)) +
  stat_summary(geom = "bar", fun = mean) +
  labs(title = str_wrap("How is test anxiety for students taking a statistics class affected by program
    x = "Program Type",
    y = "Level of Anxiety",
    ) +
  theme_minimal()

```

```

## Warning: Removed 3 rows containing non-finite outside the scale range
## ('stat_summary()').

```

