EDLD 651 Final Project Draft

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Author Note

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Abstract

FILL IN ABSTRACT IF WANTED

Keywords: keywords

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Introduction

We explore proportion of graduation (outcome), across several categorical variables. In particular, we plan to focus on comparisons of two groups who have historically had unequal access to resources: English language learners (ELL) vs. English proficient (EP) students & Special Education (SPED) status vs. non-SPED status.

Not only will we report these outcomes across different groups, we will also explore these across boroughs, too, to see if these groups are succeeding equally across boroughs—-as measured by graduation outcomes—-compared to the English proficient students in their boroughs.

Methods

We retrieved the data collected by the Department of Education from

Information about variables, how they were measured here

Information about regents examinations here

Participants

Explain participants' from what we have in data.

First, we import and clean our data:

```
raw_grad <- import(here("data", "2005-2010__Graduation_Outcomes_-__By_Borough.csv"))
grad <- raw_grad %>%
  clean_names() %>%
  as_tibble()


summary(grad$cohort) # we see here that 'Aug 2006' needs to be changed to '2006' for c
```

```
##    Length     Class      Mode
##       385 character character
```

```
grad$cohort <-  as.numeric(sub("Aug 2006", "2006", grad$cohort))


head(grad)#need to change var names to make legible, perhaps subset data to only inclu
```

```
## # A tibble: 6 x 22
##   demographic borough cohort total_cohort total_grads_n total_grads_per~
##   <chr>       <chr>    <dbl>        <int>         <int>            <dbl>
## 1 Borough To~ Bronx     2001        11453          4913             42.9
## 2 Borough To~ Bronx     2002        12032          5328             44.3
## 3 Borough To~ Bronx     2003        13632          6389             46.9
## 4 Borough To~ Bronx     2004        14364          7448             51.9
## 5 Borough To~ Bronx     2005        15175          8229             54.2
## 6 Borough To~ Bronx     2006        15579          8524             54.7
## # ... with 16 more variables: total_regents_n <int>,
## #   total_regents_percent_of_cohort <dbl>,
## #   total_regents_percent_of_grads <dbl>, advanced_regents_n <int>,
## #   advanced_regents_percent_of_cohort <dbl>,
## #   advanced_regents_percent_of_grads <dbl>, regents_w_o_advanced_n <int>,
## #   regents_w_o_advanced_percent_of_cohort <dbl>,
## #   regents_w_o_advanced_percent_of_grads <dbl>, local_n <int>,
## #   local_percent_of_cohort <dbl>, local_percent_of_grads <dbl>,
## #   still_enrolled_n <int>, still_enrolled_percent_of_cohort <dbl>,
## #   dropped_out_n <int>, dropped_out_percent_of_cohort <dbl>
```

```
# Do we want to use recode() or rename()? Also, does it make more sense to leave all o
```

PIVOTS

The data we are starting with are already tidy, but for the purposes of demonstrating our rather acute proficiency in our *ability* to tidy data, in this segment will make the data untidy and then tidy it once more.

```
messy_grad <- grad %>%
  pivot_wider(names_from = borough,
              values_from = total_cohort)
head(messy_grad)
```

```
## # A tibble: 6 x 25
##   demographic cohort total_grads_n total_grads_per~ total_regents_n
##   <chr>        <dbl>         <int>            <dbl>           <int>
## 1 Borough To~   2001          4913             42.9            2644
## 2 Borough To~   2002          5328             44.3            3118
## 3 Borough To~   2003          6389             46.9            3861
## 4 Borough To~   2004          7448             51.9            4625
## 5 Borough To~   2005          8229             54.2            5618
## 6 Borough To~   2006          8524             54.7            6312
## # ... with 20 more variables: total_regents_percent_of_cohort <dbl>,
## #   total_regents_percent_of_grads <dbl>, advanced_regents_n <int>,
## #   advanced_regents_percent_of_cohort <dbl>,
## #   advanced_regents_percent_of_grads <dbl>, regents_w_o_advanced_n <int>,
## #   regents_w_o_advanced_percent_of_cohort <dbl>,
## #   regents_w_o_advanced_percent_of_grads <dbl>, local_n <int>,
## #   local_percent_of_cohort <dbl>, local_percent_of_grads <dbl>,
## #   still_enrolled_n <int>, still_enrolled_percent_of_cohort <dbl>,
## #   dropped_out_n <int>, dropped_out_percent_of_cohort <dbl>, Bronx <int>,
## #   Brooklyn <int>, Manhattan <int>, Queens <int>, `Staten Island` <int>
```

```
clean_grad <- messy_grad %>%
  pivot_longer(cols = c("Bronx":"Staten Island"),
               names_to = "borough",
               values_to = "total_cohort",
               values_drop_na = TRUE)

clean_grad <- clean_grad[, c(1,21,2,22,3:20)]
kable(clean_grad)
```

demographic	borough	cohort	total_cohort	total_grads_n	total_grads_
Borough Total	Bronx	2001	11453	4913	
Borough Total	Bronx	2002	12032	5328	
Borough Total	Bronx	2003	13632	6389	
Borough Total	Bronx	2004	14364	7448	
Borough Total	Bronx	2005	15175	8229	
Borough Total	Bronx	2006	15579	8524	
Borough Total	Bronx	2006	15579	9215	
Borough Total	Brooklyn	2001	19961	9758	
Borough Total	Brooklyn	2002	20808	10337	
Borough Total	Brooklyn	2003	21334	11064	
Borough Total	Brooklyn	2004	22353	12303	
Borough Total	Brooklyn	2005	22331	12603	
Borough Total	Brooklyn	2006	22177	13040	
Borough Total	Brooklyn	2006	22177	14043	
Borough Total	Manhattan	2001	12670	7480	
Borough Total	Manhattan	2002	13463	7746	
Borough Total	Manhattan	2003	13879	7613	
Borough Total	Manhattan	2004	15127	8780	
Borough Total	Manhattan	2005	15843	9816	
Borough Total	Manhattan	2006	16416	10411	
Borough Total	Manhattan	2006	16416	10947	
Borough Total	Queens	2001	17011	9180	
Borough Total	Queens	2002	18262	9869	
Borough Total	Queens	2003	18415	10455	
Borough Total	Queens	2004	18725	10922	
Borough Total	Queens	2005	19511	11863	
Borough Total	Queens	2006	19558	12465	
Borough Total	Queens	2006	19558	13378	
Borough Total	Staten Island	2001	3872	2565	

```
head(clean_grad)
```

```
## # A tibble: 6 x 22
##   demographic borough cohort total_cohort total_grads_n total_grads_per~
##   <chr>       <chr>    <dbl>        <int>         <int>            <dbl>
## 1 Borough To~ Bronx     2001        11453          4913             42.9
## 2 Borough To~ Bronx     2002        12032          5328             44.3
## 3 Borough To~ Bronx     2003        13632          6389             46.9
## 4 Borough To~ Bronx     2004        14364          7448             51.9
## 5 Borough To~ Bronx     2005        15175          8229             54.2
## 6 Borough To~ Bronx     2006        15579          8524             54.7
## # ... with 16 more variables: total_regents_n <int>,
## #   total_regents_percent_of_cohort <dbl>,
## #   total_regents_percent_of_grads <dbl>, advanced_regents_n <int>,
## #   advanced_regents_percent_of_cohort <dbl>,
## #   advanced_regents_percent_of_grads <dbl>, regents_w_o_advanced_n <int>,
## #   regents_w_o_advanced_percent_of_cohort <dbl>,
## #   regents_w_o_advanced_percent_of_grads <dbl>, local_n <int>,
## #   local_percent_of_cohort <dbl>, local_percent_of_grads <dbl>,
## #   still_enrolled_n <int>, still_enrolled_percent_of_cohort <dbl>,
## #   dropped_out_n <int>, dropped_out_percent_of_cohort <dbl>
```

Now that we have tidied the entire dataset, we can focus on our variables of interest: enrollment and graduation for specific boroughs, cohorts and demographics.

```
filtered_grad <- clean_grad %>%
  select(c(1:6, 16:22)) %>%
  filter(demographic == "English Language Learners" |
         demographic == "English Proficient Students" |
```

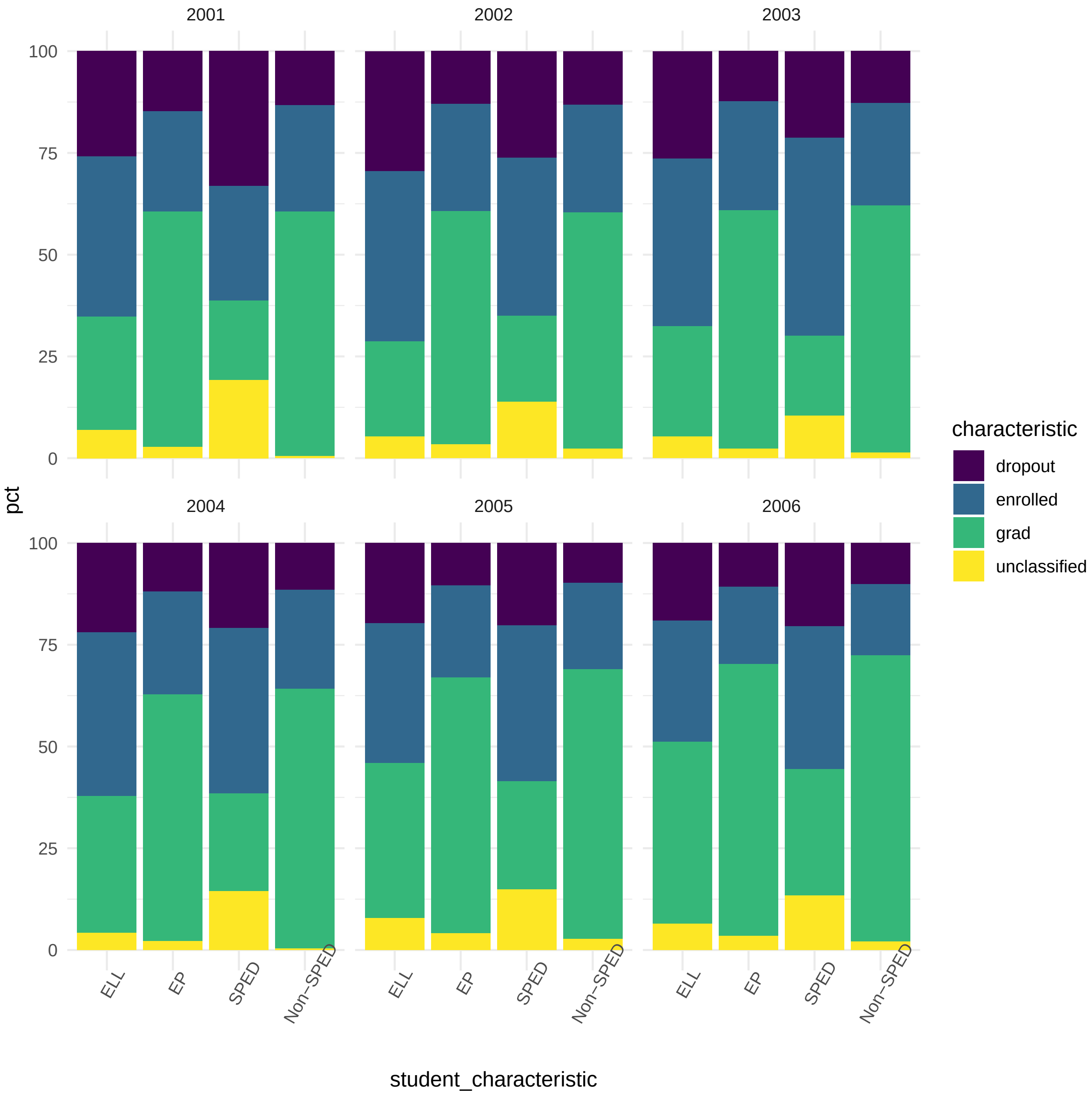
```r
         demographic == "Special Education" |
         demographic == "General Education") %>%
  mutate(student_characteristic =
           factor(demographic,
                  levels = c("English Language Learners",
                      "English Proficient Students",
                      "Special Education",
                      "General Education"),
                  labels = c('ELL', 'EP', 'SPED', 'Non-SPED')
                  ))

new_grad <- filtered_grad %>%
  mutate(unclassified_n = total_cohort - (total_grads_n + dropped_out_n + still_enrolled
         unclassified_percent_of_cohort = round(unclassified_n/total_cohort * 100, 1))
```

```r
head(new_grad)
```

```
## # A tibble: 6 x 16
##   demographic borough cohort total_cohort total_grads_n total_grads_per~ local_n
##   <chr>       <chr>    <dbl>        <int>         <int>            <dbl>   <int>
## 1 English La~ Bronx     2001         1984           388             19.6     311
## 2 English La~ Bronx     2002         1693           333             19.7     257
## 3 English La~ Bronx     2003         1905           391             20.5     296
## 4 English La~ Bronx     2004         1894           640             33.8     426
## 5 English La~ Bronx     2005         1940           694             35.8     377
## 6 English La~ Bronx     2006         2143           791             36.9     395
## # ... with 9 more variables: local_percent_of_cohort <dbl>,
## #   local_percent_of_grads <dbl>, still_enrolled_n <int>,
## #   still_enrolled_percent_of_cohort <dbl>, dropped_out_n <int>,
## #   dropped_out_percent_of_cohort <dbl>, student_characteristic <fct>,
## #   unclassified_n <int>, unclassified_percent_of_cohort <dbl>
```

```r
# group by relevant demographics (ELL & EP, GE & SPED)
demographic_data <- new_grad %>%
  group_by(student_characteristic, cohort) %>%
  summarize(mean_grad_pct = mean(total_grads_percent_of_cohort),
            mean_dropout_pct = mean(dropped_out_percent_of_cohort),
            mean_enrolled_pct = mean(still_enrolled_percent_of_cohort),
            mean_unclassified_pct = mean(unclassified_percent_of_cohort))

# group by borough, look at % of local students
borough_data <- new_grad %>%
  group_by(borough, cohort) %>%
  summarize(mean_local = mean(local_percent_of_cohort),
            mean_grad_pct = mean(total_grads_percent_of_cohort),
            mean_dropout_pct = mean(dropped_out_percent_of_cohort),
            mean_enrolled_pct = mean(still_enrolled_percent_of_cohort),
            mean_unclassified_pct = mean(unclassified_percent_of_cohort))
```

```r
demographic_bar <- demographic_data %>%
  pivot_longer(cols = contains("mean"),
               names_to = c("characteristic", ".value"),
               names_prefix = "mean_",
               names_sep = "_")

# which makes more sense?
# Option 1 - cohort as factor(), faceted by characteristic
# demographic_bar %>%
#   ggplot(aes(fill = factor(cohort), x = student_characteristic, y = pct)) +
#   geom_bar(position = "stack", stat = "identity") +
#   theme(axis.text.x = element_text(angle = 60)) +
#   facet_grid(~characteristic + cohort) +
#   scale_fill_viridis_d()


# Option 2 - cohort and characteristic switched
demographic_bar %>%
  ggplot(aes(fill = characteristic, x = student_characteristic, y = pct)) +
  geom_bar(position = "stack", stat = "identity") + # do we want stack or dodge for pos
  theme(axis.text.x = element_text(angle = 60)) +
  facet_wrap(~cohort) +
  scale_fill_viridis_d()
```



```
# We can also look at the following to get a general sense of the data:
# - total cohorts/grads, facet_wrap by borough
# - grad percentage by student_characteristic, then can do a deeper dive by borough
# - the above two repeated with dropout rate
```

Data analysis

All analysis were conducted in R, with heavy reliance upon the `{tidyverse}` packages to manipulate and visualize the data.

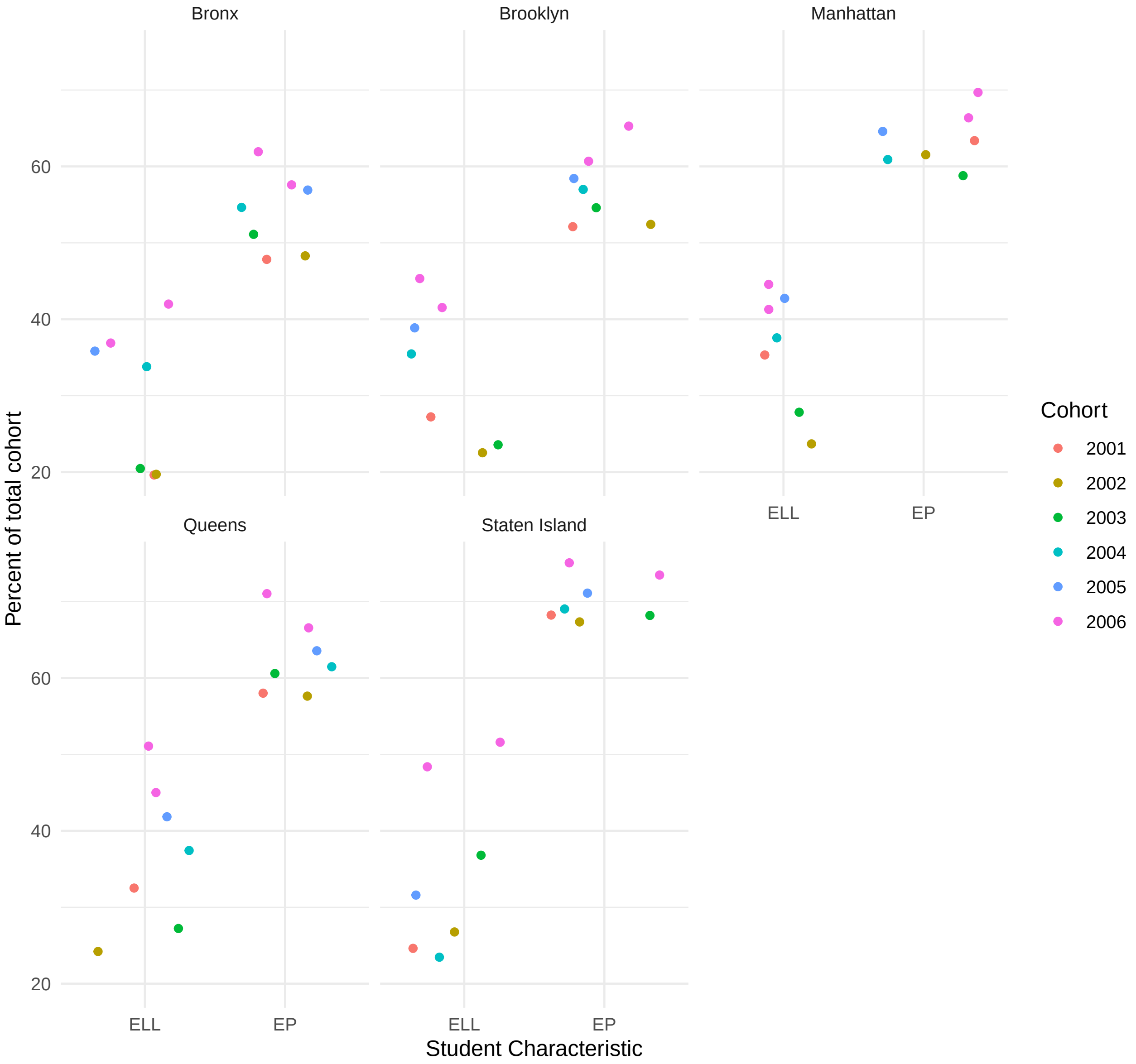
Results

```
#report graduation by borough

#report graduation by english language status

#report graduation by SPED status

#report graduation by borough & SPED status

#report graduation by borough & english learner status
```

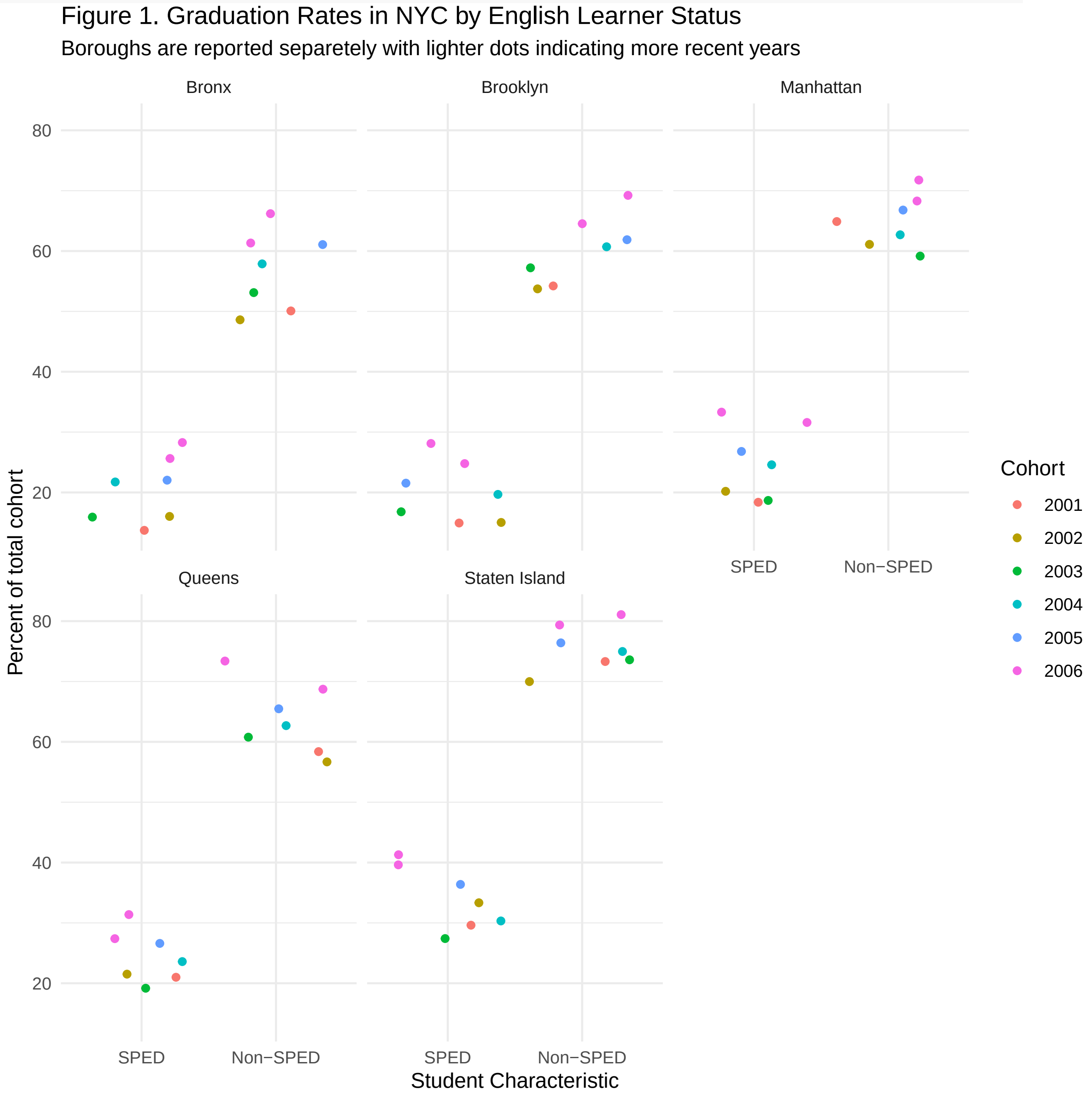
```
new_grad %>%
  filter(student_characteristic == "ELL" |
           student_characteristic == "EP") %>%
  mutate(Cohort = factor(cohort)) %>%
  group_by(student_characteristic, borough) %>%
  ggplot(aes(x = student_characteristic,
             y = total_grads_percent_of_cohort)) +
  geom_jitter(aes(color = Cohort)) + facet_wrap(~borough) +
  labs(title = 'Figure 1. Graduation Rates in NYC by English Learner Status',
       subtitle = 'Boroughs are reported separetely with lighter dots indicating more re
       y = 'Percent of total cohort',
       x = 'Student Characteristic')
```

Figure 1. Graduation Rates in NYC by English Learner Status

Boroughs are reported separetely with lighter dots indicating more recent years



```
new_grad %>%
  filter(student_characteristic == "SPED" |
           student_characteristic == "Non-SPED") %>%
  mutate(Cohort = factor(cohort)) %>%
  group_by(student_characteristic, borough) %>%
  ggplot(aes(x = student_characteristic,
             y = total_grads_percent_of_cohort)) +
  geom_jitter(aes(color = Cohort)) +
  facet_wrap(~borough) +
  labs(title = 'Figure 1. Graduation Rates in NYC by English Learner Status',
       subtitle = 'Boroughs are reported separetely with lighter dots indicating more re
       y = 'Percent of total cohort',
       x = 'Student Characteristic')
```



Discussion

Differences appear to be blah by blah for blah. XYZ boroughs should consider blah blah blah, based on the results. Inferential tests are recommended for next directions.

References