

MEMORANDUM

TO: Ryan [last name here]
FROM: Rory Pulvino
RE: Analysis of TFA Alums at KIPP
DATE: December 20, 2016

I. Background

This is a brief analysis evaluating how long Teach for America (TFA) alums teach at KIPP as compared to non-TFA alums. The analysis is further broken down based on a teacher's sex. Unfortunately, many of the teachers are missing data on these two criteria: whether they are a TFA alum (or an alum of any similar teacher training program) and their sex. This missing data increases the variance of estimates and may be a source of bias in the data that skews results.

Additionally, the available data distinguishes between two distinct groups of teachers: current KIPP teachers and former KIPP teachers. The first two parts of the analysis focus on former KIPP teachers since the data on how long they taught at KIPP is complete i.e. they have a start date and an end date that completely reflects their teaching time at KIPP. Meanwhile, current KIPP teachers are not a uniform group since their 'end date' in the data was imposed as today's date (12/20/2016) and introduces bias when analyzing their length of tenure.¹ Some current teachers though are included in the third analysis section testing whether TFA alums are more likely to stay at KIPP longer than the average.

II. Do TFA alums teach at KIPP longer than non-TFA alums?

TFA alums average teaching at KIPP 754 days, while non-TFA alums average 713 days. Though TFA alums on average stay about a month longer than non-TFA alums this difference is not statistically significant.² This is illustrated by the fact that given the sample data, the error intervals for TFA alums (728 days to 780 days) overlaps with the interval of non-TFA teachers (691 days to 735 days). Even when comparing TFA alums to other teacher training programs, TFA alums do not appear to be different than other program alums in how long they stay at KIPP. This is illustrated by looking at the error intervals where TFA alums overlap with other non-TFA program intervals in the graph below. TFA-alums *do* appear to stay longer than some programs where the error intervals do not overlap, but these are programs with very few teachers at KIPP and more data is needed to verify these differences.³

Program	Obs.	Average No. of Days Teaching	Standard Deviation	Standard Error	Median
None	2480	716	640.95	12.87	470
<i>Teach for America</i>	2100	754	576.82	12.59	691
NYC Teaching Fellow	47	720	592.34	86.40	625
Washington DC Teaching Fellow	43	842	1271.08	193.84	691
Academy for Urban School Leadership	2	321	4.24	3.00	321

¹ Current teacher data is included in the appendix.

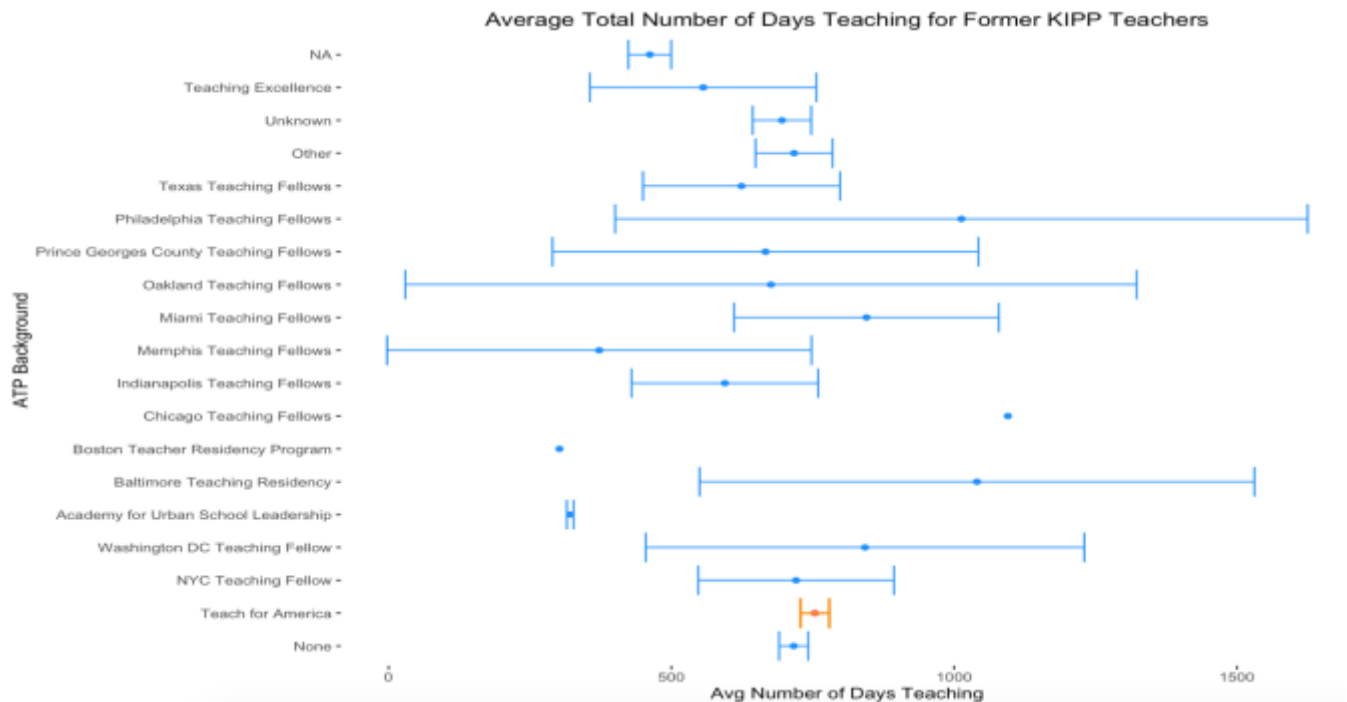
² The standard error for TFA alums is 13 days, while for all non-TFA it is 11 days.

³ For example, TFA teachers appear to stay longer than teachers from the Indianapolis Teaching Fellows program, but with only 2 teachers from that program to compare to, that small sample may not be representative.

Baltimore Teaching Residency	7	1040	649.01	245.30	1028
Boston Teacher Residency Program	1	302	NA	NA	302
Chicago Teaching Fellows	1	1095	NA	NA	1095
Indianapolis Teaching Fellows	2	595	116.67	82.50	594.5
Memphis Teaching Fellows	3	372	324.94	187.60	298
Miami Teaching Fellows	3	845	202.66	117.01	730
Oakland Teaching Fellows	3	676	559.98	323.30	893
Prince Georges County Teaching Fellows	6	666	461.20	188.28	679
Philadelphia Teaching Fellows	8	1013	865.88	306.13	689
Texas Teaching Fellows	31	624	484.97	87.10	354
Other	402	717	683.28	34.08	450
Unknown	804	695	733.51	25.87	426
Teaching Excellence	14	556	374.63	100.12	344.5
NA	529	462	434.43	18.89	381

Looking at the above table, the average number of days a TFA alum is at KIPP is not significantly different than many other teacher training programs. This can easily be seen in the graph below where the middle point is the average number of days teaching at KIPP for each program. The error bars represent a 95% confidence interval and clearly reflect the large variation in teacher tenure. Since many of the error bars for the different programs overlap, any differences in means between programs is not statistically significant.⁴ The lack of real differences between the groups reflects that most former teachers taught for two years – about 730 days – and that teachers are unlikely to leave during a given school year.

⁴ TFA alums teach at KIPP for similar amounts of time as compared to non-TFA alums when using the median as the number of comparison as well. A graph showing this result is included in the appendix.



III. Do TFA teacher lengths vary by gender?⁵

There is not a significant difference between male and female TFA alums in how long they teach at KIPP. Though male TFA alums average 50 more days teaching at KIPP than female TFA alums (790 to 740 days), the confidence intervals of males and females overlap as shown in the graph below.⁶ The overlap around 730 days reflects that most former KIPP teachers taught for 2 years, regardless of gender. The grouping of data around 730 days is likely a result of teachers being unlikely to leave during the school year out of commitment to their students. The data also suggests that male's length of tenure is much more variable than females, reflected in male's larger standard error and standard deviation.

Comparing TFA alums to all non-TFA alums, male TFA alums average over 70 more days at KIPP than their male non-TFA counterparts (790 days to 718 days).⁷ Similarly, female TFA alums average 29 more days at KIPP than female non-TFA teachers (740 days to 711 days). But these differences are not statistically significant as the large variation leads to overlapping confidence intervals reflected in the graph below. Again, this appears to reflect that among former KIPP teachers, most are likely to teach at KIPP for two years regardless of gender or teacher-training program and that most are unwilling to leave during the school year. Interestingly, similar to trends among TFA alums, males vary much more in their length of tenure with KIPP than females among non-TFA alums.

TFA?	Gender	Obs.	Average No. of Days Teaching	Standard Deviation	Standard Error	Median
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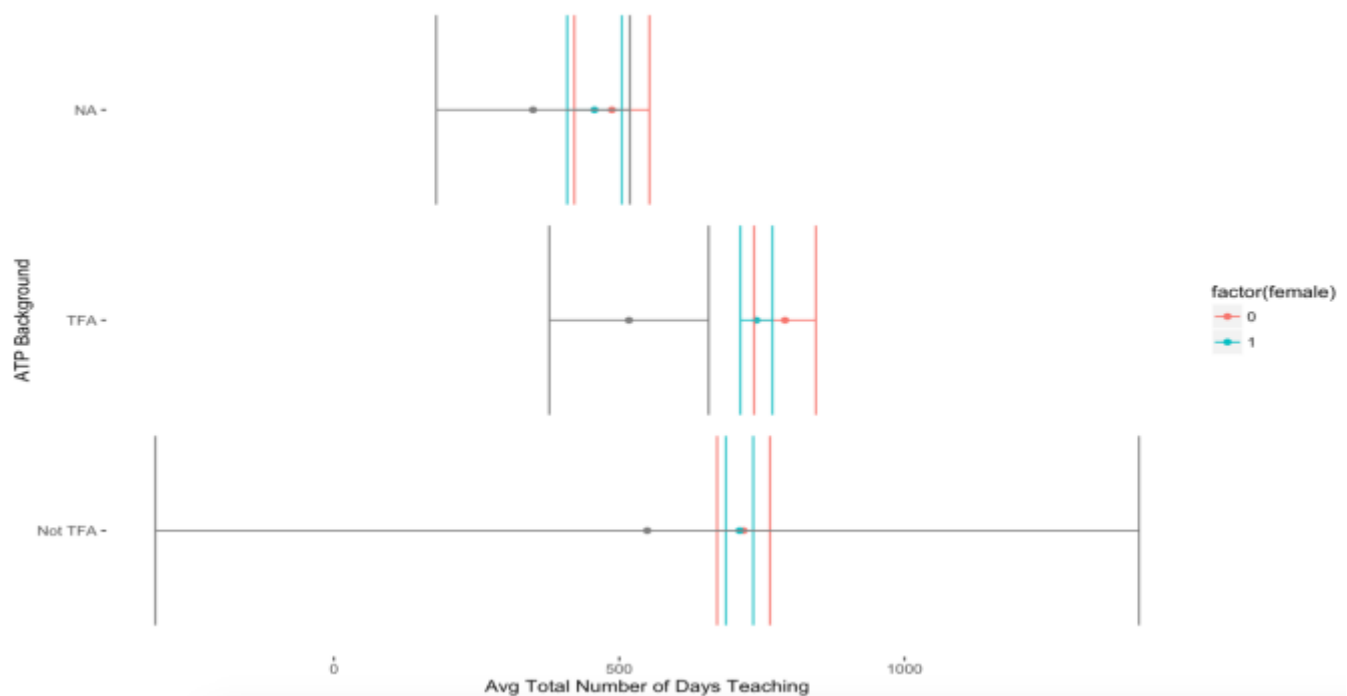
⁵ See the appendix for a look at differences in males and females generally.

⁶ The confidence interval for male TFA alums is (736 – 844 days) and for women is (712 – 768 days).

⁷ See the appendix for a look at differences in males and females based on teacher training program.

Not TFA	Male	1133	718	780.13	23.18	402
	Female	2722	711	622.69	11.94	500.5
	NA	2	549	609.53	431.00	549
TFA	Male	583	790	652.56	27.03	698
	Female	1513	740	545.07	14.01	688
	NA	4	517	139.72	69.86	517
NA	Male	176	487	436.03	32.87	382
	Female	329	457	434.71	23.97	382
	NA	24	349	415.43	84.80	184

Average Number of Days Teaching at KIPP by TFA Status and Gender



IV. Are TFA alums more likely to teach at KIPP for more than two years?

Given that former KIPP teachers average teaching at KIPP for two years, an important question is whether TFA alums are more likely than non-TFA alums to teach at KIPP for more than two years. This analysis includes all former teachers and current teachers who have been at KIPP for more than 800 days.⁸ Within this subset, TFA alums are slightly less likely to stay at KIPP over 800 days.⁹ Females, whether TFA alums or not, are slightly more likely to stay at KIPP over 800 days than their male counterparts.¹⁰

⁸ I use 800 days as the two-year cut off as a very conservative estimate to include only those current teachers that will teach more 2 years.

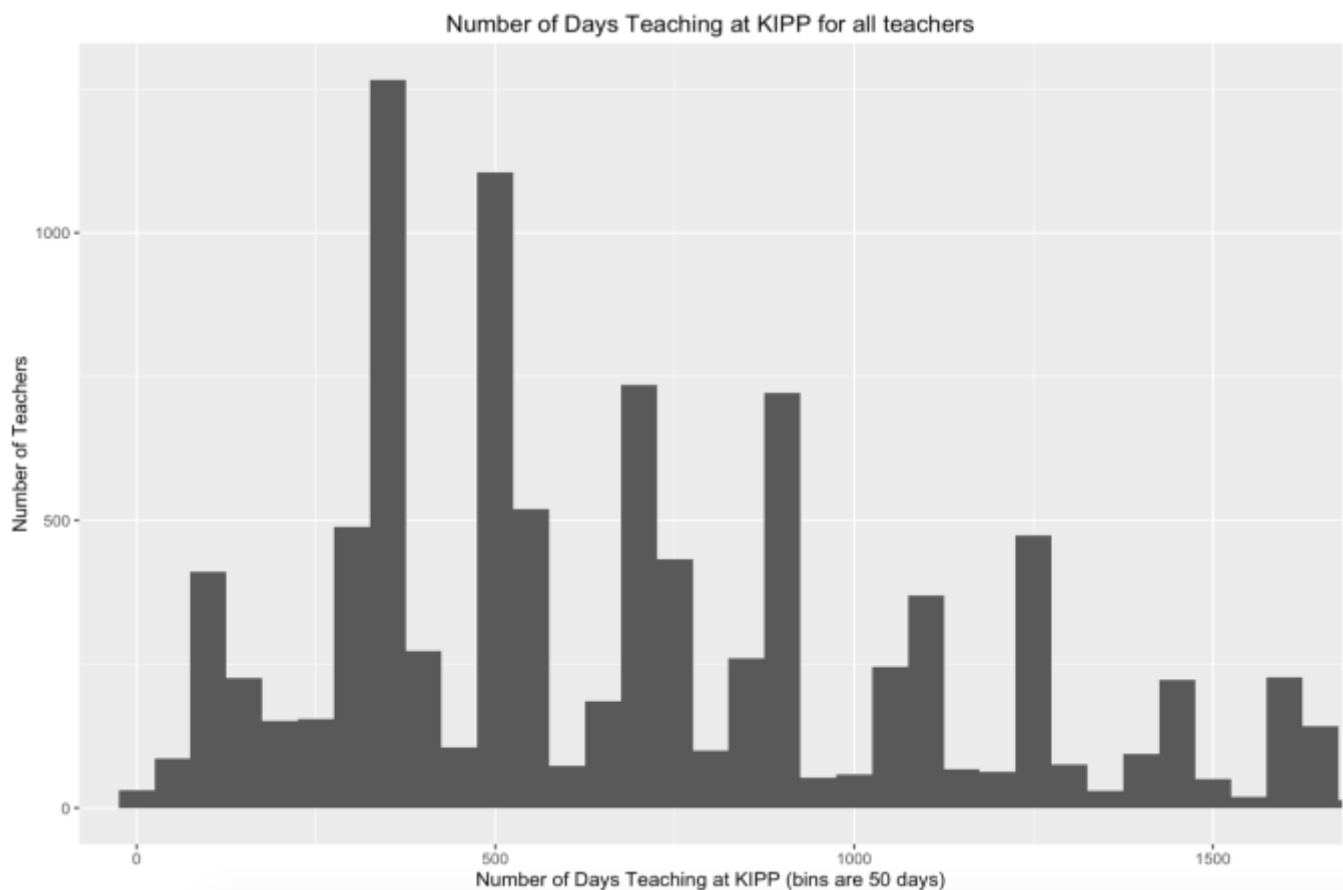
⁹ 49.4% compared to 46.5%.

¹⁰ Among TFA alums, females stay over 800 days 46.9% of the time as compared to 45.8% for males. Among non-TFA alums, females stay over 800 days 50.2% of the time as compared to 46.5% for males.

In a simple model examining whether TFA alums are more likely to stay at KIPP for more than two years, TFA alums were about 3% less likely to stay at KIPP for more than two years.¹¹ This result is statistically significant, but it should be emphasized that the lack of other controlling variables means that the model is very weak.¹²

V. Conclusion

Ultimately, among former KIPP teachers, TFA alums do not appear to stay longer or shorter than non-TFA alums, nor does gender appear to matter much in estimating how long someone stays as a KIPP teacher. Though there are slight differences in the averages between TFA and non-TFA teachers and between men and women, these differences are not significant because of the large variance in the data. The large amount of variance makes getting precise estimates difficult and leads to the large intervals shown in the graphs. These intervals represent the space in which the ‘true’ average likely lies and since these intervals overlap across teacher training program and gender, the differences in average may only be a product of the data and not a reflection of reality. Furthermore, the average days teaching shows that among former teachers, most will teach at KIPP for two years. The consistency of this phenomenon – shown in the graph below¹³ – demonstrates that teachers generally leave at the half or end of year mark.



¹¹ The models can be found in the appendix.

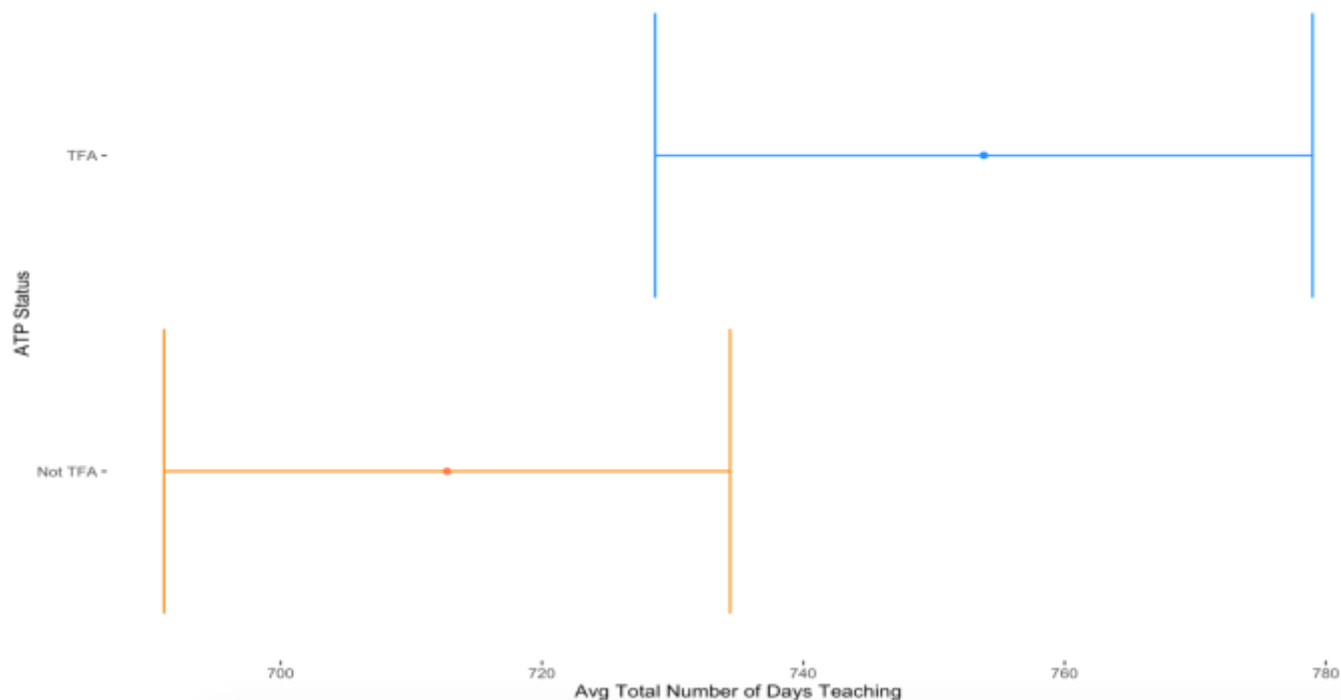
¹² Of the three models, the largest R-squared is 0.1%, this is well below standards for social science research of at least 20%.

¹³ The spikes in the graph show that teachers leave at regular intervals and these intervals align roughly with years taught (365 days, 730 days, 1095 days, etc.). The other spikes, such as around 500 days align with teaching for half years.

Given that former KIPP teachers average teaching at KIPP for about two years, understanding if TFA alums are more likely to stay at KIPP beyond two years is an important question to knowing if there are differences between TFA alums and non-TFA alums in staying at KIPP. With the small amount of data available, TFA alums appear to be slightly less likely to stay at KIPP for more than two years. More data is needed though to further evaluate this question and the current estimations are very weak.

Appendix

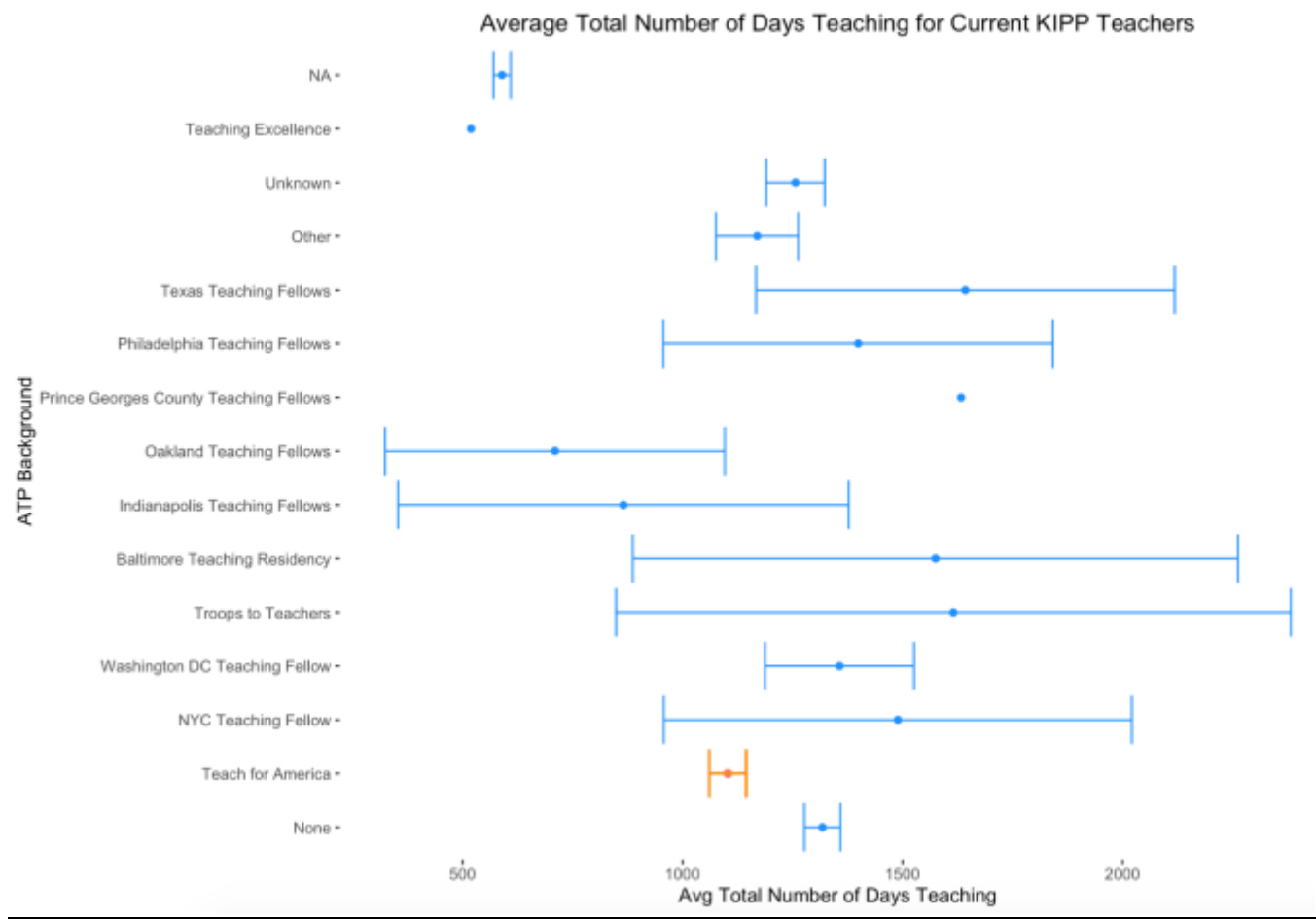
Average Total Number of Days Teaching for Former KIPP Teachers



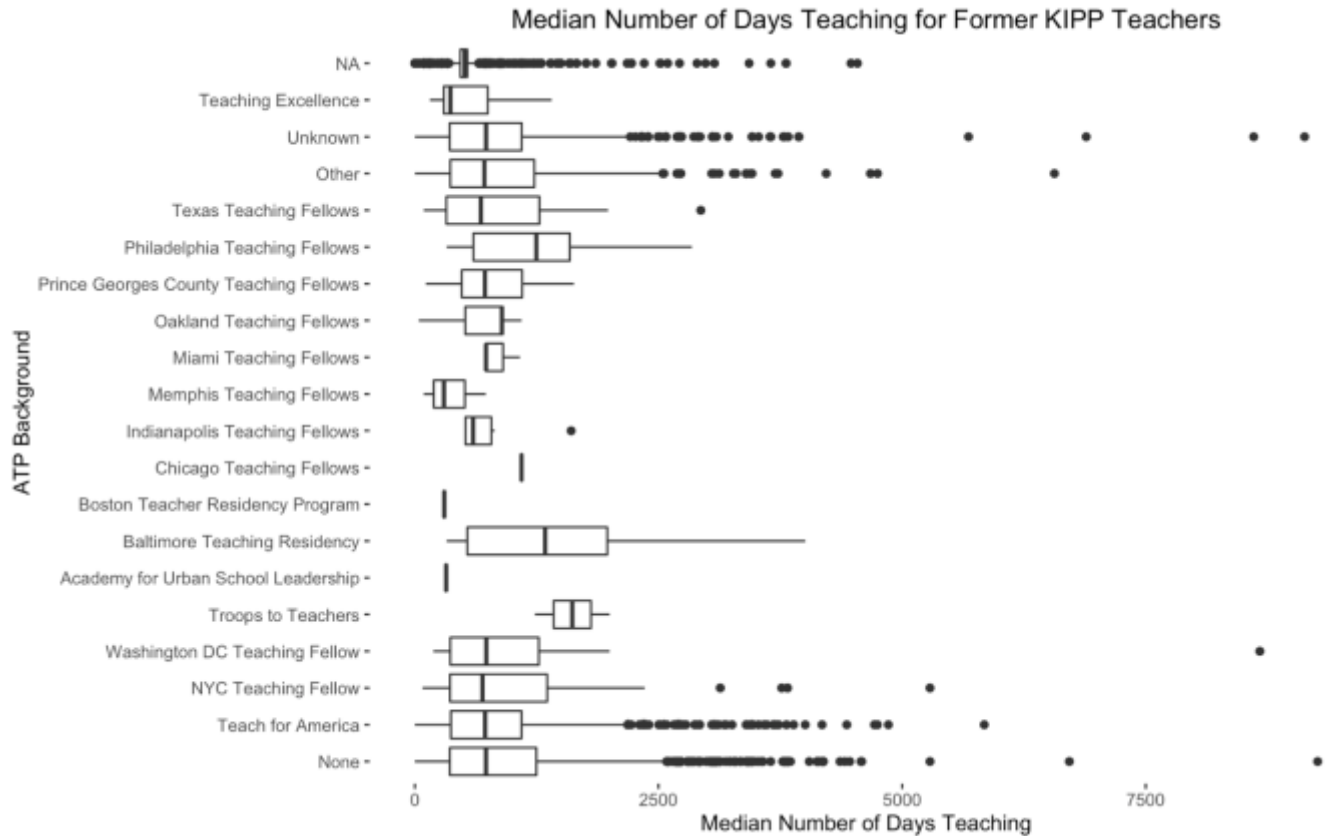
Average Number of Days Teaching at KIPP for Current Teachers

Program	Obs.	Average No. of Days Teaching	Standard Deviation	Standard Error	Median
None	1325	1318	744.47	20.45	1226
<i>Teach for America</i>	924	1103	635.47	20.91	903
NYC Teaching Fellow	24	1489	1302.87	265.95	875
Washington DC Teaching Fellow	18	1357	359.02	84.62	1272
Troops to Teachers	2	1616	542.35	383.50	1615.5
Baltimore Teaching Residency	10	1575	1087.29	343.83	1494.5
Indianapolis Teaching Fellows	4	866	512.37	256.19	669.5
Oakland Teaching Fellows	2	710	272.94	193.00	710
Prince Georges County Teaching Fellows	1	1633	NA	NA	1633
Philadelphia Teaching Fellows	7	1399	585.80	221.41	1571
Texas Teaching Fellows	8	1643	672.95	237.92	1602
Other	240	1170	726.93	46.92	903
Unknown	365	1257	635.15	33.25	903
Teaching Excellence	1	519	NA	NA	519
NA	1042	590	314.65	9.75	519

Appendix



Appendix

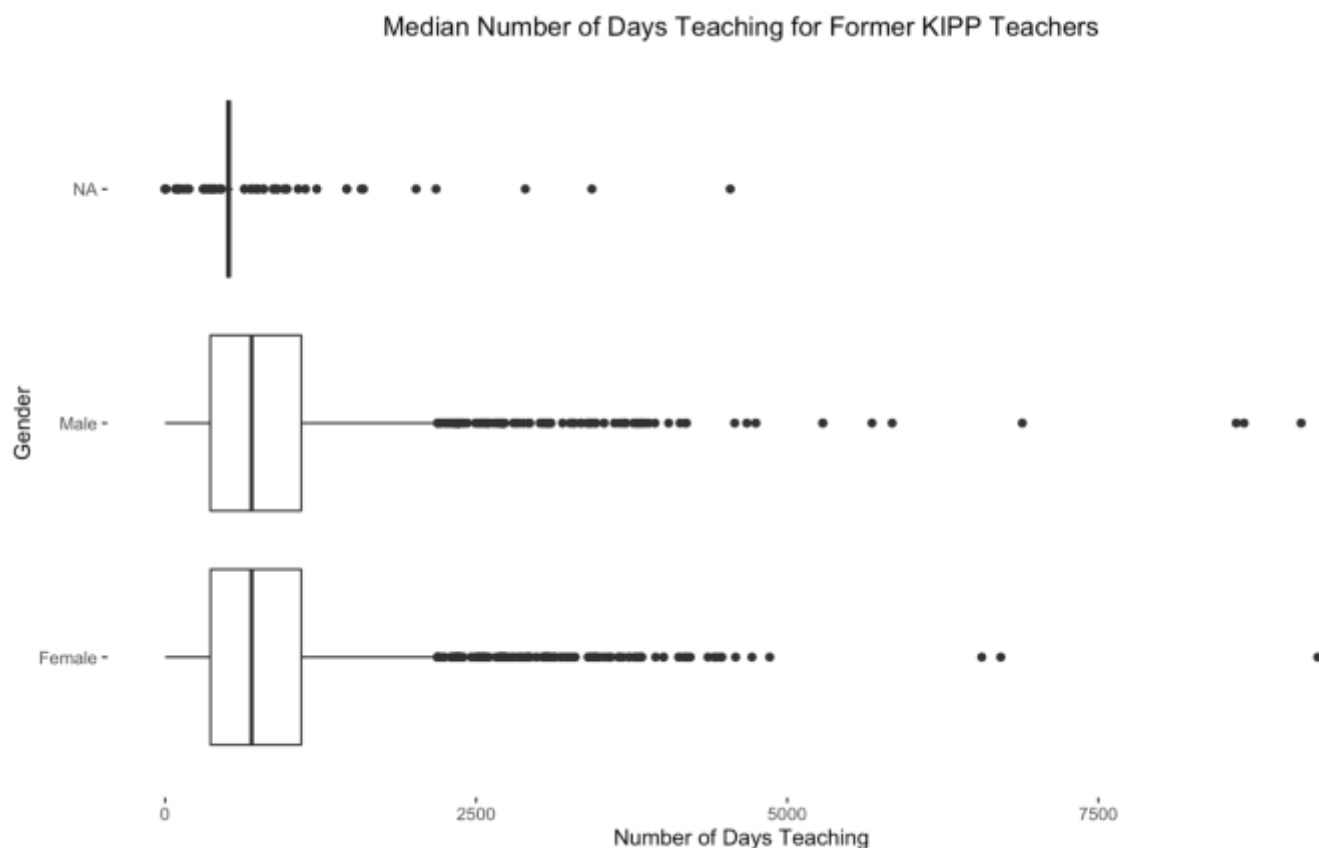


Do men and women differ in how long they teach at KIPP?

Gender	Obs.	Average No. of Days Teaching	Standard Deviation	Standard Error	Median
Male	1892	719	720.81	16.57	513.5
Female	4564	702	590.02	8.73	547
NA	30	385	396.29	72.35	319

Based on the data, there is not a significant difference in how long women and men stay as teachers at KIPP. Though men average a slightly longer stay at KIPP, the overlap in the confidence intervals between the sexes show that this difference is not statistically significant – male (685 – 753 days), women (684 – 720 days). This is driven by the large variation in how long teachers stay at KIPP, as illustrated in the large standard deviation. The similarity between men and women can also be seen in looking at the median for each sex and the spread of the data, shown in the box plot below.

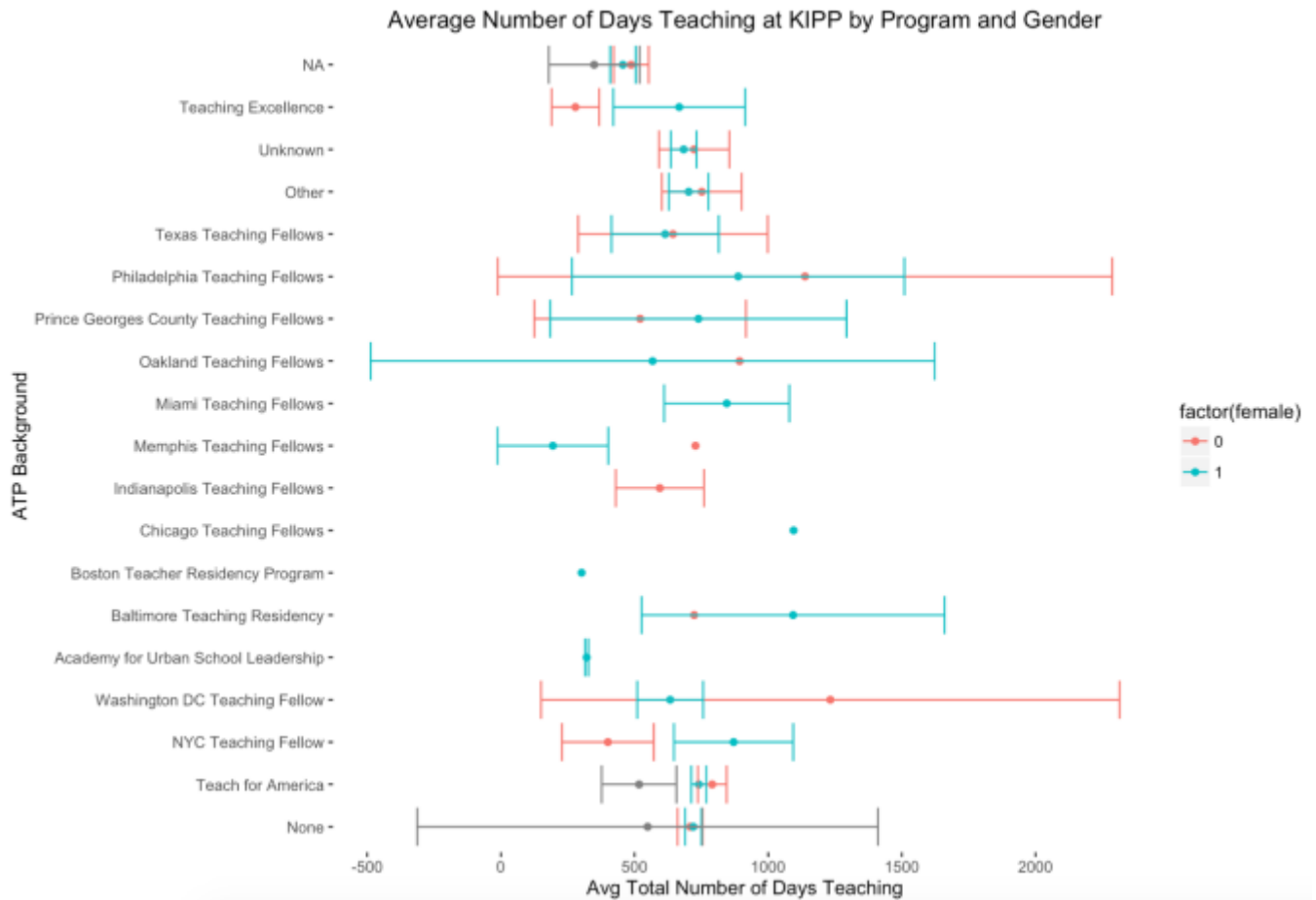
Appendix



TFA alums are also not distinguishable from many other teacher training programs, even when controlling for gender.¹⁴ As seen in the graph below, the large variance across different programs creates large error intervals. Since these intervals overlap for different programs and gender, the differences in average number of days that a teacher is at KIPP may not reflect differences in reality. For example, since the intervals between programs and gender overlap, there is not a strong basis to differentiate between the average number of days a male TFA alum stays at KIPP versus a female NYC Teaching Fellow alum as the true average for each falls somewhere in their respective interval and may be equal. While some of the intervals do not overlap, many have large intervals reflecting a lack of data on these programs.

¹⁴ A complete table of different programs broken down by gender is available in the appendix.

Appendix



Average Number of Days Teaching at KIPP for Former Teachers based on Gender and ATP

Program	Gender	Obs.	Average No. of Days Teaching	Standard Deviation	Standard Error	Median
None	Male	721	708	632.23	23.55	415
	Female	1757	720	644.82	15.38	493
	NA	2	549	609.53	431.00	549
<i>Teach for America</i>	Male	583	790	652.56	27.03	698
	Female	1513	740	545.07	14.01	688
	NA	4	517	139.72	69.86	517
NYC Teaching Fellow	Male	15	400	332.82	85.93	330
	Female	32	871	630.62	111.48	727
Washington DC Teaching Fellow	Male	15	1232	2095.41	541.03	715
	Female	28	633	326.70	61.74	641.5
Academy for Urban School Leadership	Female	2	321	4.24	3.00	321
Baltimore Teaching Residency	Male	1	723	NA	NA	723
	Female	6	1093	694.24	283.42	1182.5

Appendix

Boston Teacher Residency Program	Female	1	302	NA	NA	302
Chicago Teaching Fellows	Female	1	1095	NA	NA	1095
Indianapolis Teaching Fellows	Male	2	595	116.67	82.50	594.5
Memphis Teaching Fellows	Female	1	728	NA	NA	728
	Male	2	195	146.37	103.50	194.5
Miami Teaching Fellows	Female	3	845	202.66	117.01	730
Oakland Teaching Fellows	Male	1	893	NA	NA	893
	Female	2	568	746.00	527.50	567.5
Prince Georges County Teaching Fellows	Male	2	521	280.01	198.00	521
	Female	4	739	554.30	277.15	691.5
Philadelphia Teaching Fellows	Male	4	1138	1149.36	574.68	689
	Female	4	888	621.86	310.93	895
Texas Teaching Fellows	Male	10	644	560.58	177.27	333
	Female	21	614	459.45	100.26	425
Other	Male	117	752	807.20	74.63	667
	Female	285	703	626.39	37.10	385
Unknown	Male	240	723	1019.21	65.79	367
	Female	564	684	570.93	24.04	506
Teaching Excellence	Male	4	279	88.96	44.48	298
	Female	10	667	390.11	123.36	698
NA	Male	176	487	436.03	32.87	382
	Female	329	457	434.71	23.97	382
	NA	24	349	415.43	84.80	184

	Model 1	Model 2	Model 3
Variable			
TFA	-0.028*	-0.028*	-0.033**
Female		0.02	0.02
Previous Years Teaching Experience			X
R-Squared	0.001	.001	-0.000