GENDER BIAS IN GRANTMAKING

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InnovationLab

Gender Bias in Grantmaking

An Our Community Innovation Lab report

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This report is produced by the Our Community Innovation Lab – the engine room for mobilising data to drive social change.

Our team of data scientists, IT engineers and domain knowledge experts is working to bring to life ideas to do old things better and new things first.

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Introduction

This project analyses applications made through the SmartyGrants grants management platform between 2013 and 2016 (405,188 applications in total). We set out to determine if a gender bias was present in the awarding of grants.

Our analysis involved attempting to answer the following questions:

- How many applicants were men/women/unknown?
- How many men/women/unknown applicants were successful in their applications?
- Was one gender more successful than the other in being approved for a grant:
  - Across all applications across the time period?
  - Across all grantmaker organisation types?
  - In the amount of money granted?
- Did any specific grantmakers stand out from the general trend?

Executive summary

Findings

The data shows that 42.17% of grant applications in SmartyGrants are approved and grantmakers in Australia appear to judge applications by their content regardless of the gender of the applicant. **That is to say, we did not detect a gender bias in grants awarded across time, organisation type or amount of money granted.**

Women lodged the majority of applications (52.45%) compared to men (34.78%) and people with unknown gender (12.77%).

In general, the number of grants awarded to men/women was determined by the number of applications placed by men/women. Roughly 42% of the applicants were approved regardless of the applicant's gender – i.e. for every 100 applicants, at least 52 were women and 34 were men; of those 22 women and 19 men were approved for funding.

We found two exceptions to our general findings:

a) The grantmakers classified by SmartyGrants as 'State/Territory Government Grantmakers' showed gender bias in favour of women. Applications submitted by women were funded more often than applications submitted by men (34% vs 26%).

b) Applications requesting more than a million dollars were more likely to be submitted by men than applications for lesser amounts (49% for males and 36% for females). However, women were more successful than men (32% vs 20% success rate). Grants for more than a million dollars comprise less than 1% of the data pool (597 applications) but are considered significant given the amount of money they represent.

Results

The results presented in this report are derived from aggregated SmartyGrants data from 2013 to 2016.

Our Community's data policy states that an individual client's data can only be reviewed if the client has granted express permission and/or requested a client-specific analysis of their data. Five SmartyGrants clients provided permission to check for gender bias in their data. The results of these analyses have been provided in confidence to these clients alone. In general, we found different success rates and different numbers of male/female applicants for each client. However, none recorded a gender bias of any kind.

How many applicants are men/women/unknown?

How many men/women/unknown were successful in their applications?

To answer these questions, we separated the SmartyGrants data by gender and calculated the percentage of placed and approved applications, with the following results:
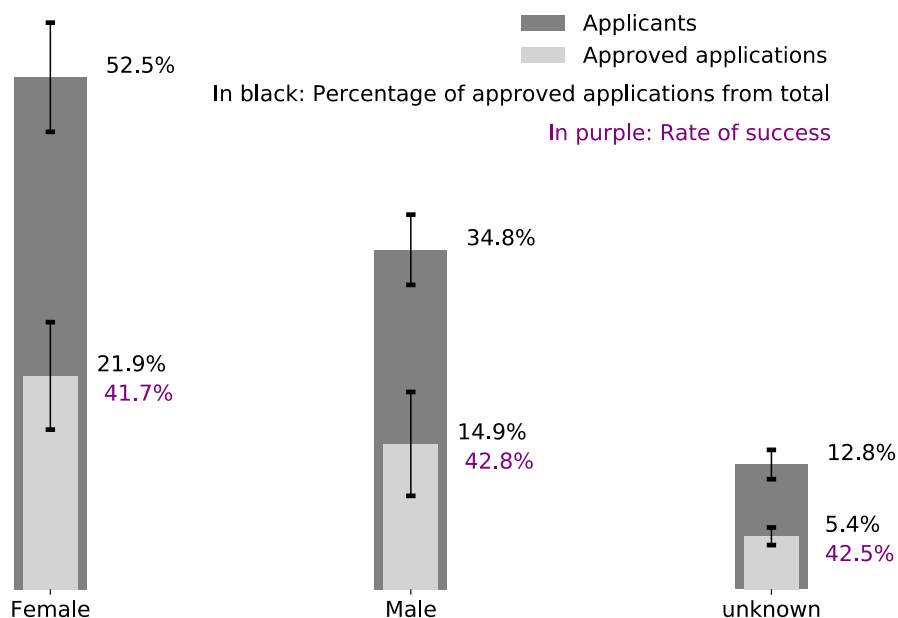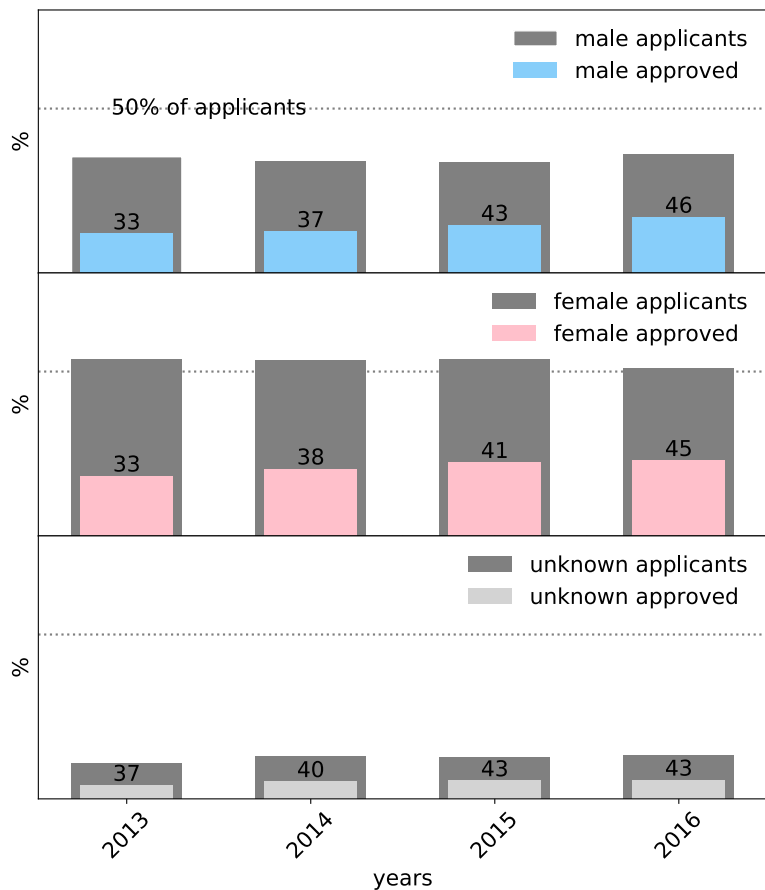

Figure 1: Percentage of female/male/unknown applicants. The dark grey bars show the total number of applicants for each gender. The light grey bars show the approved applications per gender. The percentages in black are relative to the total (100%) of applications. The percentages in purple are relative to the number of applicants per gender (rate of success).

|	Gender	%Applicants	%Approved (from total)	Success Rate
	Table 1: Summary of all SmartyGrants data			
0	Female	52.45	21.86	41.68
1	Male	34.78	14.89	42.82
2	Unknown	12.77	5.42	42.46

From Figure 1 and Table 1 we can infer that **women place significantly more applications than men.** However, **the percentage of applications granted is well balanced** and proportional to the number of applications per gender. Roughly 52% of male and female applications placed are granted.

Is there a gender balance across time?

Figure 2: Percentage of applicants and approved applications per year. The grey bars show the total of applicants per year per gender. The blue/pink/light grey bars show the approved applications per male/female/unknown applicants respectively. The dotted line shows where 50% of the total applicants sits.

The previous results are consistent throughout the years. **Women consistently, over years, place more applications than men and the success rate is roughly the same for men and women.** A clearer way of visualising the gender balance is through Figure 3. Here we show the women's rate of success minus the men's rate of success. For all the years this difference falls within 5%. A 5% difference is allowed given that the mean error is 5.25%.
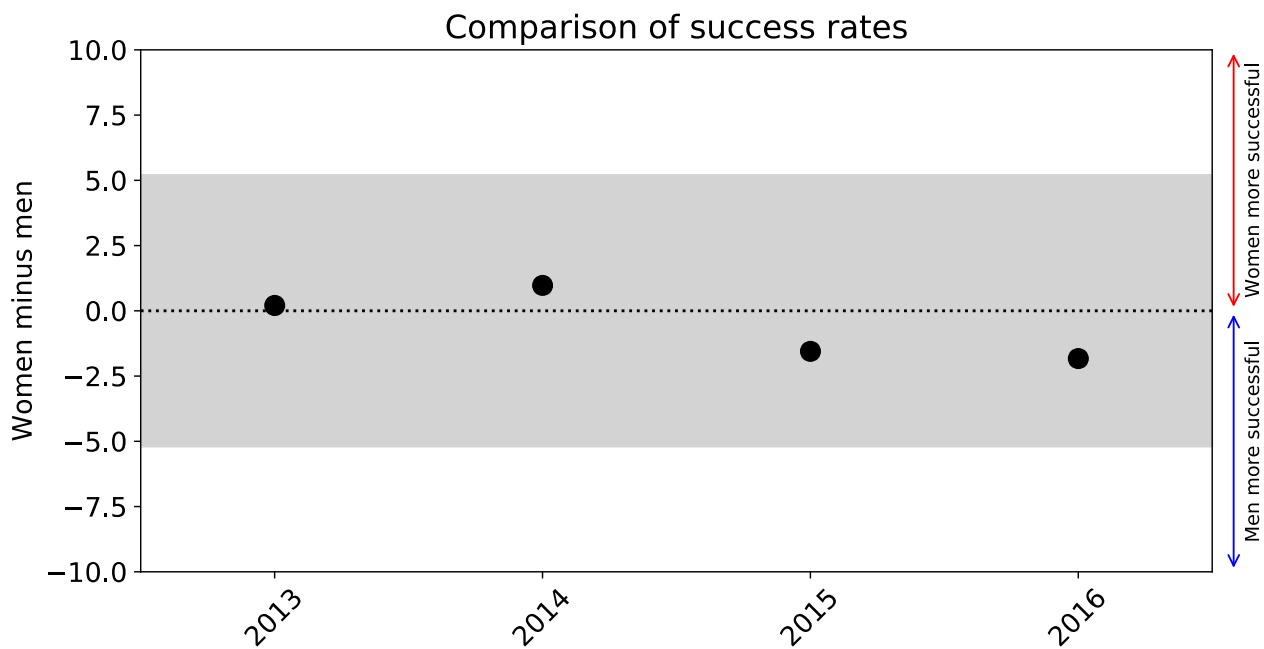
Figure 3: Difference between women's rate of success and men's rate of success per year. The dotted line shows zero difference, which means there is an equal rate of approval for both genders. The grey area shows the margin of error allowed. Any difference within this range is not statistically significant.

Table 2: SmartyGrants data broken by years

description	2013	2014	2015	2016
total	14844.00	56482.00	71800.00	101860.00
% male applicants	35.36	33.79	33.60	36.07
% female applicants	53.83	53.38	53.75	50.82
% unknown applicants	10.81	12.83	12.65	13.11
% male approved	11.88	12.55	14.47	16.93
% female approved	18.19	20.34	22.31	22.92
% unknown approved	4.10	5.24	5.48	5.67
success rate males	33.59	37.14	43.07	46.93
success rate females	33.79	38.11	41.51	45.10
success rate unknown	37.97	40.83	43.34	43.29
No male applicants	5249.00	19086.00	24122.00	36741.00
No female applicants	7991.00	30149.00	38593.00	51766.00
No unknown applicants	1604.00	7247.00	9085.00	13353.00
No male approved	1763.00	7088.00	10389.00	17243.00
No female approved	2700.00	11489.00	16021.00	23346.00
No unknown approved	609.00	2959.00	3937.00	5780.00

## Is there a gender balance in all organisation types?

When we explore the percentage of male and female applicants per grantmaker organisation type (Figure 4 and Figure 5), we see different distributions. This highlights the following conclusions:

a) Women place more applications then men regardless of the grantmaker's organisation type.

b) We see a gender balance in applications granted by: 'Local Government', 'Federal Government', 'Statutory Authority/QUANGO', 'Other Non-for-Profit', 'Corporate' and 'Educational Institution'.

c) There are two organisation types that approve more applications submitted by women than those submitted by men: those designated as 'State/Territory Government' grantmakers (8% difference) and 'Other' grantmakers (6% difference). 'Other' is a small data set (comprising less than 1% of the sample, 650 applications in total). While the 'State/Territory Government' designation applies to 16% of all the applications (65,550 applications). An 8% difference represents 5,244 applications.

d) The grantmaker organisation type 'Educational Institution' has the smallest rate of success. Only 11% of applications that are submitted are approved. That is, if you apply for funding from an 'Educational Institution' you have little chance of getting the money. The rejection rate is 89%.

e) 'Local Government' has the highest rate of success (56%). That is, if you apply for funding from a 'Local Government' grantmaker you have a good chance of getting the money.
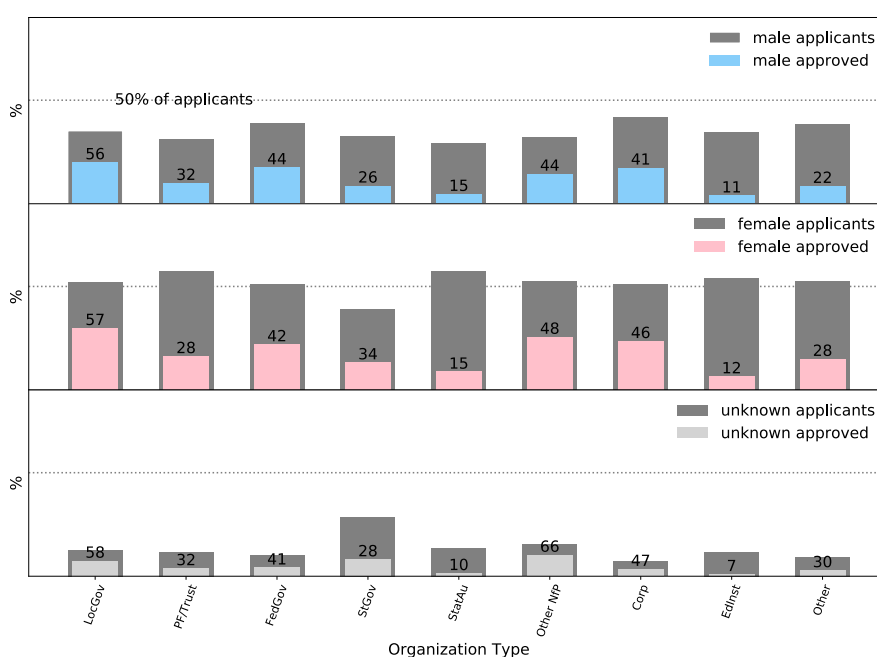
Figure 4: Percentage of applicants and approved applications per grantmaker organisation type. The grey bars show the total of applicants per organisation per gender. The blue/pink/light grey bars show the approved applications per male/female/unknown applicants respectively. The dotted line shows where 50% of the total applicants sit.

Comparison of success rates
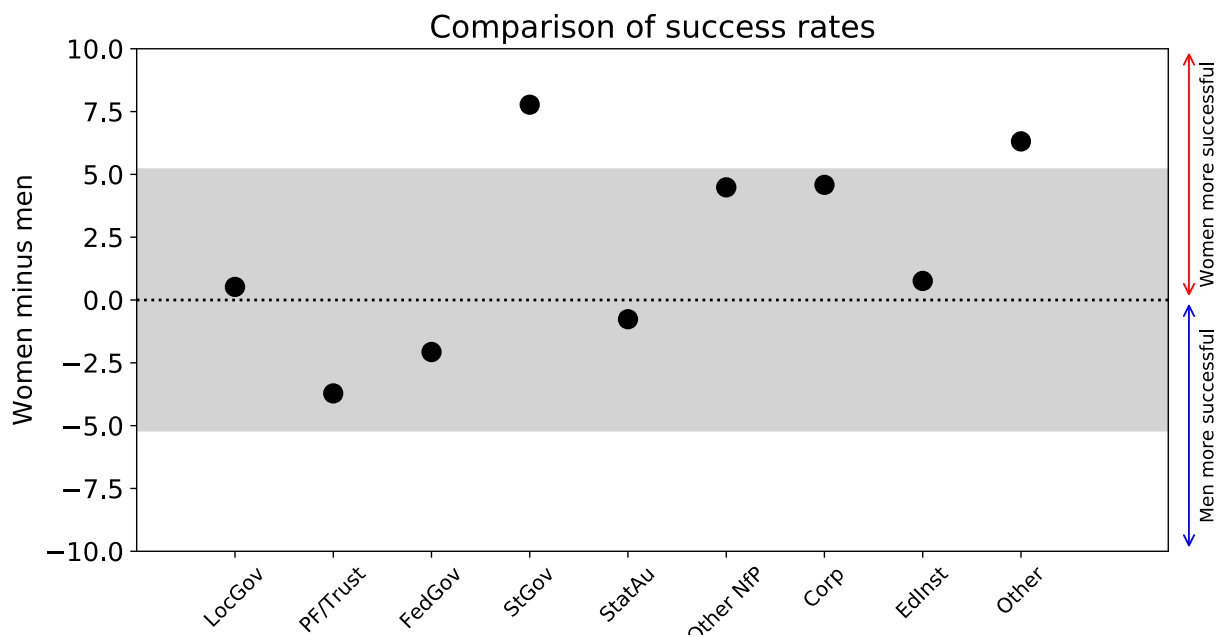
Figure 5: Difference between women's rate of success and men's rate of success per organisation type. The dotted line shows zero difference, which means there is an equal rate of success for both genders. The grey area shows the margin of error allowed. Any difference within this range is not statistically significant.

Table 3: SmartyGrants data broken by organisation type

description	LocGov	PF/Trust	FedGov	StGov	StatAu	Other NfP	Corp	EdInst	Other
total	80274.00	38321.00	65550.00	13523.00	21660.00	15370.00	323.00	2191.00	7774.00
% male applicants	35.17	31.02	38.95	32.69	29.01	32.37	41.80	34.46	38.35
% female applicants	52.15	57.37	51.17	38.65	57.40	52.27	51.08	53.95	52.34
% unknown applicants	12.68	11.61	9.89	28.66	13.59	15.36	7.12	11.59	9.31
% male approved	19.93	9.94	17.52	8.66	4.64	14.39	17.34	3.88	8.50
% female approved	29.83	16.24	21.96	13.24	8.73	25.58	23.53	6.48	14.91
% unknown approved	7.38	3.77	4.11	8.07	1.41	10.25	3.41	0.91	2.80
success rate males	56.68	32.03	44.98	26.49	15.98	44.46	41.48	11.26	22.17
success rate females	57.20	28.31	42.91	34.26	15.21	48.94	46.06	12.01	28.48
success rate unknown	58.21	32.49	41.56	28.15	10.36	66.75	47.83	7.87	30.11
No male applicants	28231.00	11888.00	25529.00	4420.00	6284.00	4975.00	135.00	755.00	2981.00
No female applicants	41865.00	21983.00	33541.00	5227.00	12433.00	8034.00	165.00	1182.00	4069.00
No unknown applicants	10178.00	4450.00	6480.00	3876.00	2943.00	2361.00	23.00	254.00	724.00
No male approved	16002.00	3808.00	11484.00	1171.00	1004.00	2212.00	56.00	85.00	661.00
No female approved	23948.00	6224.00	14393.00	1791.00	1891.00	3932.00	76.00	142.00	1159.00
No unknown approved	5925.00	1446.00	2693.00	1091.00	305.00	1576.00	11.00	20.00	218.00

**Is there a gender balance in the amount of money granted?**

It is important to highlight that only 20% of applications (95,030) recorded within SmartyGrants include information that shows what quantum of money is represented by Declined or Approved applications. Some grantmakers do not record the dollar amount requested when an application has been Declined. Therefore, we excluded those grantmakers from this analysis. Bearing that in mind, this is what we found.

The best way of understanding the money granted is to break the data into 5 representative bins: $20 to $1,000; $1,000 to $10,000; $10,000 to $100,000; $100,000 to $1 million; and greater than $1 million. Figures 6 and 7 and Table 4 show that:

a) Most application are concentrated between $1,000 and $10,000 (44%, 40,933 applications), followed by applications from $10,000 to $100,000, which constitute 32% of the data (30,163 applications).

b) The rate of approval decreases with the amount of money requested – i.e. the more money you ask for the less likely it is that you will get funded. The majority of the applications for between $20 and $1,000 are approved (72%) while the success rate drops to 25% for applications asking for more than $1 million.

c) Women are more likely to apply for amounts of between $20 and $1 million, and women and men in this data range have roughly the same success rate.

d) Men are more likely to apply for amounts of more than $1 million (597 applications). However, women in this data range have a higher success rate (32%) than men (20%).
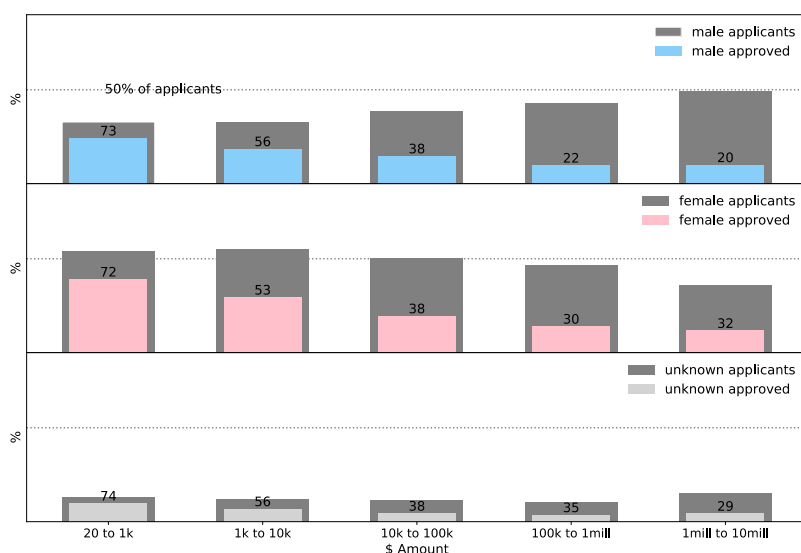
Figure 6: Percentage of applicants and approved applications per money granted. The grey bars show the total of applicants per organisation per gender. The blue/pink/light grey bars show the approved applications per male/female/unknown applicants respectively. The dotted line shows where 50% of the total applicants sits.
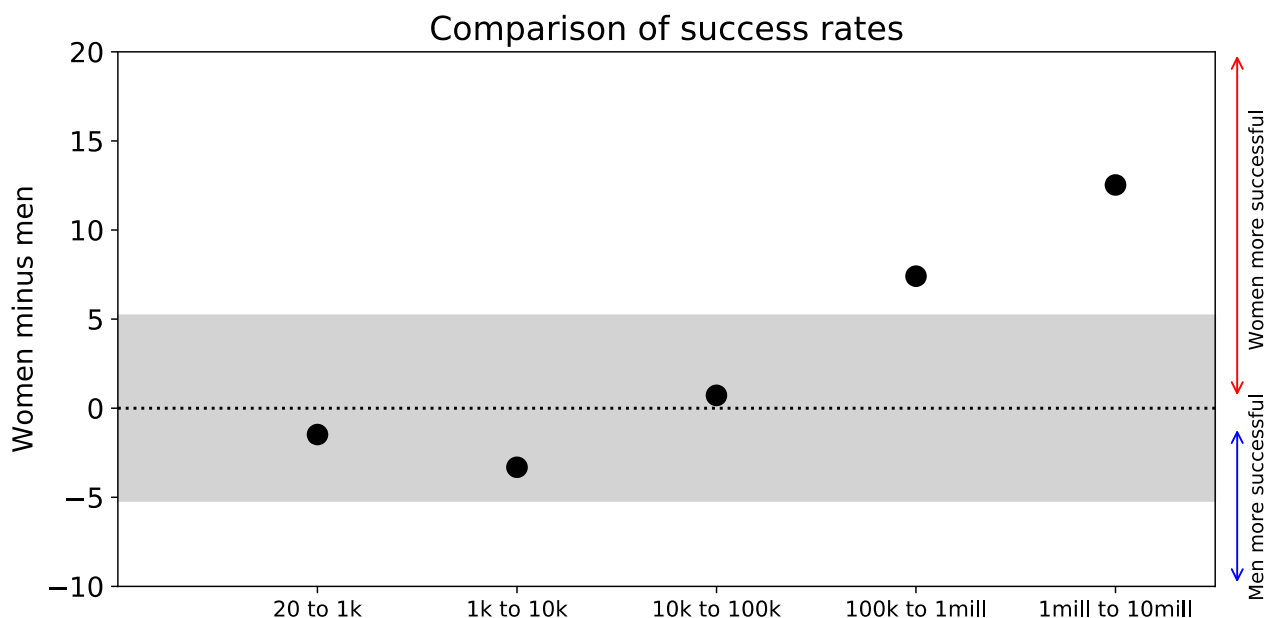
Figure 7: Difference between women's rate of success and men's rate of success per money granted. The dotted line shows zero difference, which means there is an equal rate of success for both genders. The grey area shows the margin of error allowed. Any difference within this range is not statistically significant.
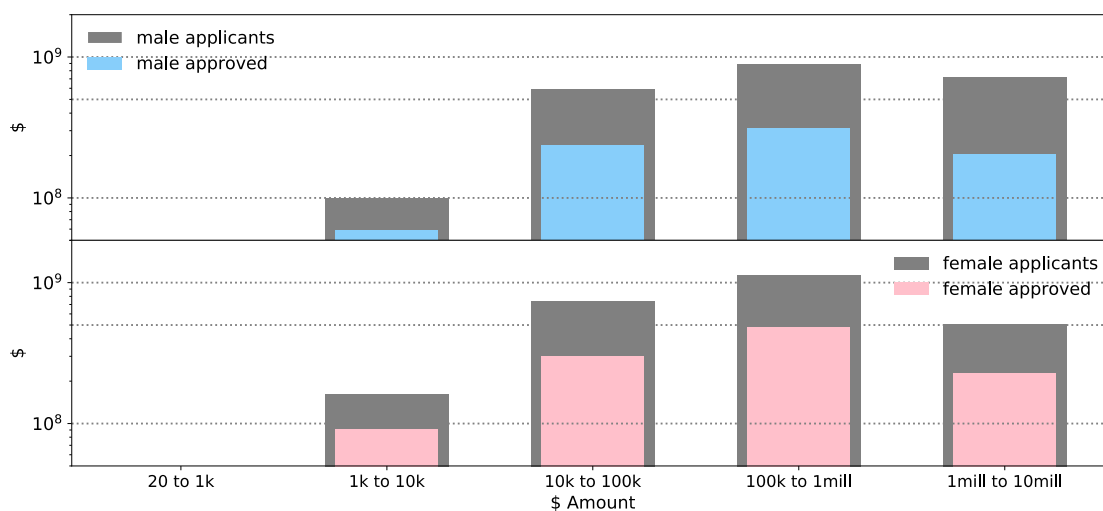
Figure 8: Amount of money requested and approved per gender. The grey bars show the money requested per gender. The blue/pink bars show the money approved per male/female applicants respectively. The y-axis is shown in log scale to make the differences more visible.

description	20 to 1k	1k to 10k	10k to 100k	100k to 1mill	1mill to 10mill
total	8639.00	40933.00	30163.00	7358.00	597.00
% male applicants	32.83	32.69	38.50	43.08	49.41
% female applicants	53.96	55.24	50.16	46.62	35.68
% unknown applicants	13.21	12.06	11.34	10.30	14.91
% male approved	24.27	18.56	14.72	9.77	10.05
% female approved	39.10	29.52	19.54	14.03	11.73
% unknown approved	9.79	6.82	4.41	3.63	4.36
success rate males	73.94	56.76	38.24	22.68	20.34
success rate females	72.46	53.44	38.96	30.09	32.86
success rate unknown	74.15	56.50	38.91	35.22	29.21
No male applicants	2836.00	13383.00	11613.00	3170.00	295.00
No female applicants	4662.00	22612.00	15129.00	3430.00	213.00
No unknown applicants	1141.00	4938.00	3421.00	758.00	89.00
No male approved	2097.00	7596.00	4441.00	719.00	60.00
No female approved	3378.00	12084.00	5894.00	1032.00	70.00
No unknown approved	846.00	2790.00	1331.00	267.00	26.00

Methodology

Data

SmartyGrants data covers the period from 1960 to 2017. However, a large proportion of data that pre-dates 2013 has been migrated into the system and many grantmakers do not have records of declined applications. Some of the caveats we encountered were:

a) Before 2000 the total of applications per year was less than 3000.
b) Between 2000 and 2013 a large fraction of SmartyGrants data comes from migrated records and many of them do not specify the name of the applicant.
c) The data from 2017 is not conclusive since many of the applications are still open and awaiting a decision.

To safeguard against misleading statistics, for this study we used only applications received from 2013 to 2016 and excluded the migrated records.

The major challenge associated with this project was the lack of a formal gender identification for each applicant. SmartyGrants records the applicant's name in some cases and the user's name in most cases. To overcome this challenge, we sought to use the applicant's first name/username to determine a gender. Before commencing the classification, we conducted a data cleansing exercise to remove the user names that would be impossible to classify per gender; e.g. acronyms, organisation names, non-gender-specific honorifics (e.g. Dr., Prof.), emails that did not contain name clues, etc.

This reduced the final sample to 405,188 applications spanning 2013 to 2016.

Gender classification

Within the SmartyGrants data we found 23,084 unique names to which we sought to assign a gender. There are many libraries available online that can be used to classify names into genders. After exploring the field, we decided to use three well-known libraries that seemed to suit our data:

a) SexMachine python module. This module, written by Jorg Michael, is free and was able to run our large data set in minimum time. It classified each name into one of the following categories: female, male, mostly female, mostly male, andy (for unisex names), and unknown. SexMachine classified 13% of our sample entries as unknown (a combination of andies and real unknowns).
b) Genderize.io and Gender API. These are commercial libraries with a more comprehensive database than SexMachine. Each name in their dictionary had been classified by at least 100 native speakers, providing a good probability of each name being classified properly. Unfortunately, these libraries proved to be both expensive and slow.

The process of classifying the names into genders was carried out as follows:

1. We selected a control sample of 500 names where we ran all three libraries and compared their accuracy.
2. Once we were sure that SexMachine would return the correct genders, we ran SexMachine over the entire SmartyGrants database and treated that as the final classification.

Uncertainties

The final analysis broke the data into percentages to answer the questions listed above.

We identified two sources of uncertainties in this approach:

a) **What is the probability that a woman has been incorrectly classified as a man and vice versa?** To calculate this error, we compared the name classification in SexMachine with the name classification of Gender API and genderize.io. To achieve this we used a control sample of 500 names. We extracted a mean probability for males, females, mostly males and mostly females. This error is identified as **Ec.**

b) **What is the probability of finding the same percentages in random samples?** Using a bootstrapping technique[1], we calculated the error on the mean **Eb.**

The final error is the combination of both $E_f = \sqrt{Ec^2 + Eb^2}$

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[1] Bootstrapping: A **bootstrap** sample is a smaller sample that is **"bootstrapped"** from a larger sample. **Bootstrapping** is a type of resampling where large numbers of smaller samples of the same size are repeatedly drawn, with replacement, from a single original sample.

Author

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