Tweeting Economists: Antisocial in the socials?

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Abstract

Economists have often been accused of adopting superior and distant attitudes (Fourcade, Ollion and Algan, 2015). This attributed stance has been variously linked to both poor understanding and traction of economics with the general public, the failure to generate realistic predictions and prescriptions (Coyle, 2012; Bresser-Pereira, 2014), and the lack of diversity in the profession (Crawford et al., 2018; Stevenson and Zlotnick, 2018; Bayer and Rouse, 2016). In this piece we focus specifically on Twitter communications by economists to investigate the ability of economists to fruitfully engage with the public in these networks and the attitudes their language use betrays. We compare economists to scientists, gathering data from the Twitter accounts of both the top 25 economists and 25 scientists as identified by IDEAS and sciencemag, who account for the lion's share of the Twitter following, collecting a total of 127,593 tweets written between December 2008 and April 2017. Using both network and language analysis our paper finds that although both groups communicate mostly with people outside their profession, economists tweet less, mention fewer people and have fewer Twitter conversations with strangers than a comparable group of experts in the sciences, and sentiment analysis shows they are also more distant. The language analysis of differences in register (a higher register is generally less accessible and thus more distanced) finds that economists use a higher number of complex words, specific names and abbreviations than scientists, and differences in pronoun use reveal they are also less inclusive, all of which adds to distancing.

1. Introduction

Economists have been historically criticised for their unrealistic characterisation of human beings as cold calculating machines and its potential consequences on the ability of the discipline to produce realistic and useful models and prescriptions (Bowles and Gintis, 1993; Nelson, 1995; Tahler, 2000; Boyd et al, 2001) as well as potentially encourage antisocial behaviours (Frey and Meyer, 2003; Lee at al., 2009; Bowles, 2008; Frank, 1987). More recently, arguments about arrogance have featured in parallel discussions about the way in which economists and the discipline itself are perceived by the public and by potential undergraduate recruits (Carwford et al, 2018; Tonin and Wahba, 2015; Emerson et al, 2012; Dynan and Rouse, 1997), and about the lack of diversity in the profession (Bayer and Rouse, 2016; Stevenson and Zlotnick, 2018; Hengel, 2017).

Studies addressing the approach and communication style of economists are not new: Fourcade, Ollion and Algan (2015) found in their work that economists display higher assertiveness and a sense of superiority, which they link to the higher remunerations, insularity and hierarchy that exists relative to the other social sciences, and Hengel (2017) in her recent paper found that papers written by women take, on average, six months longer to make it through the peer-review process and, importantly for the external validity of our study, that the difference persists *in spite of the fact that female economists tend to be slightly better writers than their male counterparts, as measured by some standardized measures of readability,* suggesting that readability is perhaps not strongly valued. The question of how economists talk has come strongly to the front since our analysis took place in the research by Alice Wu (2017) who found that discussions in EJMR about women focus on physical appearance or family information, whilst discussions about men focus on academic or professional aspects. Wu also found significantly stronger deviation from an Academic/Professional focus when there is a prior mention of women; in contrast, the deviation from a Personal/Physical topic is stronger if the prior post is about men rather than women, and that female economists also receive more and negative attention online than their male counterparts. The problem has been linked to the lack of diversity in the profession as discussed in many fora recently and summarized in the paper by Bayer and Rouse (2016), showing that the economics profession includes disproportionately few women and members of historically underrepresented racial and ethnic minority groups, relative both to the overall population and to other academic disciplines and this likely hampers the discipline constraining amongst other things the ability to reach out to the public.

In this piece, we investigate the tweeting behaviour of economists, by concentrating on the 25 most followed accounts (from IDEAS), which have a total of about 7 million followers and as the next 300 accounts together have about 2 million can reasonably be treated as a representative sample of how economists communicate with the public. We specifically address their networks, the sentiment and the language used in order to see whether evidence of arrogance or generally poor communication is present. To do so, we compare these accounts with the 25 most followed accounts by scientists drawn from SCIMAG, which we assume to be a comparable group of experts who need to communicate complex ideas on matters that the public cares or should care about. Our criterion for data collection was to select the last 3240 tweets from each person on the list (economists' tweets ranged from 02/11/2009 to 06/04/2017, the scientists' tweets from 09/12/2008 to 13/04/2017), which gave us a total of 64121 tweets from the economists and 63472 from the scientists. In what follows we describe the networks, sentiment and language analysis of the tweets by the two groups and present our conclusions.

2. Network Analysis

Twitter is a social media platform where users can post short texts (up to 140 characters in length) for viewing by other users. Twitter users often direct or address their public tweets to other users by using mentions with the @ symbol. Suppose there are two users with usernames Alice and Bob. Alice might publicly tweet (instead of privately messaging): "@Bob, have you seen this today (url)?". Bob might reply with "Shocking! @Alice". In that way, we assume that there is a conversational relationship between two (or more) users if they mention each other repeatedly. Note that although mentions are used to address other users in a tweet, the tweet itself is still public and the messages may be read and commented on by other users.

Tweets by the top 25 scientists (obtained by taking 25 top living scientists from Science magazine list published in 2014) and top 25 economists (from the IDEAS list which is updated daily, we have taken the list on the 6th of April 2017) were gathered into two datasets, from which only tweets containing mentions were extracted for the network. Tweets that were retweets were disregarded, as were loops, i.e., when a Twitter user mentioned themselves in a tweet. Table 1 shows tweets by the top 25 scientists and top 25 economists, with tweets containing mentions (disregarding retweets and loops). We then collected users' details of all the mentioned users and with a simple keyword search on user descriptions, classified them into three classes: economists, scientists and others.

Table 1: Tweets (excl. retweets)

Dataset	No. of tweets	No. of tweets containing mentions	No. of users mentioned
Sci	51,289	27,380	15,606
Econ	42,535	15,810	7,465

Table 2: Summary of edges by occupation (excl. loops) for scientist network

From	*Scientist*	*Other*	Total
Scientist	463	38,096	38,559

Table 3: Summary of edges by occupation (excl. loops) for economist network

From	*Economist*	*Other*	Total
Economist	252	24,196	24,448

A tendency of a node to connect to similar nodes in a network is also known as *homophily*. We used *the statnet* R package for networks analysis to examine homophily in the network with regard to occupation by creating exponential-family random graph models (ERGMs). We study the tendency of a node to have an edge with (or, in our context, to mention) a node of the same occupation (*nodematch.scientist* and *nodematch.economist*). We obtain similar results on occupation in both networks, that is both economists and scientists communicate mostly with people outside their professions.

Table 4: Monte Carlo MLE Results for Scientist Tweets

	Estimate	Std. Error	p-value
edges	-9.548184	0.007588	< 1e-04***
nodematch.scientist	7.914551	0.110696	< 1e-04***

Signif. codes: 0<'***'<0.001<'**' 0.01<'*'<0.05

Table 5: Monte Carlo MLE Results for Economist Tweets

	Estimate	Std. Error	p-value
edges	-8.79362	0.01088	< 1e-04***
nodematch.economist	6.43859	0.14551	< 1e-04***

Signif. codes: 0<'***'<0.001<'**' 0.01<'*'<0.05

Mentions are a useful way to establish the points of reference of users, and of course we expect to see a difference between the two groups. One interesting aspect of this difference, however, is that scientists mention more videos than economists: while for Scientists YouTube is on the top, for Economists it is Financial Times.

Table 6: Mentions

No of mentions	Economists	No of mentions	Scientists
20	Financial Times'	18	'YouTube'
19	The Economist'	17	'The New York Times'
19	The New York Times'	16	'The Guardian'
17	Justin Wolfers'	14	'Donald J. Trump'
16	The Wall Street Journal'	13	'Elon Musk'
15	Bloomberg View'	13	'The Economist'
15	RePEc Author Signup'	13	'NASA'
15	Bloomberg'	12	'CNN'
14	Forbes'	12	'Scientific American'
13	Washington Post'	12	'The New Yorker'
13	Donald J. Trump'	12	'Richard Dawkins'
13	Lawrence H. Summers'	12	'Brian Cox'
13	Project Syndicate'	12	'Slate'
13	Branko Milanovic'	11	'Neil deGrasse Tyson'
13	The New Yorker'	11	'Washington Post'
13	The Guardian'	11	'President Trump'
13	Tim Harford'	10	'TED Talks'
12	tylercowen'	10	'Ed Yong'
12	World Economic Forum'	10	'New Scientist'

12	Vox'	10	'The Wall Street Journal'

3. Sentiment

To assess the difference in sentiment between the two groups, we also ran all the Tweets through Sentistrength (Telwall et al, 2012), an open source software that detects the sentiment of some given text, and then assigns it a positive and negative score: 1 to 5 for positive and -1 to -5 for negative. These scores were used to create an average sentiment for each tweet by calculating the mean of these two scores. A t-test for means of two independent samples from descriptive statistics (mean and standard deviation) shows that Economists' mean of 1.3312 was significantly lower than Scientists' mean of 1.5349 (statistic=-5.6919, p=7.3833e-07). Economists' mean for negative sentiment score was slightly bigger, but not significantly (-1.4415 vs -1.4541, with t-test statistic=0.2557, p=0.7992). Note that usually "top broadcasters send positive sentiment messages more often, and negative sentiment messages less often. When they do use positive sentiment, it tends to be stronger." (Charlton et al, 2016).

4. Language Use

In order to examine the language used by Economists, the corpora of their language from Twitter were uploaded to Sketch Engine – linguistic software programme. This tool allows a number of comparisons to be drawn between the two data sets in order to analyse subtle differences in language as used by Economists vs. Scientists. We examined two areas of language: differences in register, whereby a higher register is generally less accessible and thus more distanced, and differences in pronoun use, with particular attention to the use of first- and second-pronoun usage, which often relate to a greater degree of involvement with the reader.

Register

To examine register, each corpus was compared against the other as a reference corpus in a keyword analysis. This involves the comparison of one corpus (the 'focus') against another (the 'reference') to identify the words which occur significantly more often in one than the other and are hence *key* in the data set. The loglikelihood metric is used as a test of statistical significance. Broadly speaking, a higher register can be thought of as one that requires a greater

amount of knowledge on the part of listener or reader, whether this is general linguistic knowledge or specialized in terms of the genre. A higher register normally involves the use of complex or specialised vocabulary. The top 100 statistically significant keywords were examined for their adherence to one of three criteria: 1) domain-specific names, which require knowledge of the field to comprehend; 2) abbreviations, which again require prior knowledge for comprehension; and 3) complex word use.

In Linguistics, a word is considered 'complex' when it is built up of more than one 'morpheme', which can be thought of as the smallest unit into which any word can be split. For example, the word *atomic* is complex as it can be split into two morphemes – the base *atom* and the suffix -*ic*; the words *atom* and *help* are not themselves complex, since they cannot be broken down into smaller components. Note that the use of the label 'complex' does not refer to the meaning of the word, which may be easily understood by most speakers of the language, but rather to the complexity of its construction. An increase in the usage of complex words within a text has generally been associated with more formal and more specialized genres, and hence a lesser degree of accessibility by non-members of the genre's group. In this report, a word is deemed complex according to its presence in a previously-compiled database of complex words (*MorphoQuantics*), itself based on the Oxford English Dictionary.

Appendix 1 shows the table of keywords for the Economists' tweets when compared to those of the Scientists as a reference corpus and vice-versa, with the relevant words marked for adherence to the three criteria listed above; for a simpler comparison, the number of words of each type was calculated and grouped into Table 1 below.

The figures show that there is a much higher number of features that demonstrate a higher register in the Economists' tweets: there are a number of uses of specialized names (*Marx*, *Krugman*) and abbreviations (*GDP* 'Gross Domestic Product', *FT* 'Financial Times'), as well as over a third of the words being complex (*downloadable*, *inflation*). By comparison, the Scientists' tweets show slightly fewer names (*Pinker*, *Kaku*) and abbreviations (*NASA*, *DNA*) when compared to the Economists' tweets corpus, and a noticeably smaller number of complex words (*patient*, *evolution*).

In examining and categorizing the words for these criteria, it was also observed that the Scientists' tweets showed a number of quite informal linguistic items, such as *yeah* and *wow* that point to an excitement and positive response, while the Economists' exhibited no such items; these figures are also included in Table 6. This is interesting in terms of the research hypothesis as it shows not only a tendency for the Scientists to use fewer higher-register items, but also to include a number of lower-register items, which increase the ease with which the public can engage with their language.

Although it is reasonable to assume that these findings indicate more accessible language used by Scientists, there is the possibility that some of the higher-register language used by Scientists is shared by Economists in a way that would not identify them as keywords when comparing the two corpora against each other. For this reason, it is also useful to compare both again to another reference corpus (benchmark) that exemplifies a more general spread of genres across the language; for this analysis, the British National Corpus (BNC) has been chosen.

The right-most column in Table 6 also shows the results of comparing keywords of each of the specialized corpora against the BNC for the same register criteria, including more informal linguistic items. The figures here show that the difference in register markers between the Economists and Scientists appears to be maintained under this analysis, although it is worth noting that the degree to which this is true differs for certain criteria. A greater emphasis on names and abbreviations in Economists' tweets was found when compared to the BNC as the

Table 7: *Differences in register markers across corpora.*

		vs. Economists	vs. Scientists	vs. BNC
Economists	Names	-	8	12
	Abbreviations	-	7	10
	Complex words	-	34	25
	Informal language	-	0	1
Scientists	Names	5	-	6
	Abbreviations	4	-	3
	Complex words	26	-	20
	Informal language	4	-	6

reference corpus, whereas the figures are largely unchanged for Scientists; contrastingly, the extremity of the difference in complex word use is less pronounced under these circumstances. The concentration of informal language in Scientists' tweets appears to increase and we can also note the significant use of evaluative and positive language (*lovely*, *amazing*, *interesting*, *fantastic*), which is absent from Economists' keywords suggesting that Economists might abstain from using positive evaluation or do not do it to the same extent as Scientists.

Pronoun Usage

When it comes to pronoun usage, it could be considered that the use of first- and second-person pronouns are quite personal as they address the speaker/writer and the listener/reader respectively, whereas third-person pronouns are less so since they refer to other people and objects beyond the immediate interlocutors. For the purposes of this study, differences in the use of these pronouns may indicate whether or not the language of one group is more personal, and thus less distant, than another. It should be noted here that all pronouns of a particular person have been included, such that, for example, 'first-person' in this report includes *I*, *me*, *my*, *mine* and *myself* as well as the plural forms *we*, *us*, *our*, *ours* and *ourselves*.

The top 100 most frequently-occurring words in each list was compiled using Sketch Engine and were examined for the number of pronouns included in the list, a summary of which is shown in Table 2 below. From these raw figures it seems that the use of pronouns is quite similar: Scientists have used slightly more pronouns than Economists overall, but these extra occurrences are of the third-person type, and both corpora show a preference for first- and second-person over third-person. Moreover, a significant difference in pronoun use can be seen when examining the full breakdown of pronouns and their frequencies, provided in Appendix 2. Here it can be seen that, while both corpora share most of the pronouns used, the frequency with which they are used (normalized to tokens per million to account for the difference in the sizes of the corpora) shows that highly-inclusive pronouns such as *we* and *our* are used up to twice as often by Scientists when compared to Economists. This implies a much more inclusive style exhibited by the Scientists that is likely to be far more accessible to people outside that group. It could also create the sense of togetherness and shared experience, and thus indicating a more involved stance.

In addition to the number and frequency of pronouns occurring in the list, it may be relevant to consider their average numerical position within the top 100 most frequent words, since pronouns are generally more commonly-occurring words in any case, and how this again relates to the BNC as a reference corpus of general language use. Table 7 also shows figures as a result of summing the position number of each of the pronouns in each category and dividing this by the total types present; for example, the four pronouns comprising the third-person list for Economists are found at positions 15, 40, 43 and 50, the sum of which gives

Table 8: *Differing pronoun usage across the corpora.*

		Number	**Average Position**
Economists	1st + 2nd person	8	37.5
	3rd person	4	37.0
Scientists	1st + 2nd person	8	33.1
	3rd person	6	63.0
BNC	1st + 2nd person	6	48.3
	3rd person	10	37.5

148, which is then divided by 4 to give 37. From this, we can see that, Scientists' tweets tend to use the first- and second-person pronouns slightly more frequently than Economists, and that their use of third-person pronouns is quite significantly less frequent, despite still being present in the list of 100 most frequent words. Moreover, while both show a greater tendency than the BNC towards first- and second-person pronouns (perhaps accounted for by the personal nature of Twitter and tweeting), the Economists' third-person pronoun usage is closely aligned with that of the BNC, while the Scientists again show a much smaller use.

The data from the above analyses imply that there is truth to the hypothesis that Economists' language tends to be more distant and less personal and inclusive. Their language on Twitter exhibits a number of features that are representative of a higher, more specialized register, while Scientists additionally employ some highly informal language into their tweets. While both groups use a greater number of inclusive first- and second-person pronouns than language as a whole according to the BNC, in third-person pronouns the Economists' usage greatly outnumbers the Scientists', with the latter group using these much less frequently than common

usage. Additionally, and more specifically, Scientists use a notably larger number of first-person plural pronouns such as *we* and *our* demonstrating a higher degree of togetherness. As always with examining corpus data, it should be noted that there are many ways in which the analysis could be improved, most notably by an increase in the amount of data and the timeframe allotted to analyse it, but also, in this case, by ensuring that the two corpora are consistent from the outset in terms of their content across multiple languages.

4. Conclusions

Economists are public intellectuals with a distinguished history of influence on both policy makers and public opinion (Mata and Medema, 2013; Coyle, 2012), and the language they use in the printed press has been at the centre of extensive historical analysis (Mata et al., 2016). Social media are a new medium through which public influence is exercised and it is important that the profession is aware of what makes their messages more effective in reaching the public, especially at times when the fight for people's attention is so clearly intensifying (Tim Wu, 2017). We hope that our paper provides some useful indications, on the basis of comparing the most followed economists' tweets with those of another relevant group of experts.

Our network analysis shows similar tendencies to communicate with a wide range of people by economists and scientists, however, economists tweet less, mention less and mention fewer users, as well as communicating with lower sentiment. Our language analysis of *differences in register* (a higher register is generally less accessible and thus more distanced) finds that economists use a higher number of complex words, specific names and abbreviations than scientists (as noted by Tim Harford in his piece Economicky words are just plain icky: Practitioners seem to be drawn to polysyllabic obfuscation like wasps to jam'; Tim Harford, FT, Nov. 24, 2017). Furthermore, *differences in pronoun use* (which relate to a greater degree of involvement with the reader) show that highly-inclusive pronouns such as *we* and *our* are used up to twice as often by Scientists when compared to Economists.

Based on this Twitter study, our analysis suggests economists need to focus their communication on talking with people rather than at them, show they care (and remember people do too), and worry more about being understood by non-specialists when wishing to engage with the public. Chris Dillow (http://stumblingandmumbling.typepad.com/), a popular

economics communicator in the UK, recently suggested remembering that people's beliefs cannot easily be challenged when they are related to their own identity (e.g. in the case of EU membership and the controversy over economists advice on the likely impacts of Brexit); that nobody should be talked down to; and finally and importantly that, much like good research, good communication is about sticking to facts and always being honest about the things we can and cannot research and the limitation of our findings. A change in tone, alongside the civil and respectful attitudes and the other recommendations made in the AEA ethical code of conduct discussions (https://www.aeaweb.org/resources/member-docs/draft-code-of-conduct), would perhaps not go amiss.

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*All websites accessed in April 2017.

APPENDIX 1

Table 3: *Top 100 keywords*

Eco vs Sci	Eco vs BNC	Sci vs Eco	Sci vs BNC
ricciardi[1]	rt	science[3]	rt
investor[3]	trump[1]	universe[3]	trump[1]
victor[1]	ricciardi[1]	earth	thank[4]
harvey[1]	brexit	brain	science[3]
economic[3]	behavior[3]	moon	tweet
economics[3]	investor[3]	space	twitter
venezuela	harvey[1]	genome	universe[3]
growth[3]	victor[1]	cancer	amazing[4]
economy[3]	economics[3]	phylogenomics[3]	tonight
trade	economist[3]	patient[3]	brain
financial[3]	behavioral[3]	scientist[3]	math
economist[3]	venezuela	quantum	today
finance	blog	medical[3]	video
capital[3]	eu	film	interview[3]
downloadable[3]	pdf[2]	planet	blog
pdf[2]	downloadable[3]	cell	wow[4]
market	fed	medicine	moon
behavior[3]	global[3]	physics[3]	genome
baker[1]	david[1]	sun	earth
bank	economy[3]	enjoy	podcast
fed	tweet	islam	cancer
brexit	inequality[3]	mental[3]	scientist[3]
behavioral[3]	baker[1]	maths	online
marx	interview[3]	thank	phylogenomics[3]
file	clinton[1]	math	email
debt	crisis	phylogenomic[3]	obama[1]
david[1]	china	genomic[3]	google
chile	twitter	gene	interesting[4]
china	ht[2]	nasa[2]	my
development[3]	growth[3]	lovely[3]	article[3]
india	chile	pinker[1]	quantum
gdp[2]	book	doctor	planet
investing	thank	craig[1]	u[4]
crisis	india	tonight	fun
fiscal[3]	marx[1]	star	congrats[4]
capitalism[3]	video	venter[1]	read
nudge	gdp[2]	you	piece

Eco vs Sci	Eco vs BNC	Sci vs Eco	Sci vs BNC
policy	podcast	glad	book
investment[3]	via	religion	photo
tax	obama[1]	microbiome[3]	physics[3]
rate	nudge	yeah[4]	lecture[3]
planning	investing	mars	why
inequality[3]	today	wow[4]	excellent[3]
kent	uk	yes	nasa[2]
links	gop[2]	love	fascinating[4]
wage	u.s.	light	glad
econ[2]	financial[3]	oh[4]	islam
advise	finance	evolution[3]	talk
monetary[3]	read	ticket	space
retirement[3]	donald[1]	amazing	news
income[3]	economic[3]	life	tomorrow
poverty[3]	lecture[3]	kaku[1]	datum
macro	pm	physic[3]	ok
krugman[1]	ft[2]	happy	medicine
ft[2]	capitalism[3]	trial[3]	maths
inflation[3]	fiscal[3]	atheist[3]	vote
aid	econ[2]	cool[4]	human
expert	file	orbit	phylogenomic[3]
euro	hi[4]	bbc	post
stock	links	god	muslim
aspect	debt	image	genomic[3]
summers[1]	review[3]	i	awesome
contradiction[3]	expert	disease[3]	vs
chapter	debate	cosmos	nice
no	poverty[3]	hope	happy
colombia	potus[2]	biology[3]	gop[2]
money	post	fun	ai[2]
recession[3]	colombia	dark	app
eurozone	ai[2]	neuroscience[3]	story
biases	overview	them	mars
column	capital[3]	see	youtube
infrastructure[3]	krugman[1]	cosmic[3]	pinker[1]
overview	macro	saturn	bbc
sector	vs	nhs[2]	fantastic[3]
greece	column	nature[3]	hey[4]
clinton[1]	vote	dna[2]	venter[1]

Eco vs Sci	Eco vs BNC	Sci vs Eco	Sci vs BNC
global[3]	euro	steven[1]	internet
ecb[2]	kent	sorry	via
unemployment[3]	infrastructure[3]	posted	review[3]
lbs[2]	summers[1]	tour	pm
pot	voter[3]	then	mental[3]
turbulent[3]	trade	know	microbiome[3]
business[3]	article[3]	rdfrs[2]	cnn
imf[2]	nobel	pluto	lovely[34]
tyranny[3]	nyc[2]	dr.	great[4]
affect	robot	nice	watch
markets	america	human	favorite
rise	obamacare	clinical[3]	wonderful[34]
deficit[3]	tax	physicist[3]	conversation[3]
job	times	sky	dr.
stagnation[3]	policy	code	cool[4]
uk	news	jupiter	religion
africa	usa	scientific[3]	atheist[3]
price	retirement[3]	gravity[3]	kid
austerity[3]	govt[2]	alien	brilliant[34]
reform[3]	president[3]	study	craig[1]
employment[3]	no	it	kaku[1]
cash	eurozone	sequence[3]	facebook
paul	biases	sure	yup[4]
foreign	americans[3]	mind	harvard

[1] Name   [2] Abbreviation   [3] Complex word   [4] Informal and evaluative language

Table 4: *Pronoun usage in top 100 most frequent words in the corpora.*

		Pronoun	Position	Freq.	Freq./million
Economists	1st + 2nd person	*I*	11	6,492	7,028.4
		you	19	3,861	4,180.0
		my	22	3,176	3,438.4
		we	**28**	**2,519**	**2,727.1**
		us	41	1,720	1,862.1
		your	45	1,410	1,526.5
		me	58	1,249	1,352.2
		our	**76**	**1,026**	**1,110.8**
	3rd person	*it*	15	5,020	5,434.8
		he	40	1,733	1,876.2
		they	43	1,496	1,619.6
		his	50	1,381	1,495.1
Scientists	1st + 2nd person	*I*	6	13,306	15,432.9
		you	12	9,089	10,541.9
		my	20	4,695	5,445.5
		we	**22**	**4,155**	**4,819.2**
		your	41	2,300	2,667.7
		me	42	2,247	2,606.2
		our	**49**	**1,968**	**2,282.6**
		us	73	1,367	1,585.5
	3rd person	*it*	11	9,335	10,827.2
		they	43	2,226	2,581.8
		he	60	1,724	1,999.6
		his	82	1,209	1,402.3
		their	89	1,031	1,195.8
		them	93	1,011	1,172.6