

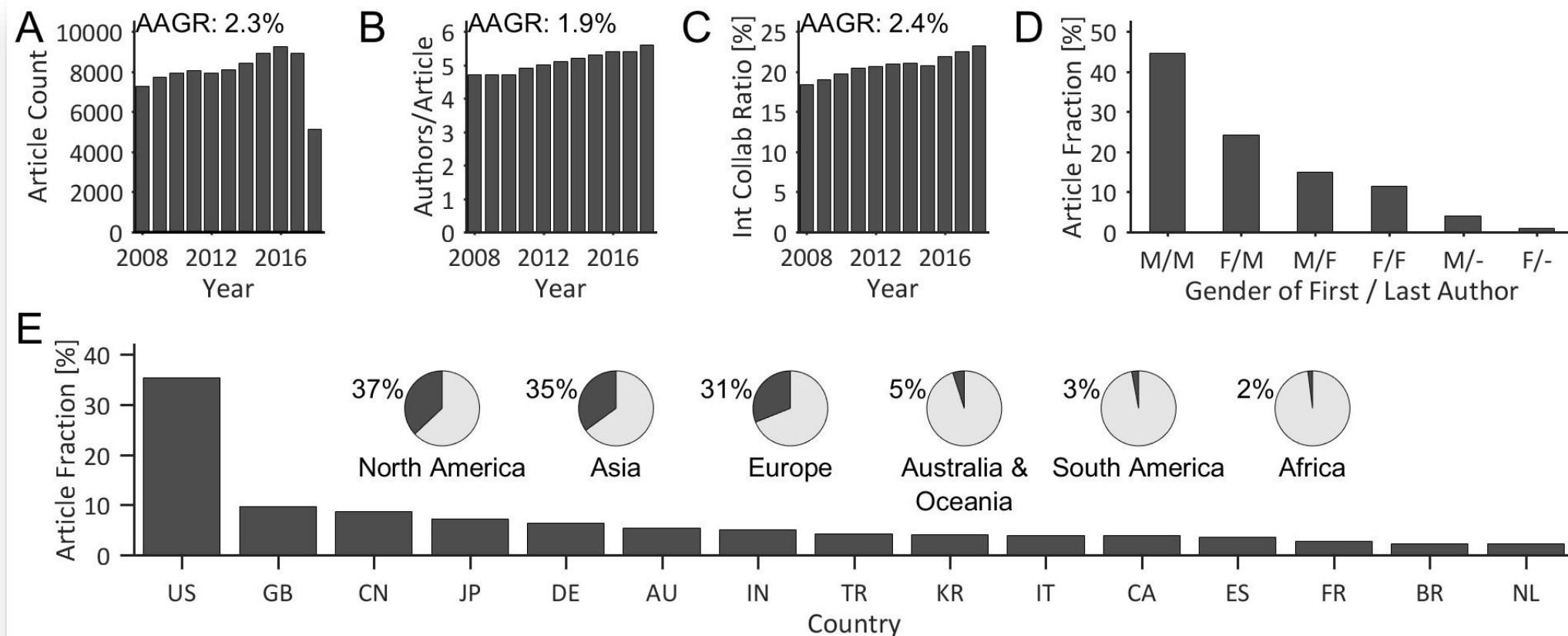
Supplementary Online Content

Kramer PW, Kohnen T, Groneberg DA, Bendels MHK. Sex disparities in ophthalmic research: a descriptive bibliometric study on scientific authorships. *JAMA Ophthalmol*. Published online August 15, 2019. doi:10.1001/jamaophthalmol.2019.3095

- eFigure 1.** Bibliometric overview
- eFigure 2.** Convergence of Algorithmic Gender Detection
- eFigure 3.** Algorithmic Gender Detection by Time
- eFigure 4.** Algorithmic gender detection by country
- eFigure 5.** Test for alphabetical ordering of the author list
- eFigure 6.** Probability density function of the citation rate
- eFigure 7.** Correlation of journal parameters
- eFigure 8.** Gender specificity of citations and scholarly productivity
- eFigure 9.** Linear projection of the development of female authorships
- eFigure 10.** Nursing – Bibliometric overview
- eFigure 11.** Nursing - Temporal development of female authorships on the global level
- eFigure 12.** Nursing - Female authorships by authors per article
- eFigure 13.** Nursing - Gender specificity of citations and scholarly productivity
- eFigure 14.** Nursing – Correlation of journal parameters
- eFigure 15.** Otorhinolaryngology - Bibliometric overview
- eFigure 16.** Otorhinolaryngology - Temporal development of female authorships on the global level
- eFigure 17.** Otorhinolaryngology - Female authorships by authors per article
- eFigure 18.** Otorhinolaryngology - Gender specificity of citations and scholarly productivity
- eFigure 19.** Otorhinolaryngology – Correlation of journal parameters
- eTable.** Classification of journal subject categories

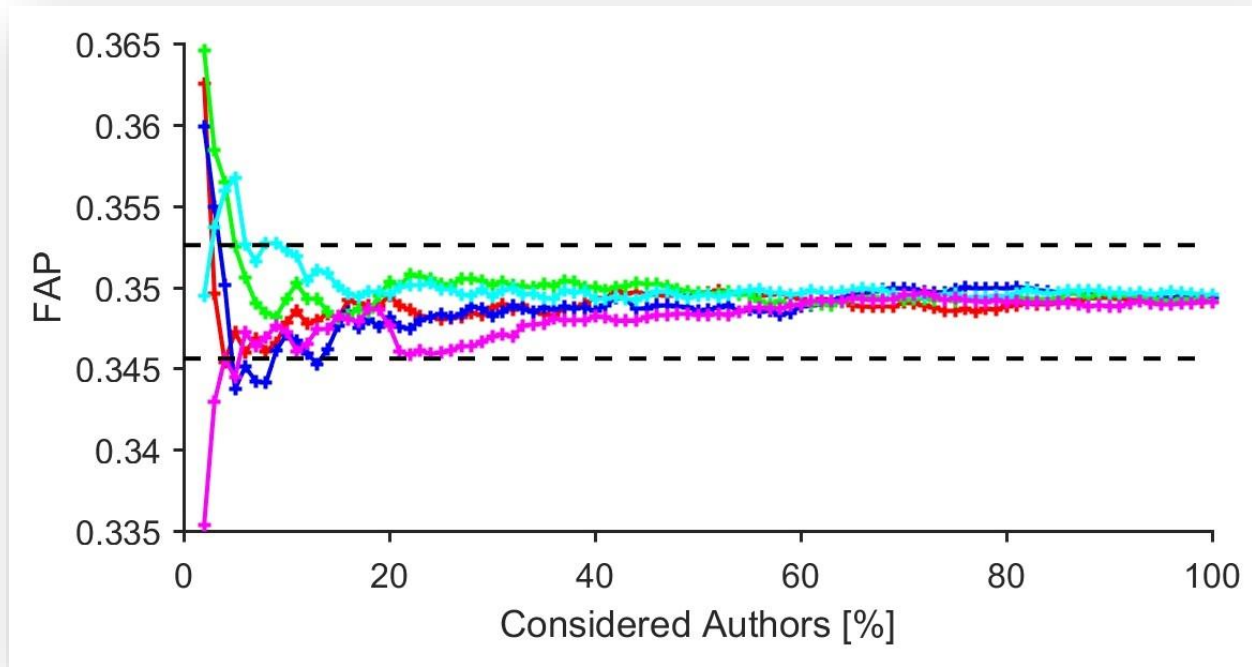
This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1. Bibliometric overview



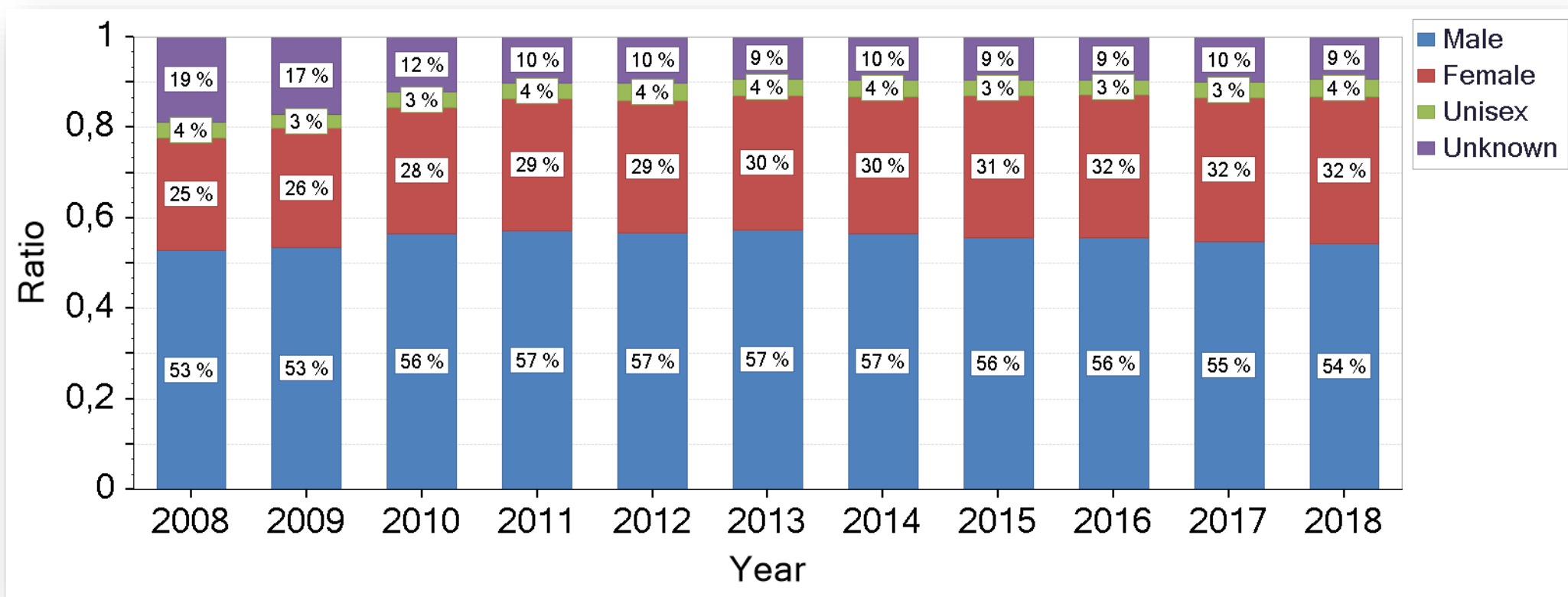
(A) The article count has an average annual growth rate (AAGR) of 2.3% between 2008 and 2017. The small number of articles for the year 2018 is based on the incomplete study year. (B) The number of authors per article slightly increases with an AAGR of 1.9%. (C) The percentage of international collaboration articles increases from 18.4% in 2008 to 22.5% in 2018 with an AAGR of 2.4%. (D) The fraction of articles grouped the gender of their key authors' documents a quantitative superiority of articles with male last authorships. (E) The fraction of articles is depicted by country (bar plot) and by continent (pie charts). The three continents North America, Asia, and Europe contribute about 1/3 of the articles. Please note that the sum of percentages is greater than one due to international collaborations. AU=Australia, BR=Brazil, CA=Canada, CN=China, DE=Germany, ES=Spain, FR=France, GB=United Kingdom, IN=India, IT=Italy, JP=Japan, KR=South Korea, NL=The Netherlands, TR=Turkey, US=United States.

eFigure 2. Convergence of Algorithmic Gender Detection



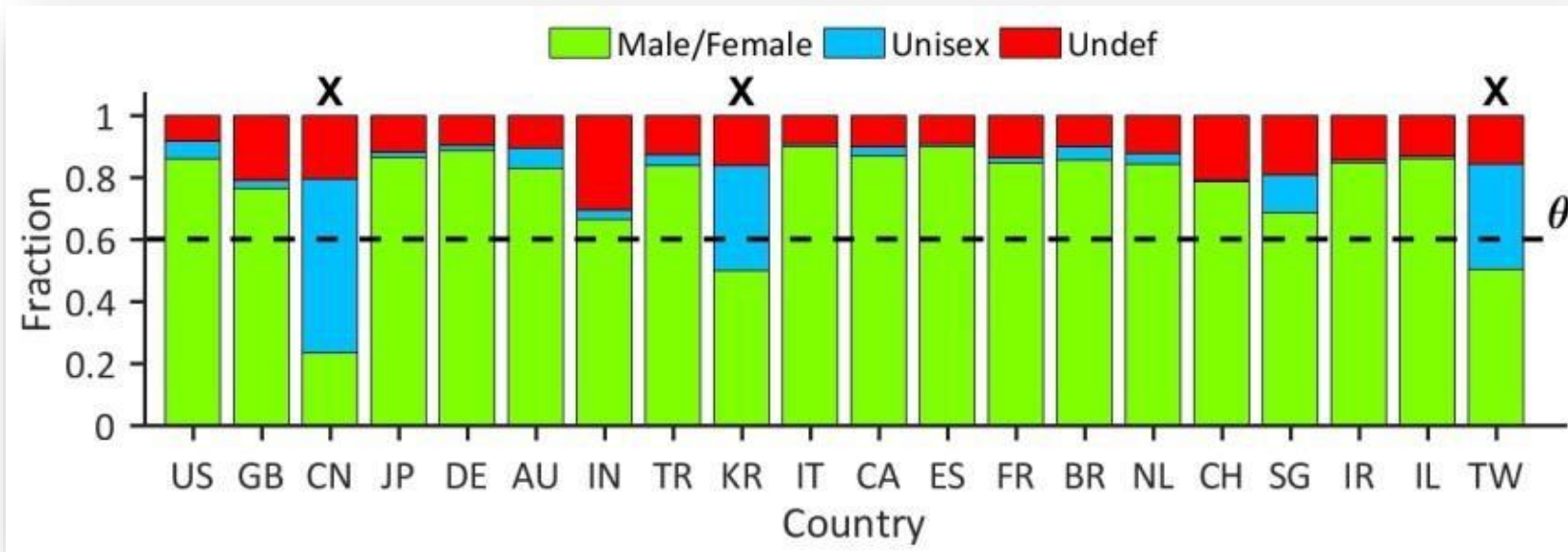
Determination of FAP as a function of considered authorships in 5 consecutive runs (authorships were shuffled before each run). The dashed lines represent the 1% interval around the effective FAP. Evidently, the algorithm converges very fast; it is sufficient to consider about 20% of all male and female authorships to assess the FAP with an error deviation of less than 1%.

eFigure 3. Algorithmic Gender Detection by Time



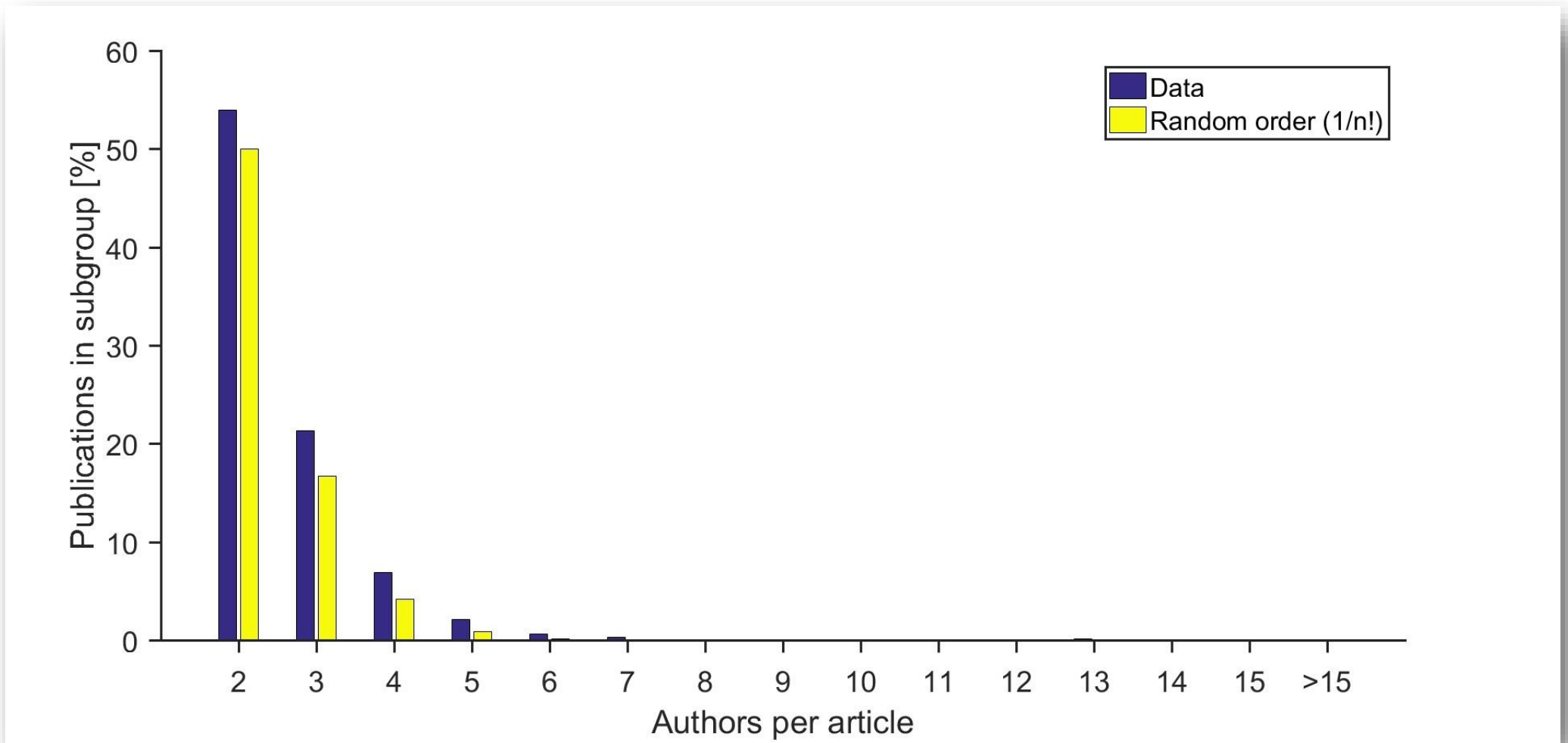
The proportions of detected male, female, unisex and undefined authorships ordered by publication year show a reduction of unknown authorships over time. The reason for this lies in the consistent conversion of first name abbreviations to advertised names by the responsible journals.

eFigure 4. Algorithmic gender detection by country



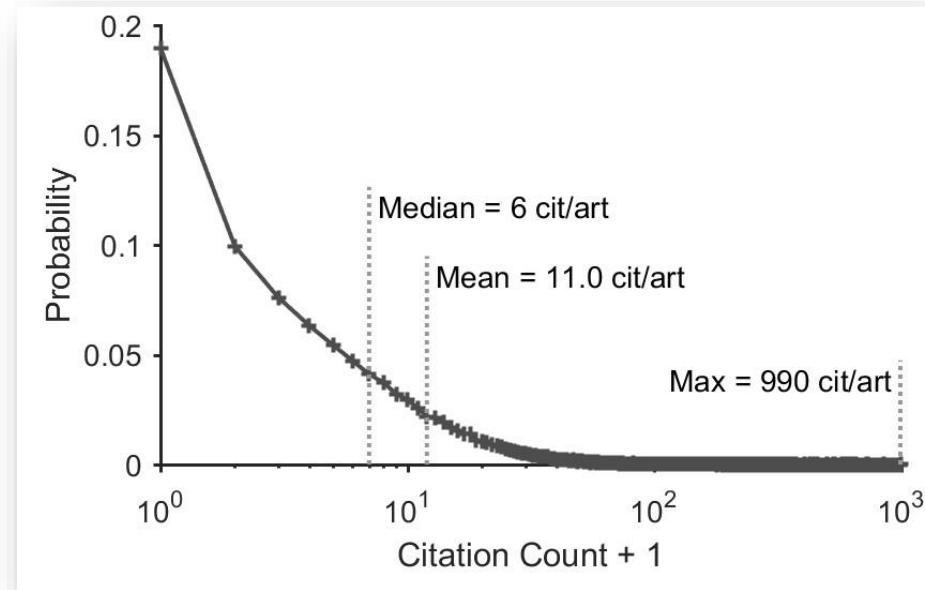
The result of the algorithmic gender detection - classified as male/female, unisex or undefined - grouped by countries that are ordered in descending order by their publication count, documents a relative high frequency of male/female authors for most of the top 20 countries, with the exception of the Asian countries China (CN), South Korea (KR), and Taiwan (TW). The latter countries are characterized by a high frequency of unisex names and were excluded (X) from analysis by applying a threshold criterion θ (dotted line) of 60% detected male or female authorships. AU=Australia, BR=Brazil, CA=Canada, CH=Switzerland, CN=China, DE=Germany, ES=Spain, FR=France, GB=United Kingdom, IL=Israel, IN=India, IR=Iran, IT=Italy, JP=Japan, KR=South Korea, NL=The Netherlands, SG=Singapore, TR=Turkey, TW=Taiwan, US=United States.

eFigure 5. Test for alphabetical ordering of the author list



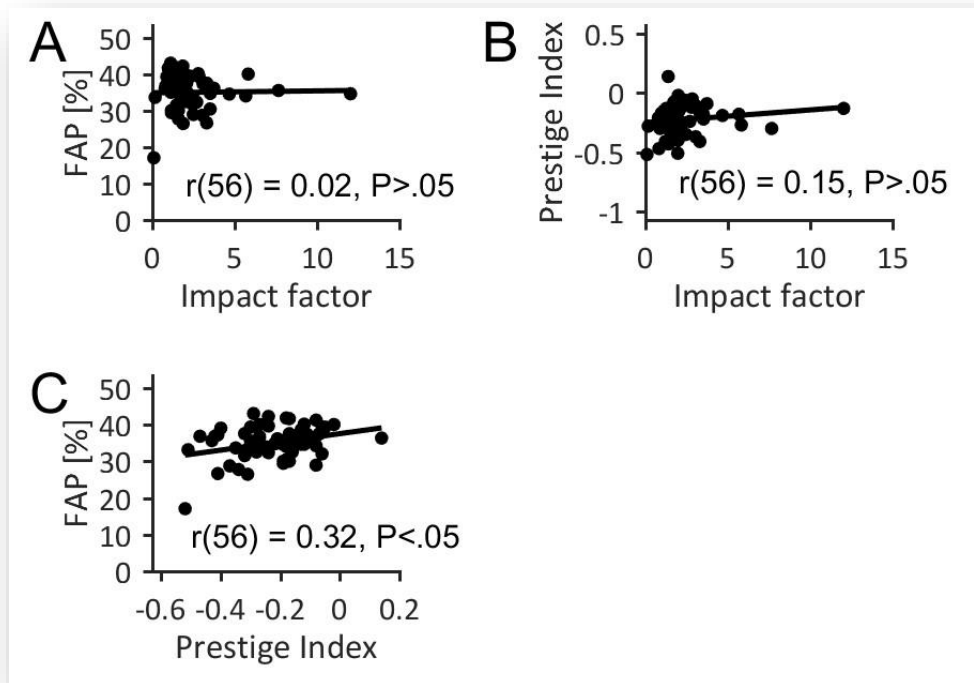
The proportion of publications with an alphabetic ordered author list is depicted with respect to the authors per article (blue). The values correspond very closely to those obtained for randomly ordered author lists (yellow).

eFigure 6. Probability density function of the citation rate



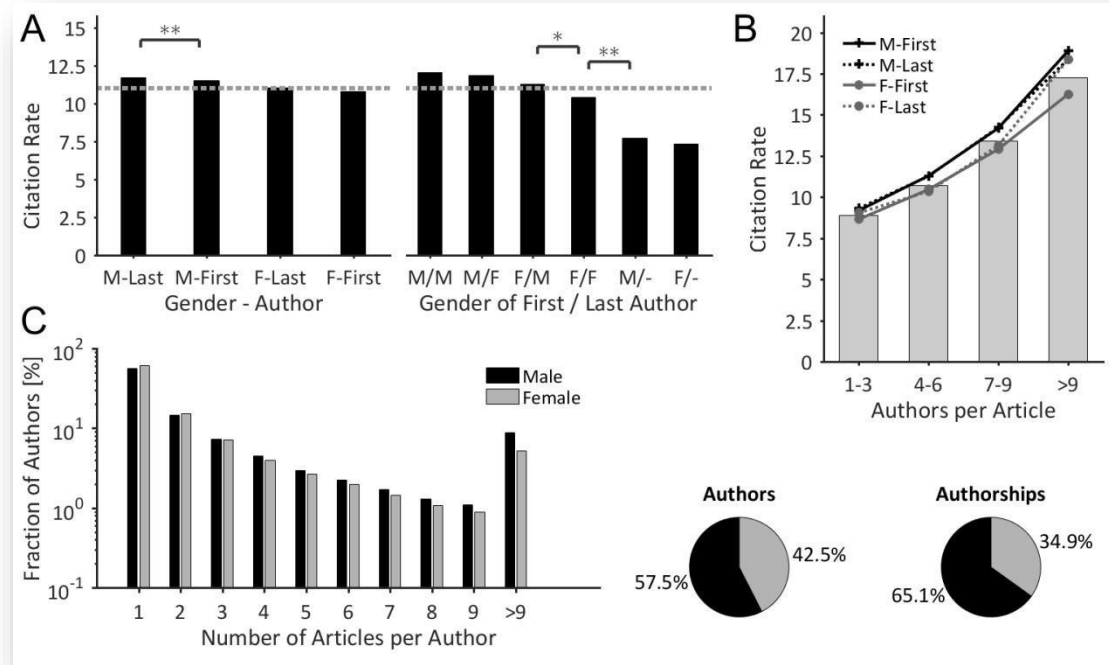
The semi-logarithmic plot of the citation count per article (=citation rate) exhibits an exponential-like decreasing probability density function with a mean citation rate of 11.0 citations/article.

eFigure 7. Correlation of journal parameters



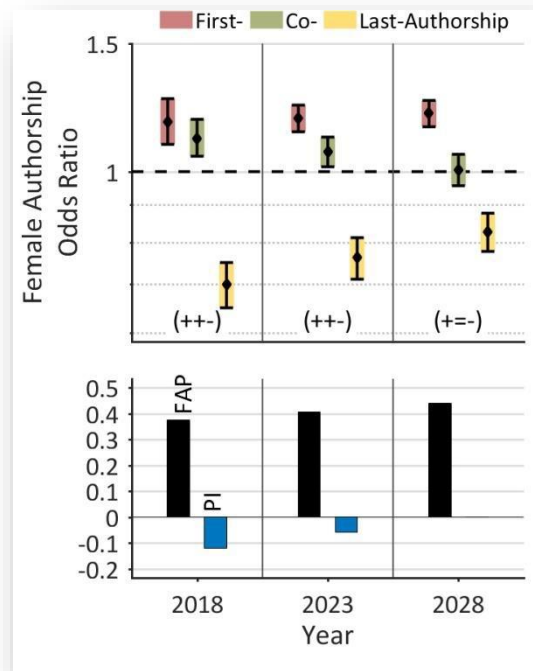
The analysis reveals no correlation between the (A) FAP of the journal and its Mean-Impact-factor and (B) the PI and the Mean-Impact-Factor. (C) There is a slight positive correlation between the FAP and the PI, i.e. the higher the PI of a journal the higher is its FAP.

eFigure 8. Gender specificity of citations and scholarly productivity



(A) The descending ordered citation rates show that articles with male key authorships are slightly more frequently cited than articles with female key authorships. Articles with a female first authorship are on average below the mean citation rate of 11.0 citations/article, which is depicted by a dotted line. The analysis of combined authorships shows citations rates above average for articles with male-first/male-last, male-first/female-last and female-first/male-last authorships. Single author articles (M/- and F/-) have the lowest citation rates (Kruskal- Wallis test, *P<0.05, **P<0.01). (B) Average citation rates of ungrouped articles (bars) and articles that were grouped by the gender of their key authorships (lines), depicted as a function of the number of authors. Overall, the citation rate of an article becomes higher the more authors are involved. The gender-specific differences in citation rates are not maintained across the various levels of author count. (C) Gender-specific distribution of the article count per author. The subgroups 'author has one or two article(s)' are dominated by women. All other subgroups depict a relatively overrepresentation of male authors. Especially the subgroup of most productive authors (>9 articles per author) show a clear female underrepresentation. This ultimately correlates with the higher productivity of male authors, as 57.5% male authors hold 65.1% of all authorships.

eFigure 9. Linear projection of the development of female authorships



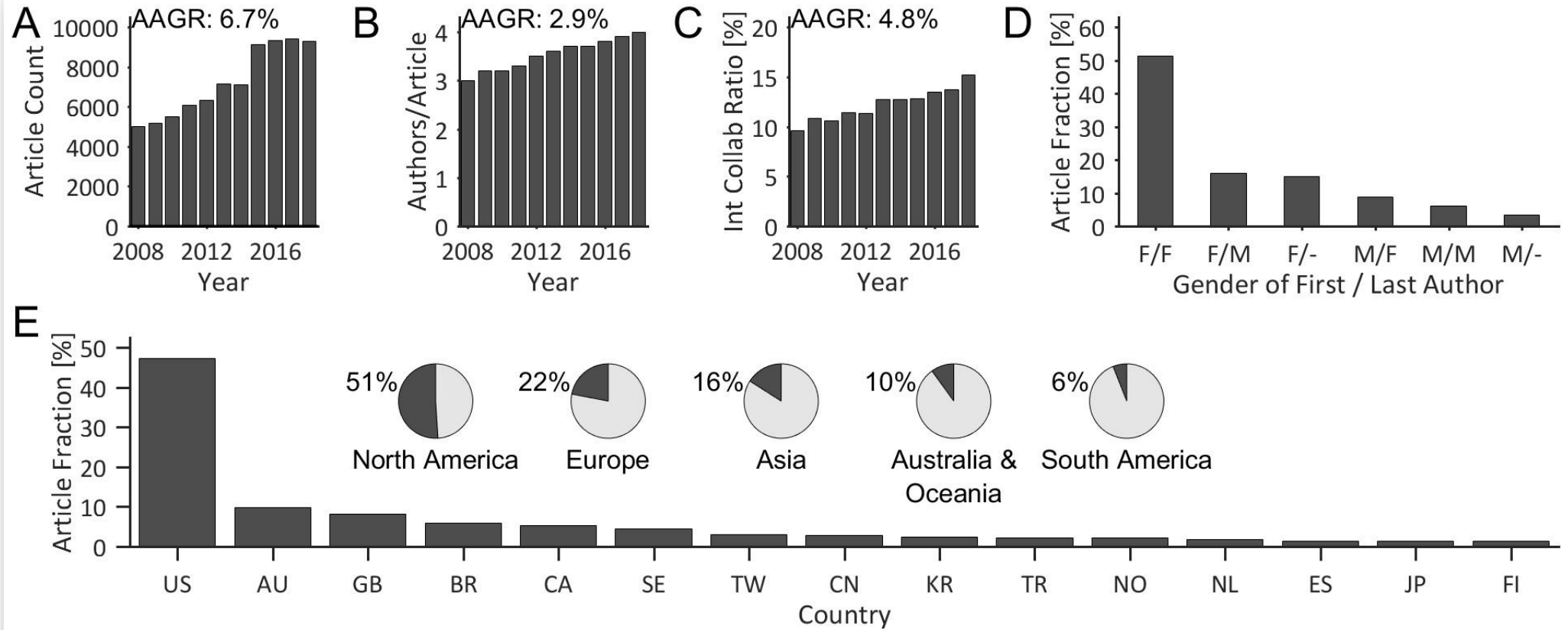
The prognosis for the next decades forecasts a further harmonization of authorship odds between the two genders with a gender-neutral distribution of prestigious authorships in 2028 (Prestige Index = 0). Especially the FAOR for last authorships will increase significantly. The FAP is prognosticated to increase up to 44.1% until the year 2028.

eTable. Classification of journal subject categories

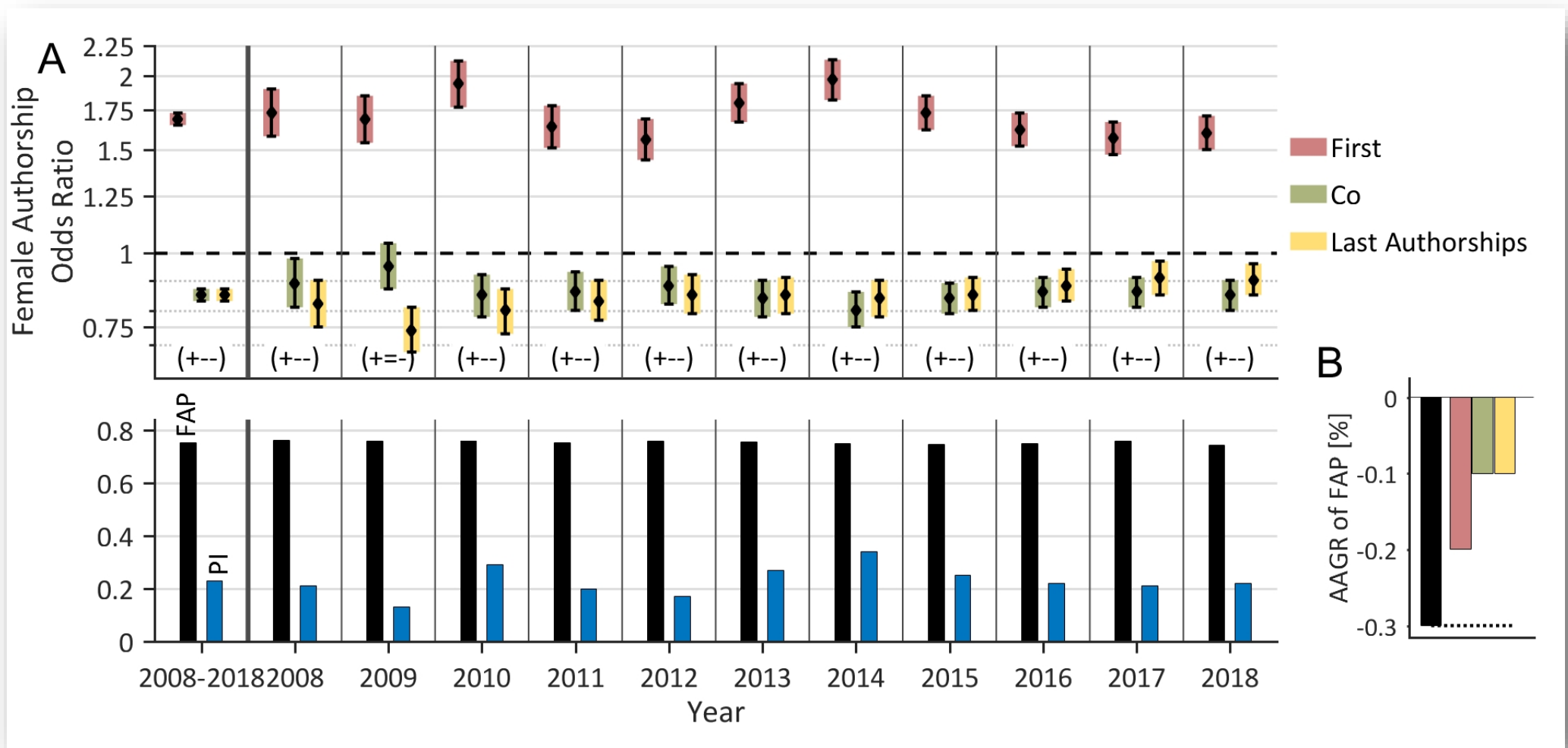
Subject category	Prestige Index	FAP	FAOR-triplet	#Articles	#Authorships
Biochemistry & Molecular Biology	-0.06	39.4%	(+, =, -)	2,432	10,052
Toxicology	-0.17	41.7%	(+, =, -)	591	2,477
Genetics & Heredity	-0.18	41.8%	(+, =, -)	561	2,692
Neurosciences & Neurology	-0.19	33.1%	(+, +, -)	3,610	10,457
Ophthalmology	-0.22	34.9%	(+, +, -)	87,640	344,433
Psychology	-0.23	34.2%	(+, +, -)	3,396	9,015
Research & Experimental Medicine	-0.25	36.6%	(=, +, -)	1,644	5,900
Pediatrics	-0.29	42.1%	(+, +, -)	2,055	7,488
Surgery	-0.32	28.2%	(=, +, -)	7,699	29,175
Pharmacology & Pharmacy	-0.55	32.7%	(=, +, -)	1,011	4,200

Subject categories are descendingly ordered by their Prestige Index. The highest FAP was found in the subfield of pediatrics (42.1%), the lowest in the subject category surgery (28.2%). The FAOR-triplets are characterized by higher or equal odds for the first- and co-authorship and in all cases lower odds for the last-authorship. The PI ranges from -0.06 to -0.55.

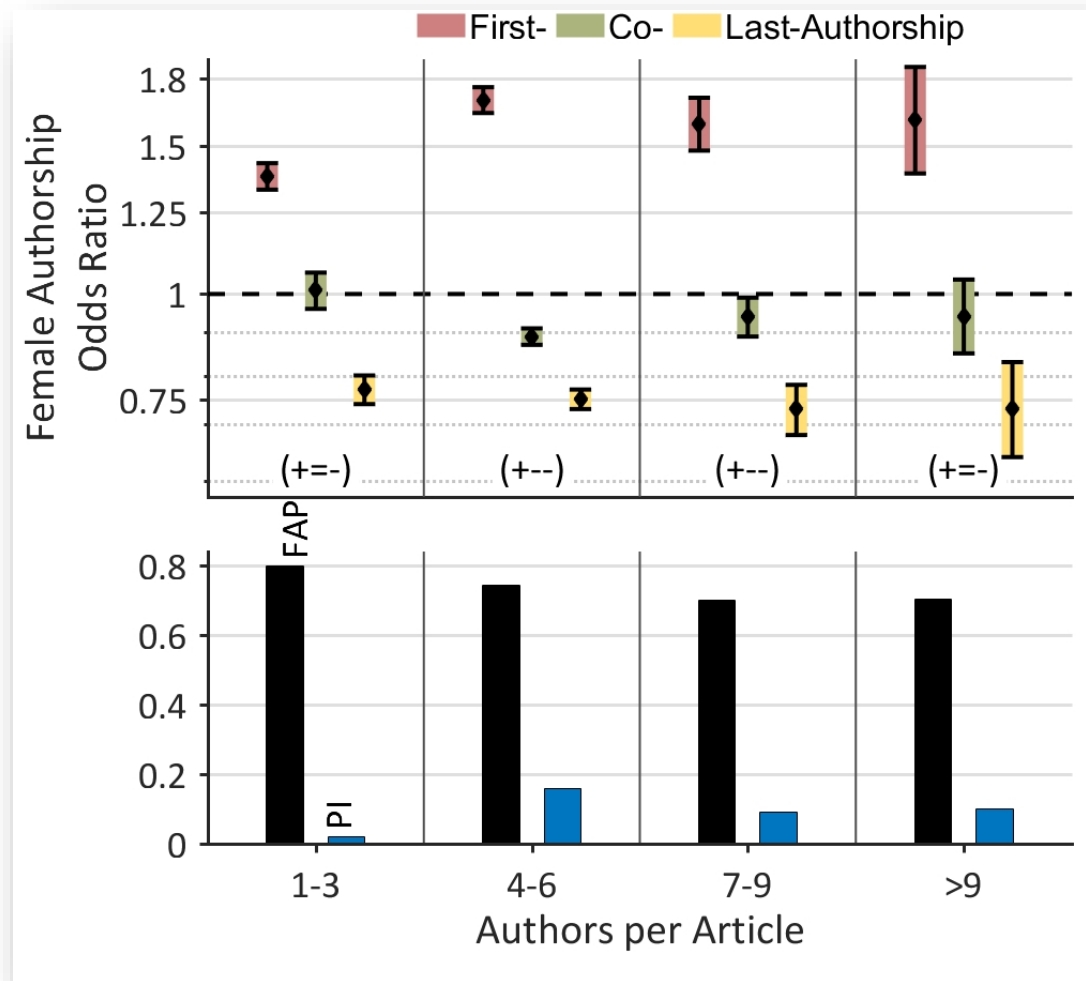
eFigure 10. Nursing – Bibliometric overview



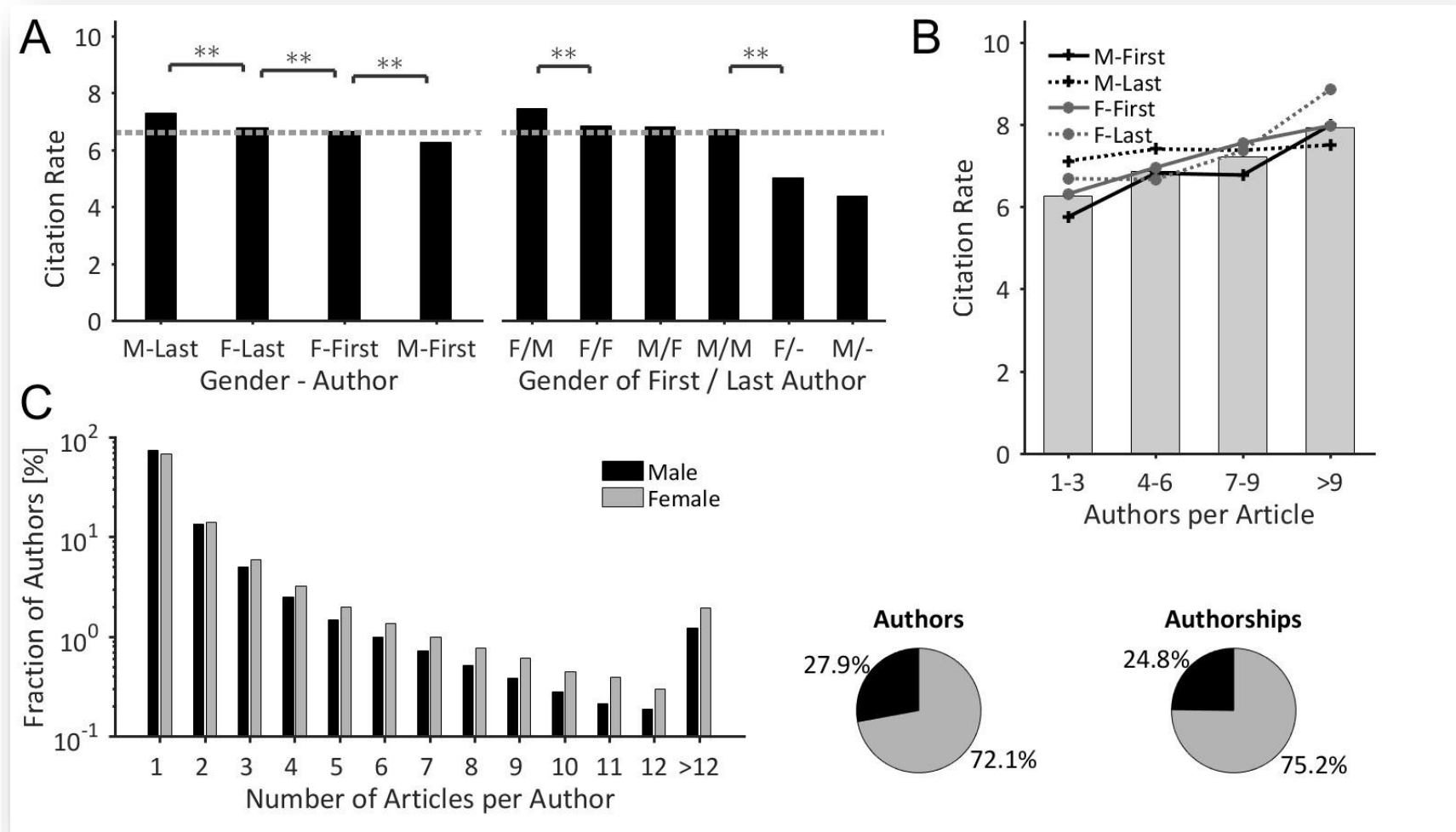
eFigure 11. Nursing - Temporal development of female authorships on the global level



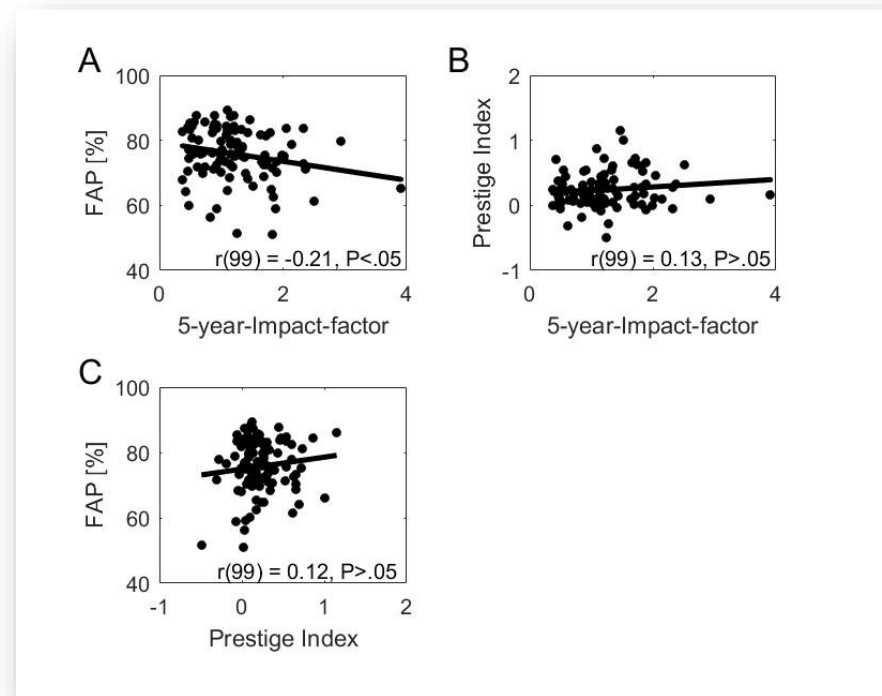
eFigure 12. Nursing - Female authorships by authors per article



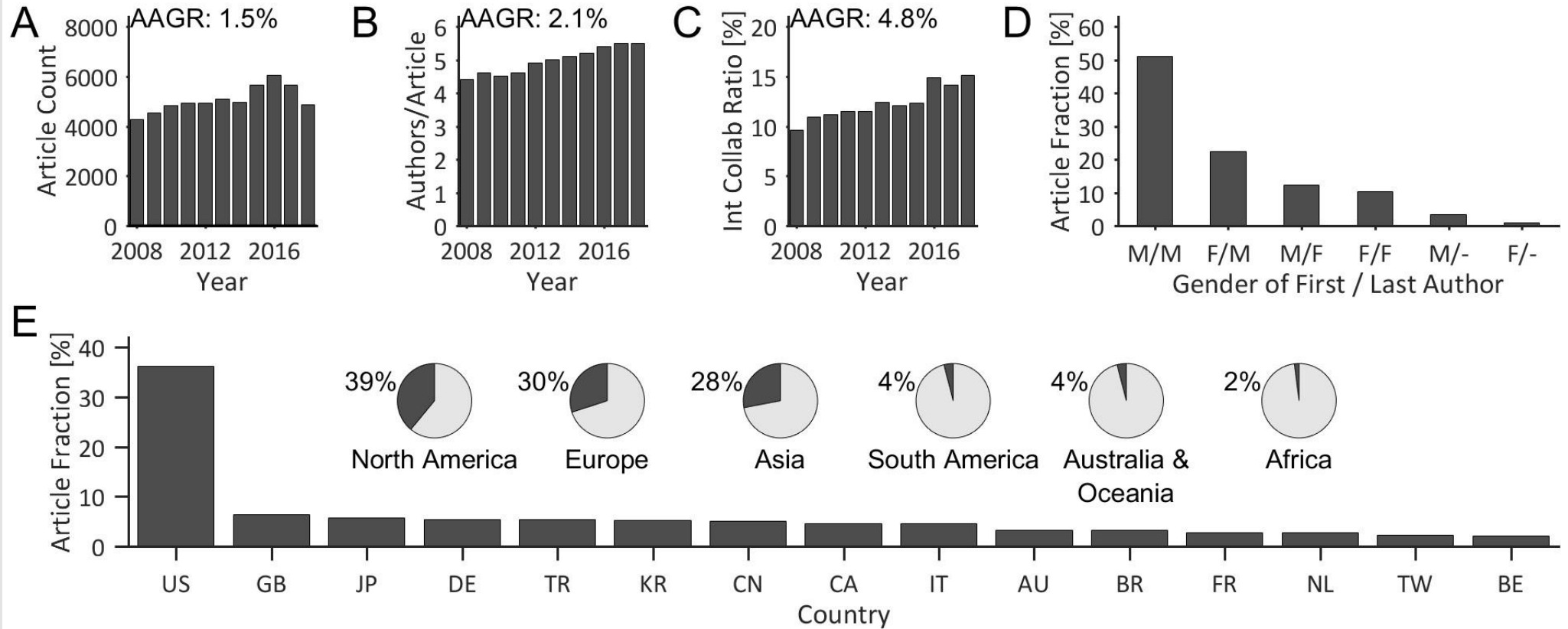
eFigure 13. Nursing - Gender specificity of citations and scholarly productivity



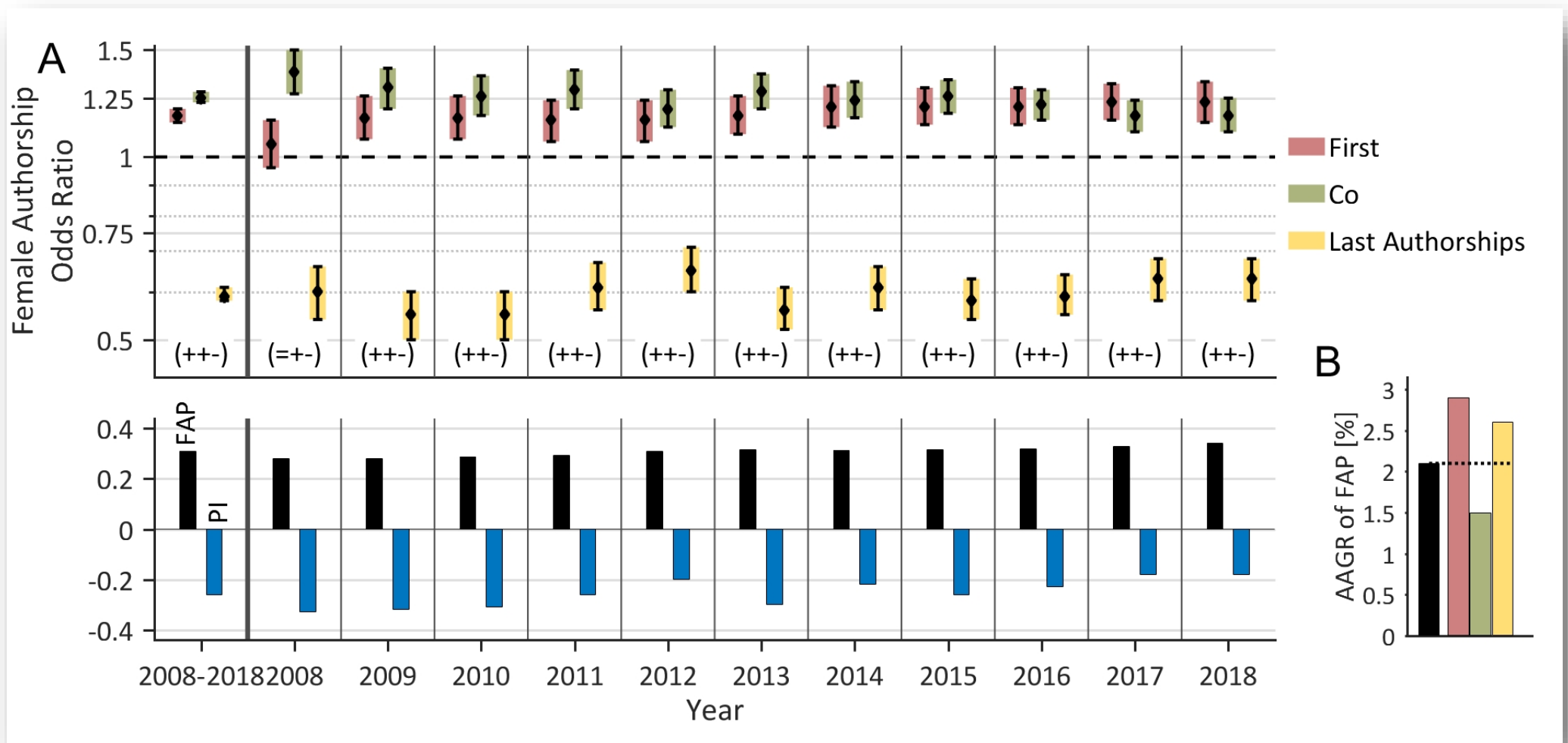
eFigure 14. Nursing – Correlation of journal parameters



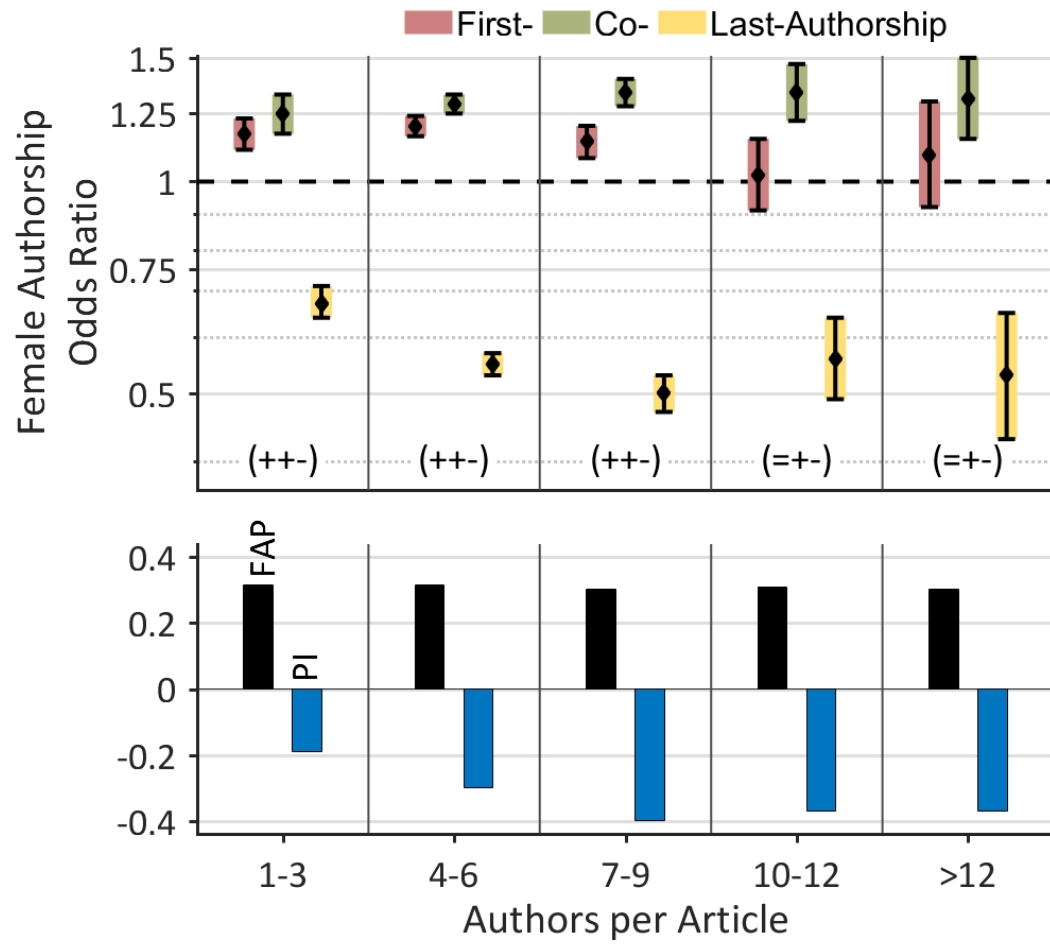
eFigure 15. Otorhinolaryngology - Bibliometric overview



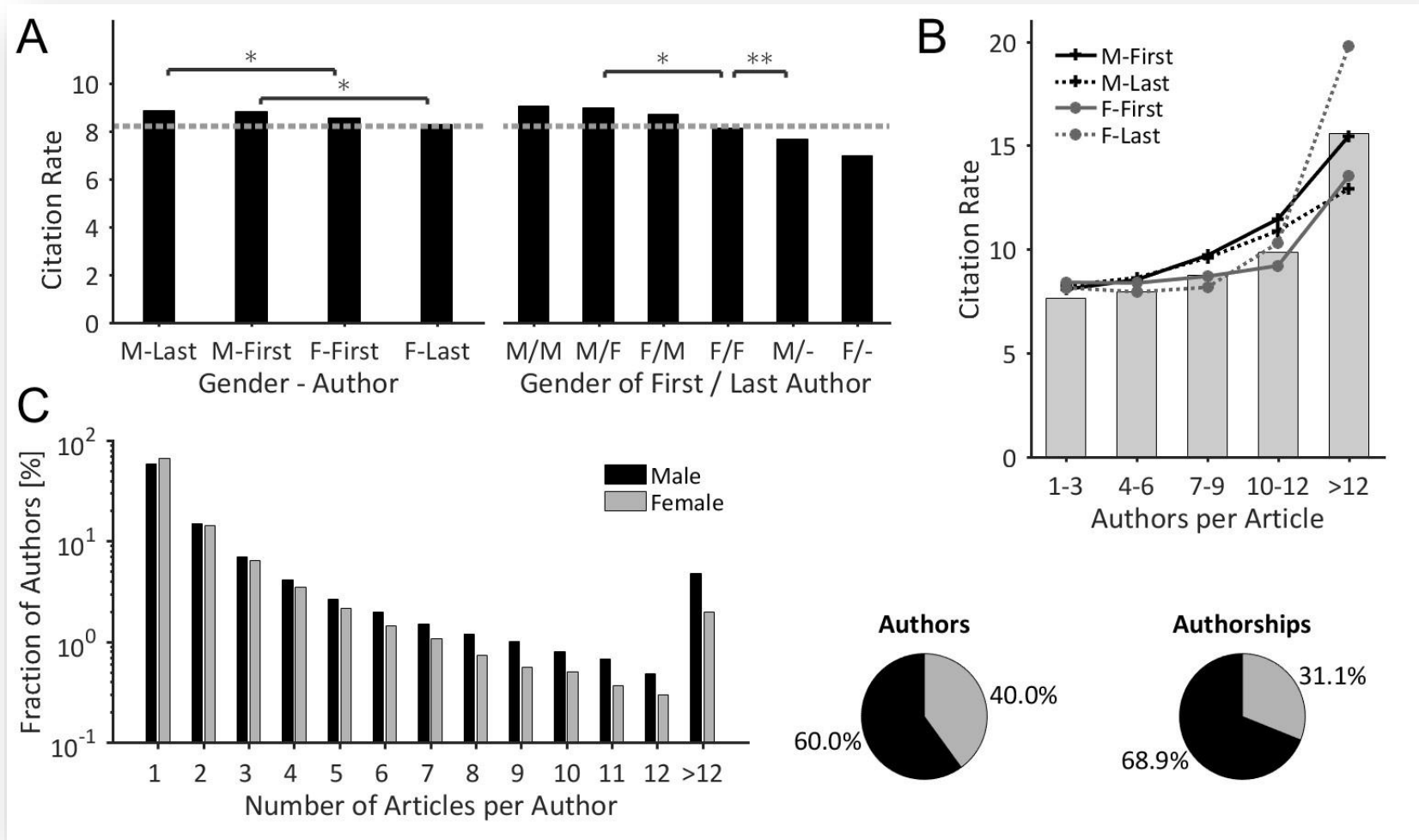
eFigure 16. Otorhinolaryngology - Temporal development of female authorships on the global level



eFigure 17. Otorhinolaryngology - Female authorships by authors per article



eFigure 18. Otorhinolaryngology - Gender specificity of citations and scholarly productivity



eFigure 19. Otorhinolaryngology – Correlation of journal parameters

