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Factors that affect scientific publication in Africa — A gender perspective. Supplément

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Appendix

Table 3 Sample size per country

Name of Country	Number of respondents[a]	Name of Country	Number of respondents[a]
South Africa	1,721	Burkina Faso	64
Nigeria	660	Côte d'Ivoire	61
Algeria	286	Botswana	60
Tunisia	275	Senegal	57
Kenya	186	Benin	45
Morocco	170	Malawi	37
Egypt	149	Congo	24
Ethiopia	143	Togo	20
Uganda	133	Madagascar	18
Cameroon	123	Niger	16
Ghana	117	Mali	15
Zambia	91	Democratic Republic of the Congo	14
Zimbabwe	88	Gabon	10
Tanzania	78	Central African Republic, Guinea, Burundi, Seychelles, and Chad[b]	15
Total			**4,676**

Note: [a] The number of respondents by country is provided in appendix 1 (pp. 184-185) of the published book: The next Generation of Scientists in Africa: https://www.africanminds.co.za/the-next-generation-of-scientists/.
[b] For confidentiality reasons, and to respect the ethics certificate of this project, data where the number of respondents is less than 10 cannot be disclosed.

Table 4 Variable description

Variable	Type	Description	*Survey questions*[c]
Dependent variable			
Number of articles	Continuous	Natural logarithm of the number of articles published/accepted (including co-authored) in refereed or peer-reviewed academic journals	"*Please indicate how many of the following research output types you have produced over the last three years: articles published/accepted (including co-authored) in refereed or peer-reviewed academic journals*"
Independent variables			
Main care & housework	Dummy	Takes the value 1 if the proportion of care-work and general housework for all dependents performed by the respondent is above 50% of the total, and 0 otherwise	First: "*How is the care-work for all dependents distributed in your family or relationship? (in percentage) [ ]% me [ ]% partner [ ]% others (e.g. extended family, paid service)*" Second: "*How is general housework distributed in your family or relationship? (in percentage) [ ]% me [ ]% partner [ ]% others (e.g. paid service)*"
Early-career researcher	Dummy	Takes the value 1 if the respondent is an early-career researcher (≤ 40 years of age), and 0 otherwise	"*What is your year of birth?*"
Mid-career researcher	Dummy	Takes the value 1 if the respondent is a mid-career researcher (< 40 and ≥ 50 years of age), and 0 otherwise	
Late-career researcher (reference category)	Dummy	Takes the value 1 if the respondent is a late-career researcher (< 50 years of age), and 0 otherwise	
Teaching hours	Continuous[a]	Number of working hours spent on undergraduate and postgraduate teaching	First "*On average, how many hours do you spend on your main job per week?*" Combined with second "*In a typical year, what percentage of your working time do you spend on each of the following tasks?*"
Supervising hours	Continuous[a]	Number of working hours spent on training/supervising postgraduate students	

Variable	Type	Description	*Survey questions*[c]
Research hours	Continuous[a]	Number of working hours spent on research	
Admin hours	Continuous[a]	Number of working hours spent on administration and management	
Service hours	Continuous[a]	Number of working hours spent on service (counselling of patients, voluntary services within or outside the organisation, article review, editorial duties)	
Consultation hours	Continuous[a]	Number of working hours spent on consultancy	
Fundraising hours	Continuous[a]	Number of working hours spent on raising funds/grants for research	
Funding	Continuous	Total amount of research funding received during the past three years	"*Which amount best correspond to the total amount of research funding you have received during the past three years?*"
Study-related mobility	Dummy	Takes the value 1 if the respondent obtained his/her highest degree from an institution in a country other than the country of his/her home country, and 0 otherwise	"*Did you complete all aspects of your doctoral (or equivalent) education in what you would consider to be your home country?*"
Work-related mobility	Dummy	Takes the value 1 if the respondent has worked in a country other than what he/she would consider his/her home country (i.e. abroad), and 0 otherwise	"*During the past five years, have you lived or worked in a country other than what you would consider your home country?*"
Collaboration with own inst./country	Dummy[b]	Takes the value 1 if the respondent has collaborated often (4) or very often/always (5) with researchers from his/her own institution, and 0 otherwise	
Collaboration with own country	Dummy[b]	Takes the value 1 if the respondent has collaborated often (4) or very often/always (5) with researchers from his/her own country, and 0 otherwise	"*How often during your career so far have you collaborated in joint research projects with the following groups of researchers?*"
Collaboration within Africa	Dummy[b]	Takes the value 1 if the respondent has collaborated often (4) or very often/always (5) with researchers from institutions in **other** African countries, and 0 otherwise	
Collaboration outside Africa	Dummy[b]	Takes the value 1 if the respondent has collaborated often (4) or very often/always (5) with researchers institutions outside of Africa (e.g. Europe, North America, Asia, etc.), and 0 otherwise	
Moderating variable			
Woman	Dummy	Takes the value 1 if the respondent is a woman, and 0 otherwise	"*Are you: [ ] Male [ ] Female?*"
Control variables			
South Africa	Dummy	Takes the value 1 if the respondent's country of work is South Africa, and 0 otherwise	"*In which country do you currently work / reside?*"
STEM fields	Dummy	Takes the value 1 if the respondent's research discipline is in Science, Technology, Engineering and Mathematics (STEM) fields, and 0 otherwise	
Health fields	Dummy	Takes the value 1 if the respondent's research discipline is in the Health Science fields, and 0 otherwise	"*In which field did you obtain your highest qualification?*"
SSH fields	Dummy	Takes the value 1 if the respondent's research discipline is in the Social Sciences and Humanities fields, and 0 otherwise	

Note: [a] The number of hours was calculated by multiplying the total number of hours reported by the respondent and the corresponding proportion of their time devoted to a particular academic task.
[b] 5-point Likert scales (1 = Never or very rarely, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very often/always) transformed into dummy variables.
[c] A slightly modified version of the questionnaire used for this study is provided in appendix 2 of the published book: The next Generation of Scientists in Africa: https://www.africanminds.co.za/the-next-generation-of-scientists/.

Table 5 Descriptive statistics

	All				Men		Women		Diff.
Variables	**Mean**	**Std. Dev.**	**min**	**max**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**p**
Dependent variable									
Number of articles	8.3488	(6.6592)	0	21	8.8994	(6.7961)	7.1065	(6.1634)	***
Independent variables									
Age [a]	46.1642	(10.1235)	23	75	46.6401	(10.2612)	45.0905	(9.7241)	
Early-career researcher	0.3317	(0.4709)	0	1	0.3139	(0.4641)	0.3719	(0.4835)	***
Mid-career researcher	0.3518	(0.4776)	0	1	0.3556	(0.4788)	0.3433	(0.4750)	
Late-career researcher	0.3165	(0.4652)	0	1	0.3306	(0.4705)	0.2848	(0.4515)	***
Proportion of care- & housework [a]	43.6276	(26.5533)	0	100	37.4565	(24.6117)	57.5513	(25.4914)	***
Main care & housework	0.4279	(0.4948)	0	1	0.3164	(0.4651)	0.6797	(0.4668)	***
Teaching hours	7.8602	(8.4573)	0	69.7	8.1059	(8.6217)	7.3057	(8.0496)	***
Supervising hours	5.7495	(5.8676)	0	50.0	5.4726	(5.5534)	6.3743	(6.4797)	***
Research hours	10.5896	(10.2197)	0	90.0	10.4045	(9.9809)	11.0071	(10.7309)	*
Admin hours	5.7383	(7.7908)	0	68.8	5.3547	(7.6133)	6.6038	(8.1135)	***
Service hours	2.6186	(4.6384)	0	80.0	2.4549	(4.4431)	2.9878	(5.0335)	***
Consultation hours	1.8720	(4.8592)	0	100.0	2.0049	(4.9406)	1.5722	(4.6581)	***
Fundraising hours	1.7458	(2.9381)	0	33.3	1.7001	(2.9201)	1.8488	(2.9768)	
Funding	82,489	(208226)	0	1,000,000	80,634	(207475)	86,675	(209921)	
Study-related mobility	0.3606	(0.4802)	0	1	0.4012	(0.4902)	0.2688	(0.4435)	***
Work-related mobility	0.3349	(0.4720)	0	1	0.3654	(0.4816)	0.2660	(0.4420)	***
Collaboration with own inst.	0.6097	(0.4879)	0	1	0.6244	(0.4844)	0.5766	(0.4943)	***
Collaboration with own country	0.3516	(0.4775)	0	1	0.3627	(0.4808)	0.3266	(0.4691)	**
Collaboration within Africa	0.1518	(0.3589)	0	1	0.1660	(0.3722)	0.1198	(0.3248)	***
Collaboration outside Africa	0.3749	(0.4841)	0	1	0.3830	(0.4862)	0.3565	(0.4791)	*
Moderating variable									
Woman	0.3071	(0.4613)	0	1					
Independent variables									
South Africa	0.3482	(0.4764)	0	1	0.2728	(0.4455)	0.5181	(0.4998)	***
STEM fields	0.5357	(0.4988)	0	1	0.5762	(0.4942)	0.4443	(0.4971)	***
Health fields	0.2254	(0.4179)	0	1	0.2108	(0.4079)	0.2584	(0.4379)	***
SSH fields	0.2389	(0.4264)	0	1	0.2130	(0.4095)	0.2974	(0.4573)	***

Note: N_{total} = 4,676 observations; N_{men} = 3,240 observations; N_{women} = 1,436 observations.
***, **, * represent significance at the 0.01, 0.05 and 0.1 levels.
[a] Age and the Proportion of care- & housework were transformed into dummy variables prior to being used in the regression analysis.

Table 6 Correlation table

Variables		1	2	3	4	5	6	7	8	9	10	11	12	
Number of articles [a]	**1**	1												
Woman	**2**	-0.1257 *	1											
Age [b]	**3**	0.1380 *	-0.0706 *	1										
Early-career researcher	**4**	-0.1620 *	0.0568 *	-0.7408 *	1									
Mid-career researcher	**5**	0.0838 *	-0.0118	-0.0673 *	-0.5190 *	1								
Late-career researcher	**6**	0.0779 *	-0.0454 *	0.8190 *	-0.4794 *	-0.5013 *	1							
Main care & housework	**7**	-0.1063 *	0.3387 *	-0.0808 *	0.0810 *	-0.0398 *	-0.0412 *	1						
Teaching hours [a]	**8**	0.0889 *	-0.0513 *	-0.0162	-0.0497 *	0.0623 *	-0.0137	-0.0019	1					
Supervising hours	**9**	0.2876 *	0.0541 *	0.1578 *	-0.1749 *	0.0642 *	0.1111 *	-0.0186	0.3623 *	1				
Research hours [a]	**10**	0.1067 *	0.0159	-0.0866 *	0.0991 *	-0.0410 *	-0.0582 *	0.0268	-0.1163 *	0.1392 *	1			
Admin hours [a]	**11**	-0.0090	0.0951 *	0.0645 *	-0.0899 *	0.0167	0.0738 *	0.0186	-0.0424 *	0.1356 *	0.0706 *	1		
Service hours [a]	**12**	0.0555 *	0.0593 *	0.0487 *	-0.0516 *	0.0261	0.0254	-0.0100	0.0227	0.1362 *	0.0961 *	0.2123 *	1	
Consultation hours [a]	**13**	-0.0387 *	-0.0846 *	0.0507 *	-0.0335 *	0.0068	0.0270	-0.0593 *	-0.1107 *	-0.0323 *	-0.0185	0.0391 *	0.1372 *	
Fundraising hours [a]	**14**	0.1851 *	0.0269	-0.0384 *	0.0160	0.0163	-0.0329 *	-0.0219	-0.0896 *	0.1915 *	0.3075 *	0.2432 *	0.1478 *	
Funding [a]	**15**	0.2345 *	0.0357 *	0.1351 *	-0.1222 *	0.0082	0.1153 *	-0.0181	-0.0403 *	0.2041 *	0.2321 *	0.1247 *	0.0095	
Study-related mobility	**16**	0.0376 *	-0.1272 *	0.0285	-0.0371 *	0.0279	0.0090	-0.0770 *	0.0095	-0.0252	0.0020	-0.0684 *	-0.0519 *	
Work-related mobility	**17**	0.0558 *	-0.0972 *	-0.1343 *	0.1180 *	-0.0066	-0.1127 *	-0.0377 *	-0.0169	-0.0257	0.1080 *	-0.0575 *	-0.0009	
Collaboration with own inst.	**18**	0.1770 *	-0.0452 *	-0.0072	-0.0109	0.0147	-0.0041	-0.0567 *	-0.0615 *	0.0782 *	0.1296 *	0.0121	0.0095	
Collaboration with own country	**19**	0.1683 *	-0.0348 *	0.0093	-0.0260	0.0222	0.0035	-0.0367 *	-0.0859 *	0.0371 *	0.0973 *	0.0256	-0.0009	
Collaboration within Africa	**20**	0.1603 *	-0.0595 *	0.0082	-0.0323 *	0.0277	0.0042	-0.0793 *	-0.0882 *	0.0113	0.0769 *	0.0265	-0.0255	
Collaboration outside Africa	**21**	0.1663 *	-0.0252	0.0097	-0.0154	0.0114	0.0039	-0.0251	-0.0966 *	0.0763 *	0.1226 *	-0.0014	-0.0391 *	
South Africa	**22**	-0.0948 *	0.2375 *	0.1229 *	-0.0276	-0.0984 *	0.1291 *	0.1418 *	-0.0773 *	0.1692 *	0.1258 *	0.2880 *	0.1185 *	
STEM fields	**23**	0.0192	-0.1220 *	-0.0653 *	0.0447 *	-0.0155	-0.0294 *	-0.0260	-0.0067	-0.0212	0.0058	-0.1041 *	-0.1810 *	
Health fields	**24**	0.1054 *	0.0525 *	-0.0128	0.0048	0.0270	-0.0326 *	-0.0238	-0.0239	0.0200	-0.0051	0.0397 *	0.2135 *	
SSH fields	**25**	-0.1258 *	0.0913 *	0.0889 *	-0.0570 *	-0.0084	0.0663 *	0.0537 *	0.0313 *	0.0051	-0.0017	0.0828 *	0.0026	

		13	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Consultation hours [a]	**13**	1												
Fundraising hours [a]	**14**	0.0700 *	1											
Funding [a]	**15**	-0.0397 *	0.3939 *	1										
Study-related mobility	**16**	0.0168	0.0657 *	0.0908 *	1									
Work-related mobility	**17**	0.0431 *	0.1273 *	0.0703 *	0.1598 *	1								
Collaboration with own inst.	**18**	-0.0020	0.1461 *	0.1472 *	0.0046	-0.0203	1							
Collaboration with own country	**19**	0.0230	0.1750 *	0.1399 *	-0.0016	0.0260	0.2411 *	1						
Collaboration within Africa	**20**	0.0087	0.1765 *	0.1703 *	0.1229 *	0.1366 *	0.1479 *	0.2776 *	1					
Collaboration outside Africa	**21**	-0.0306 *	0.2015 *	0.2740 *	0.1251 *	0.1525 *	0.0790 *	0.2171 *	0.2632 *	1				
South Africa	**22**	-0.0147	0.0854 *	0.1649 *	-0.1963 *	-0.1315 *	-0.0595 *	-0.0257	-0.1016 *	0.0080	1			
STEM fields	**23**	-0.0541 *	0.0332 *	-0.0105	0.0168	-0.0117	0.0577 *	0.0739 *	-0.0040	0.0655 *	-0.1234 *	1		
Health fields	**24**	0.0464 *	0.0197	0.0045	-0.0288 *	0.0065	0.0749 *	0.0144	0.0313 *	0.0136	-0.0483 *	-0.5795 *	1	
SSH fields	**25**	0.0178	-0.0581 *	0.0079	0.0086	0.0073	-0.1409 *	-0.1005 *	-0.0260	-0.0899 *	0.1917 *	-0.6018 *	-0.3022 *	1

Note: Significance level: * $p<0.05$.

[a] All continuous variables were transformed using the natural logarithm: ln(*variable* + 1);

[b] Age is not used in the regression analysis.

Table 7 Interactive variable coefficient comparison tests (t-tests) – Gender vs Main care and housework

		Women			
		Main care & housework			
Men	Main care & housework	NO	YES	Main care & housework	
	NO	***	***	NO vs YES [Women]	***
	YES	**	***	NO vs YES [Men]	NS

Notes: ***, **, * represent significance at the 0.01, 0.05 and 0.1 levels.

Table 8 Interactive variable coefficient comparison tests (t-tests) – Gender vs career stage

					Women		
					Early- vs Mid-career	Early- vs Late-career	Mid- vs Late-career
					***	***	*
					Women		
Men	Early- vs Mid-career	***	Men	Early-career	Early-career	Mid-career	Late-career
	Early- vs Late-career	***		Mid-career	***	NS	*
	Mid- vs Late-career	NS		Late-career	***	***	**
					***	***	**

Notes: ***, **, * represent significance at the 0.01, 0.05 and 0.1 levels.

Table 9 Interactive variable coefficient comparison tests (t-tests) – Gender vs mobility

a)

		Women			
		Study-based mobility			
Men	Study-based mobility	NO	YES	Study-based mobility	
	NO	***	***	NO vs YES [Women]	NS
	YES	***	***	NO vs YES [Men]	*

b)

		Women			
		Work-based mobility			
Men	Work-based mobility	NO	YES	Work-based mobility	
	NO	***	**	NO vs YES [Women]	*
	YES	***	***	NO vs YES [Men]	NS

Notes: a) study-related mobility; b) work-related mobility.
***, **, * represent significance at the 0.01, 0.05 and 0.1 levels.

Table 10 Interactive variable coefficient comparison tests (t-tests) – Gender vs Collaboration

a)

		Women			
		Collaboration with own inst.			
Men	Collaboration with own inst.	NO	YES	Collaboration with own inst.	
	NO	***	NS	NO vs YES [Women]	***
	YES	***	***	NO vs YES [Men]	***

b)

		Women			
		Collaboration with own country			
Men	Collaboration with own country	NO	YES	Collaboration with own country	
	NO	***	NS	NO vs YES [Women]	***
	YES	***	***	NO vs YES [Men]	***

c)

		Women			
		Collaboration within Africa			
Men	Collaboration within Africa	NO	YES	Collaboration within Africa	
	NO	***	NS	NO vs YES [Women]	***
	YES	***	NS	NO vs YES [Men]	**

d)

		Women			
		Collaboration outside Africa			
Men	Collaboration outside Africa	NO	YES	Collaboration outside Africa	
	NO	***	NS	NO vs YES [Women]	***
	YES	***	***	NO vs YES [Men]	***

Notes: a) with own inst.; b) with own country; c) within Africa; d) outside Africa.
***, **, * represent significance at the 0.01, 0.05 and 0.1 levels.