

1 **The Need for Sustainable Leadership in Academia – a German Case** 2 **Study**

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16 **Abstract**

17 Academic leaders are selected based on their publication record, citation index and
18 acquisition of third party funding. However, heading a successful research team, also
19 requires leadership skills. Despite the clear need, leadership development has been
20 systematically neglected in the present academic system. At the same time, growing
21 evidence suggests that leadership styles of academic supervisors can dramatically
22 affect the mental health of academic employees as well as drive highly skilled
23 researchers out of academia. Here, we assessed the current state of academic
24 leadership in the German academic system by surveying 368 participants currently
25 employed in academia in Germany. We report that 64% of current academic leaders
26 did not feel prepared for their current position while 86% of participants expressed their
27 interest in leadership development programs offered by their research institutions. Our
28 results highlight the demand for leadership development programs in German
29 academic institutions to ensure a more efficient academic system.

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31 **Introduction**

32 Success in science is measured through a combination of scientific output in the form
33 of publications in scientific journals and the acquisition of funding in order to enable
34 further research (1, 2). As young researchers advance in their careers, they become
35 highly trained in skills such as scientific writing so as to master publication or grant
36 writing. The mediation of leadership skills, however, is often neglected as currently
37 these do not contribute to the evaluation of scientific success or the appointment to
38 faculty positions (1). Therefore, an early career researcher (ECR) may become leader
39 of a research group based on publication record and solicitation of third party funding,
40 but without having received sufficient training of team leadership or team development
41 (3). A recent study focusing on leadership in academia, identified the neglect of
42 systematic leader selection and development as one of the most pressing challenges
43 in academic leadership, besides managing autonomy, constant change and
44 uncertainty (4). According to the authors, academic leaders are not prepared for their
45 demanding roles (4). Moreover, a survey including 233 professors from universities in
46 the United Kingdom revealed that 60% indicated their research output and
47 scholarships as the sole basis for their appointment (5).

48 In order to combat the so called “Peter Principle” (6) in academia, which states that
49 *“members of an organization where promotion is based on achievement, success, and*
50 *merit will eventually be promoted beyond their level of ability”*, researchers should be
51 sufficiently trained in leadership skills for the new set of challenges and responsibilities
52 they will face upon reaching a leading position. In fact, leadership has been considered
53 as key to academic success (7) and combined approaches of individual as well as
54 collective leadership have been suggested for successful research leadership (4). At
55 the same time, growing evidence suggests that the leadership style of academic
56 supervisors can dramatically affect mental health of academic employees, especially

57 of PhD students (8, 9). Moreover, managing students with mental health issues can
58 also pose enormous challenges on untrained supervisors (10), creating an
59 unsustainable circle of insecurity and overstress due to lack of leadership skills.

60 Despite growing movements to advance practical and robust approaches for research
61 assessment such as the San Francisco Declaration on Research Assessment (DORA)
62 (11), similar movements with regard to advancing leadership skill development for
63 academic offspring are currently rare.

64 Moreover, studies reflecting on the current status of research leadership are scarce.
65 Here we surveyed 368 participants currently working in academia in Germany on their
66 perception and experience of leadership in the German academic system, highlighting
67 the current situation as well as the needs for change towards a more sustainable
68 academic environment.

69

70 **Materials and Methods**

71 The survey (Supplementary file 1) was created using the online tool SurveyPlanet and
72 was conducted using convenience sampling with dissemination via forwarded email
73 invitations or shared via LinkedIn, and remained open for six weeks. A pilot version of
74 the survey was originally conducted with 4–8 doctoral researchers/PhD students of
75 scientific research institutions in Berlin. Based on this pilot run, some questions were
76 revised. 709 participants completed the survey. The survey was originally planned to
77 give an international overview on the topic, since however 88.7% (629) of participants
78 are currently working in German research institutions/academia, the subsequent
79 analysis was focused on German academia. When asked about their highest academic
80 degree, 7% (44) of participants stated high school diploma. According to our definition,
81 participants should have at least a university degree to take part in a survey focused
82 on academic leadership. For these reasons, participants who are currently fresh

83 students but do not yet have a university degree were excluded from further analysis.
84 Further, participants currently working in academia in Germany with at least one
85 academic degree (585), were currently not all employed in academia, in fact 37% (217)
86 of participants were currently working outside of academia, while 63% (368) of
87 participants worked in academic institutions. In order to depict the current status of
88 leadership in the German academic system, the analysis was therefore further focused
89 on all participants currently working in the German academic system (368). All the
90 descriptive statistics reported in this article are for these 368 respondents.

91

92 **Results**

93 We surveyed 585 international academics currently working in Germany on their
94 experience in leadership culture in academia, their needs for supporting leadership
95 skill development as well as their openness towards novel leadership concepts in
96 academia (see Methods for information on how the survey was disseminated).

97 Out of the surveyed German academic participants, 63% (368) are currently employed
98 in academia, 34% (197) indicated to work outside of academia or research while 3%
99 (20) indicated employment as scientists outside of academia. The latter two groups
100 show experience in academia, but are currently employed in a variety of professions
101 outside of academia; in order to reflect the current situation in academia the analysis
102 was therefore focused on the 368 academics that are currently employed in academia.
103 60% (221) of participants were women, 38% (139) were men with an average age of
104 31 years ranging from 21 to 82 years.

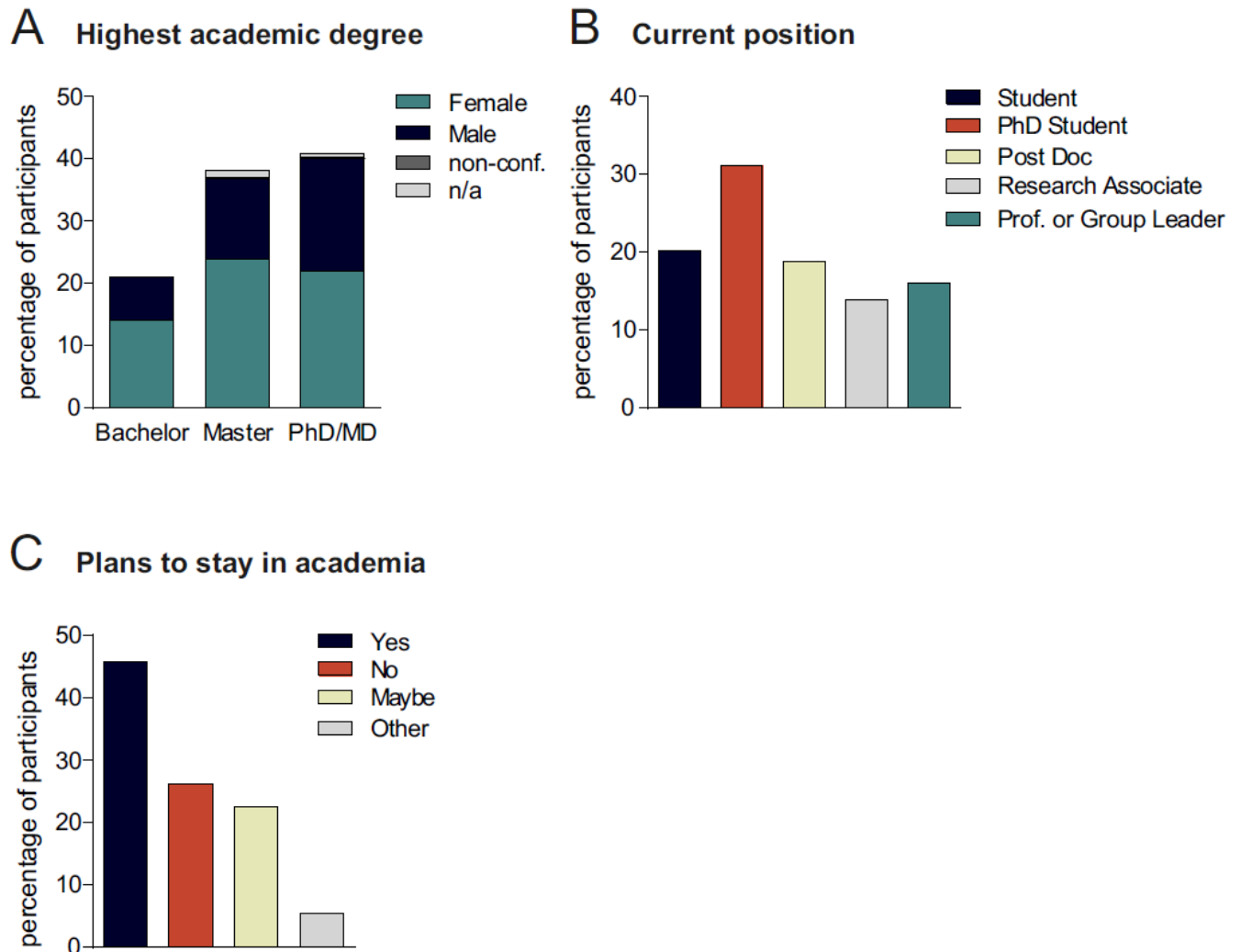
105 The majority of participants held a PhD/MD (41%) indicating substantial experience in
106 academic culture, followed by 38% holding a Master's degree, while a minor part of
107 participants held a Bachelor's degree (21%) (Figure 1A). When asked about their
108 current position in academia, 16% specified as Group Leaders or Professors, 19% as

109 Postdoctoral Researchers (Post Docs), 31% as PhD Students, 14% as Research
110 Assistants (defined as a graduate who is employed on a temporary or part-time basis
111 to assist the university or research institution with academic research) and 20% as
112 students (Figure 1B).

113 Surveyed participants currently working in academia were further asked about their
114 plans regarding academia. 46% indicated to plan to stay in academia (“Yes”; 55%
115 women, 38% men), 26% (“No”; 57% women, 42% men) are planning to leave
116 academia and 23% (“Maybe”; 72% women, 27% men) are currently undecided
117 regarding their professional future in academia (Figure 1C). While the gender ratio was
118 similar for staying or leaving academia (“Yes” or “No”), noticeably more women than
119 men indicated indecisiveness (“Maybe”) regarding their future in academia. Moreover,
120 many participants stating that they were undecided expressed their desire to stay in
121 academia but expressed their doubts on combining a career in science with family
122 planning, due to long working hours and short-term contracts.

123
124 When the 37% of surveyed participants that already left academia were asked about
125 their motivation to leave, reasons were manifold; the majority, however, stated that
126 they were concerned about poor career prospects and a lack of job security,
127 underscoring widespread concerns of participants working in academia.

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131 **Figure 1. Survey demographics.** **A.** Distribution of participants based on highest
132 academic degree ranging from Bachelor, Master to PhD or MD including gender
133 distribution. **B.** Current academic position of participants ranging from Student (cyan),
134 to PhD Student (orange), Post Doc (lime green), Research Associate (light grey) to
135 Professor or Group Leader (turquoise). **C.** Percentage of participants planning to stay
136 in academia (Yes; cyan), to leave academia (No; orange), is undecided (maybe; lime
137 green), answered other (light grey). n/a: no data available.

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141 **Academics feel unprepared for leadership in academia**

142 We further assessed whether participants working in academia feel prepared for
143 leadership in academic environments. Out of the surveyed academic participants, 59%
144 indicated to be currently in a leading position (53% women, 45% men) while 41%
145 stated to be currently not in a leading position (70% women, 27% men) (Figure 2A).
146 When asked about their plans regarding leadership, out of the 41% that are currently
147 not in a leading position, 78% indicated to be pursuing a leading position (58% women;
148 38% men) while only 15% stated not to aim for a leading position (74% women; 26%
149 men) (Figure 2B).

150
151 Despite the majority of participants aiming for a leading position in academia, 77% of
152 all academic participants stated that they were not well prepared for a leading position
153 during their academic career (Figure 2C). When focusing on the current leaders in
154 academia, 73% also stated that they did not feel well prepared for the leading position
155 they currently hold (54% women, 44% men; Figure 2D).

156 When academics currently working outside of academia were asked regarding their
157 preparedness for leadership, 51.8% of current leaders did not feel prepared for their
158 position (Supplementary File 2).

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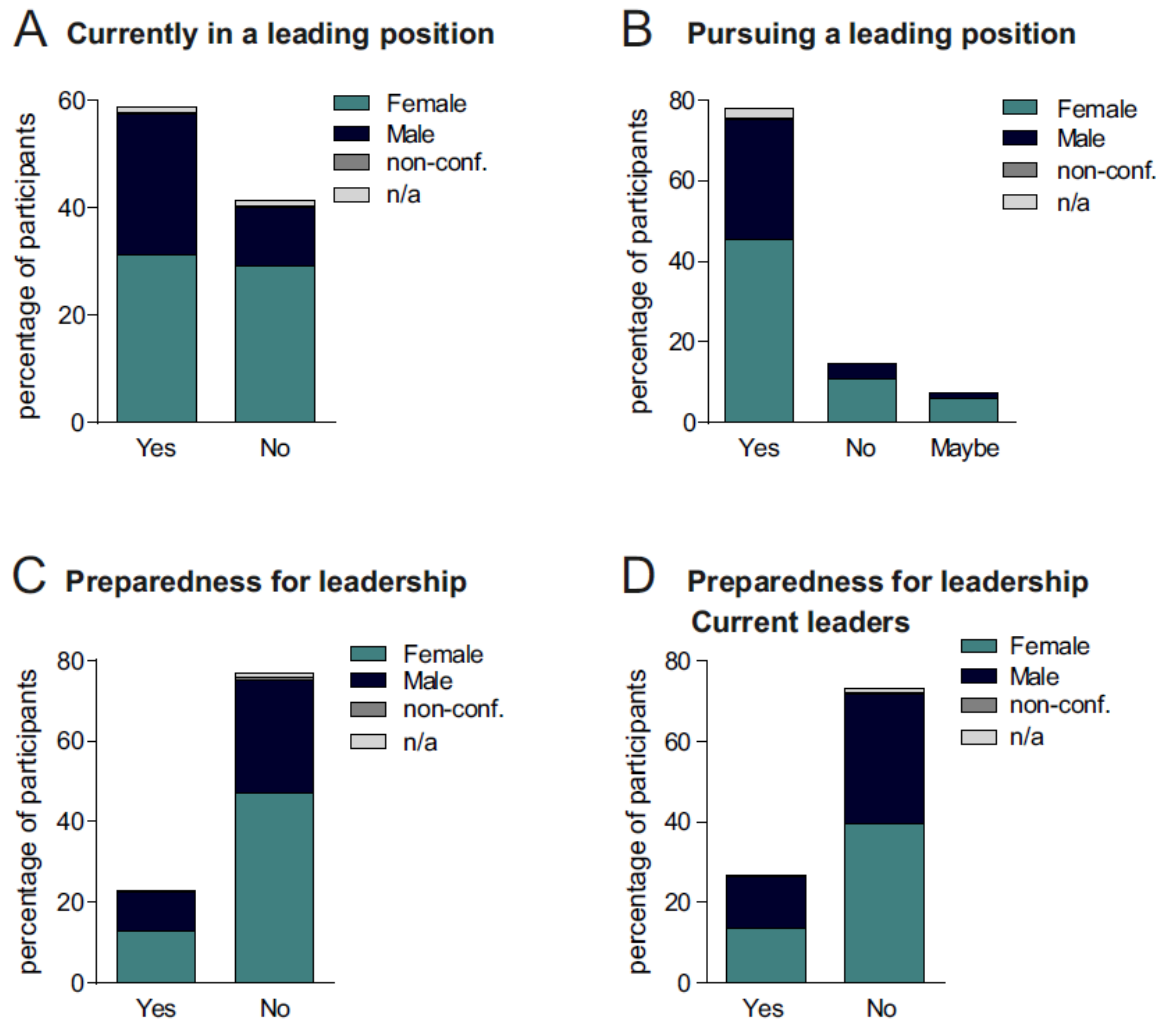
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169 **Figure 2. Leadership status of participants.** **A.** Percentage of participants currently
170 holding a leading position (Yes) and currently not holding a leading position (No)
171 including gender distribution within each group. **B.** Percentage of participants pursuing
172 (Yes), potentially pursuing (Maybe) and not pursuing (No) a leading position including
173 gender distribution within each group. **C.** Percentage of current leaders that feel
174 prepared (Yes) or not prepared (No) for a leading position. **D.** Percentage of current
175 non-leaders that felt prepared (Yes) or not prepared (No) for a leading position. n/a: no
176 data available.

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179 **Academics are interested in leadership development programs and expect**
180 **institutions to act**

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182 To better understand the needs of the academic community, we assessed their interest
183 in leadership training opportunities as well as the format and conditions of such offers.

184 84% of participants indicated their interest in a training or coaching program supporting
185 their leadership development (Figure 3A). When asked about the format they would
186 prefer for leadership skill development, interests were diverse ranging from network
187 building, to personal coaching to workshops as well as lectures or online seminars
188 (Figure 3B).

189 About 62% of current leaders also expressed their interest in participating in leadership
190 development training together with their team (Figure 3C).

191

192 Having defined the needs of the academic community, we further examined the role of
193 academic institutions in the development of leadership skills, where 86% of participants
194 stated their interest in such offers provided by their research institutions (Figure 3D).

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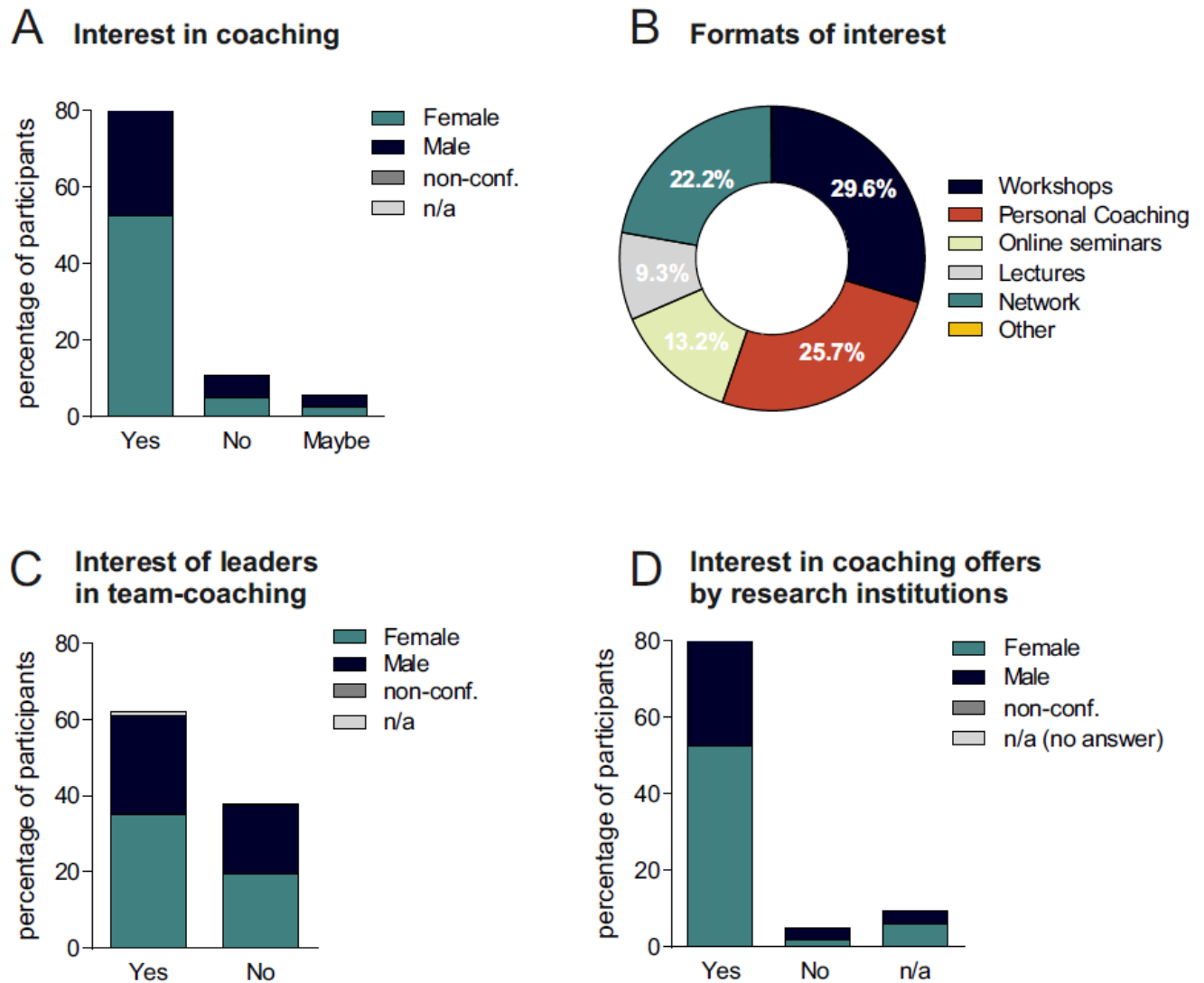
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207 **Figure 3. Interest in leadership training. A.** Percentage of participants that is

208 interested (Yes), potentially interested (Maybe), not interested (No) in coaching.

209 **B.** Percentage of participants interested in different formats for leadership training

210 including workshops (cyan), personal coaching (orange), online seminars (lime green),

211 lectures (light grey), network building (turquoise), other (yellow). **C.** Percentage of

212 current academic leaders interested (Yes) or not interested (No) in team-coaching. **D.**

213 Percentage of participants interested (Yes) or not interested (No) in coaching offers by

214 research institutions. n/a: no data available.

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218 **Discussion**

219 We here report a great need for leadership training programs in academia, based on
220 data from our survey on the current state of leadership in academia in Germany. 64%
221 of current academic leaders stated that they did not feel well prepared for the position
222 they are currently holding while 86% of all participating academics currently employed
223 in academia expressed their interest in leadership programs offered by their research
224 institutions.

225
226 In current debates about academic leadership, leadership is usually defined from the
227 perspective of a group leader or professor. From our point of view however, leadership
228 in science starts at an earlier stage, since in order to supervise or mentor another
229 student, a common scenario in the course of a PhD, leadership skills are already
230 required. Here, we therefore defined leadership as an early occurring event in the
231 course of a scientific career. Despite our definition of leadership, the majority of leaders
232 participating in our survey were at more advanced career stages as 90% of participants
233 held a Master's degree, an MD or PhD degree. More advanced career stages
234 however, indicating more time spent in academia, did not result in better preparedness
235 for leadership, underscoring the need for leadership training at every career stage.

236
237 Due to the high number of German participants, our survey focused on German
238 academia, reflecting the current state on leadership in academia in only one, but one
239 of the leading countries in academic research. Research culture however might differ
240 between countries and our data are therefore not suitable for a general statement on
241 the current state of leadership in academia. Thus, more international studies will be
242 required to confirm our data as well as to paint a more complete picture of the current
243 state on academic leadership.

244 It is beyond debate that leadership in academia is of high complexity. Academic
245 leaders are required to meet the interests of a spectrum of different stakeholders (12),
246 while being held to the highest standards regarding their excellence in research and
247 teaching (13). At the same time, academic leadership ranges across multiple levels,
248 from an individual level, to the level of a research group to the organization (4, 14).

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250 To date, only a few studies on the actual state of leadership in academia exist. One
251 study that surveyed academic leaders from Chinese and European universities,
252 reports a lack of comprehensive conceptualization of academic leadership, providing
253 a new definition of academic leadership based from an international academic context:
254 “an influence of one or more people with an academic profile on academic behavior,
255 attitudes or intellectual capacity of others based on commitment and power in order to
256 achieve managerial, structural, and institutional vision values” (15). Another study
257 highlights the fact that many current academic leaders are actually not aware of their
258 role in improving teaching quality at universities or learning success of their students
259 (16). On these lines, a recent study underscores the importance of sustainable
260 leadership practices in universities to ensure quality learning and teaching (17).
261 According to the authors, one important component of sustainable leadership practice
262 includes providing adequate developmental opportunities for those who are likely to
263 become leaders of learning and teaching (17).

264

265 Similarly, our data indicate the need for leadership training for future academic leaders
266 and at the same time their interest in such training.

267 Synergies from interdisciplinary collaborations, effective organization as well as
268 diverse environments maximize the use of resources and implement a sustainable

269 science culture in which researchers have the right framework and opportunities to
270 focus on their projects.

271

272 One way to improve scientific leadership could be training in leadership programs that
273 use leadership skills and working frameworks that have been applied successfully in
274 other fields. For example, concepts such as New Work and Agility, originating in the
275 start-up world, aim to realize an improved, innovative and creative work culture, similar
276 to the scientific field (18, 19). These concepts are based on self-motivation and
277 creativity, which makes them suitable for scientists, who are also strongly motivated
278 by purpose (20, 21). Therefore, it would be plausible to incorporate them in scientific
279 leadership training. Pioneer organizations such as the German Scholarship
280 Organization are developing programs for scientific leaders that support the
281 development of expertise exceeding the knowledge acquisition and scientific-work-
282 centered education (22).

283

284 Our data indicate that the majority of current leaders in the German academic system
285 was not prepared for their position; however, they expressed great interest in training
286 courses that could be offered by institutions, highlighting the role of institutions in
287 supporting the development of future scientific leaders. By investing in leadership
288 competencies, research institutions and universities may sustainably raise the
289 potential of academic excellence (23). Additionally, by sensitizing future academic
290 leaders towards general obstacles facing when pursuing a scientific career such as
291 lack of job security, power structures or imposter syndrome, reasons for many
292 excellent researchers to leave academia, and providing support to them, institutions
293 might contribute to sustain more researchers in academia. By promoting diversity

294 among academic leaders, research institutions might additionally contribute to fairer
295 and better research (24).

296

297 Some institutions have already integrated corresponding courses and are already
298 leading by example, such as the University of Sheffield providing online resources on
299 the development of leadership skills (25) or the Leaders Support and Development
300 Program of the English National Institute for Health Research (NIHR) offering future-
301 focused leadership programs for current and emerging research leaders (26). The
302 efficacy of such programs was shown by an Australian study reporting the
303 development of a career-development training program for early career researchers at
304 an Australian university as well as its immediate impact on research productivity on the
305 individual as well as organizational level (27).

306

307 **Conclusion**

308 We found that most academics aspire to leading positions but did not feel prepared
309 and bemoaned a lack of leadership skills in the scientific world. There might be a need
310 to transform the science work culture from a “stick and carrot” environment where
311 scientists work solely towards their next publication into a science enthusiasm and
312 innovation-driven culture.

313 With a need for excellence in times of increasingly complex problems, leadership skills
314 beyond mere management of teams are needed to tackle scientific questions in global
315 collaborations. They are also needed provide role models for young researchers and
316 provide them with future perspectives in the field of academia and a unique framework
317 to enhance their knowledge and research skills. One answer to this question could be
318 adopting work and leadership concepts that worked in highly innovative fields of
319 industry such as agility to the scientific environment.

320 **Competing interests**

321 The authors declare no competing interests.

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324 **References**

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