

**Academics as Superheroes: Female academics' lack of fit with the masculine  
stereotype of success limits their career advancement**

Ruth van Veelen<sup>1</sup>, Belle Derks<sup>1</sup>

<sup>1</sup> Department of Social, Health and Organizational Psychology, Utrecht University, The  
Netherlands

**Author note**

Ruth van Veelen: ORCID: <https://orcid.org/0000-0002-2609-1997>

Belle Derks ORCID: <http://orcid.org/0000-0002-0038-4134>

Correspondence concerning this article should be addressed to Ruth van Veelen,  
Department of Social, Health and Organisational Psychology, Heidelberglaan 1, 3584  
CS, Utrecht, The Netherlands, Email: [r.vanveelen@uu.nl](mailto:r.vanveelen@uu.nl)

**Abstract**

Gender gaps in academia persist with women being less likely to attain leadership, earning less salary, and receiving less research funding and resources compared to their male peers. The current research proposes yet another gender gap in academia called *lack of fit*, whereby compared to male academics, female academics perceive themselves to fit less well with the masculine 'superhero' stereotype of the successful academic. Results from a nationwide survey performed on all Dutch universities (N = 3978) demonstrated that academics perceive agency (e.g., self-confident, self-focused, competitive) as more descriptive of the stereotypical successful academic than communality (e.g., team-oriented, good teacher, collegial). Moreover, early career female academics perceived highest lack of fit with this agentic occupational stereotype, which predicted lower work engagement, career efficacy and career identification, and higher stress and exit intentions. Implications for building more inclusive academic cultures, where not only agentic, but also communal academic practice is recognized and rewarded are discussed.

**Keywords**

Women in Academia, Gender Inequality, Organizational Culture, Lack of Fit, Career Advancement

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Worldwide, women are more educated today than at any point in history. In many Western countries, gender gaps in education are disappearing - at times even to the advantage women (Centre for Global Development, 2019). However, the improved position of women in education does not translate to the workforce in academia. Gender inequality in academia persists, with female academics facing a number of gender gaps in their careers (Shen, 2013), such as the *leadership gap* (only one fifth of all Full Professors is female; LNVH, 2018; Higher Education Statistics Agency, 2013), the *salary gap* (female academics earn significantly less than male academics for the same work and responsibilities; e.g., De Goede, Van Veelen, Derks, 2016), and the *funding gap* (female academics' success rates in receiving funding are significantly lower, the amount of research funding they receive is significantly lower, and they are less often listed as principal investigators relative to their male peers; Bedi, Van Dam, & Munafo, 2012; Witteman, Hendriks, Strauss, & Tannenbaum, 2013). Recent research also demonstrates a more hidden gap in *research resources*, whereby female academics report to have significantly less time, facilities and assistance at their disposal for doing research than their male peers (Van Veelen & Derks, 2019). Over time, these gender gaps contribute the career stagnation and exit of women in academia (Ceci & Williams, 2011). In the current research, we argue for a fifth, even more subtle gender gap in academia, namely a *lack of fit* whereby, compared to male academics, female academics perceive themselves to fit less well with normative masculine 'superhero standards' in academic culture. Based on a large-scale national survey distributed among academics at all 14 Universities in the

Netherlands, we will demonstrate that, particularly among early career female academics, the experience of lack of fit contributes to higher levels of work stress, lower levels of career identity ("Yes, I am an academic!") and career efficacy ("Yes, I have what it takes to be an academic!"), and a higher inclination to opt out of academia compared to male academics.

Obtaining gender equity in academia is important - for moral reasons but also because it leads to better science (Nielsen et al., 2017). Diversity in organisations contributes to better informed decision-making (i.e., less groupthink), more innovative problem-solution, and more creative idea generation (Galinsky et al., 2015). And since academic institutions are the cornerstones of societies' innovative problem-solution and sustainable development, having and maintaining a diverse workforce is crucial (Gibbs, Han, & Lun, 2019). Indeed, empirical research among knowledge teams shows that, relative to male-dominated teams, teams with a more equal gender representation exhibit higher levels of collective intelligence. This means that the social perceptiveness for each other's expertise and the level of conversational turn-taking is of higher quality, which results in more effective problem-solving (Joshi, 2014; Woolley et al., 2010).

Furthermore, studies using computational text mining discovered that scientific journal articles written by women-dominated author groups addressed different research topics, posed different questions and targeted different populations compared to men-authored studies (Nielsen et al., 2017). As such, women in academia represent an underutilized

resource for broadening the scope and heightening the collective intelligence of academic products.

Even though universities increasingly endorse the added potential of a diverse workforce, closing existing gender gaps in academia is easier said than done. An important reason for this is the implicit and pervasive nature of gender stereotypes in academia - the characterization of women as lacking the masculine qualities associated with scientific ability and success (Moss-Racusin et al., 2012). For example, asking 14-year old children to 'draw a scientist' results in 75% of all drawings being portrayed as middle-aged white men (Miller et al., 2018). The same gendered associations hold for adults too. A large-scale study among 66 nations demonstrates that worldwide, science ability is implicitly more strongly associated with men than with women. The stronger this national gender bias about science the more pervasive the underrepresentation of women in academia within that nation (Miller, Eagly, & Linn, 2015). Academics themselves also hold gendered notions about their profession, such that scientific ability is often seen as an innate, raw talent, held more strongly by men than by women. This gendered belief among academics is directly linked to underrepresentation of women within that academic discipline (Cejka & Eagly, 1999; Leslie et al., 2015).

With academia still being viewed as a "men's world", our first hypothesis (Hypothesis 1) is that academics tend to hold a highly masculine notion of what it takes to build a successful career in academia. Qualitative research shows that in constructing an image of "academic excellence", leaders in academia (i.e., faculty deans) consider being self-confident, self-focused, competitive and output-oriented to be more important for success than being a team player, a nice colleague, a good teacher and a collaborator

(Bleijenbergh, Van Engen, & Vinkenburg, 2013; Van den Brink & Benschop, 2012).

These ingredients of academic success fit with the current reward and promotion culture in academia which is still largely based on a superhero standard of high individual performance-indicators such as the number and impact of first-authored publications, H-indexes and acquisition of highly competitive personal research funds or awards, rather than teaching, mentoring, team science, and interdisciplinary collaboration (McKiernan et al., 2019).

Secondly, we hypothesize that the masculine superhero standard of success in academia has negative consequences for female academics' perceived lack of fit in academic culture (Hypothesis 2). The lack of fit framework explicates that gender role expectations portray men as highly *agentic* (e.g., achievement-oriented, competitive, self-focused, self-confident) and women as highly *communal* (e.g., relationship-oriented, kind, helpful, cooperative, concerned for others) and that these gender stereotypes create a barrier for women to gain success in male-typed positions and occupations such as in academia (Haines, Deaux, Lofaro, 2016; Heilman & Caleo, 2018). Specifically, the incongruence between communal attributes associated with women on the one hand, and agentic attributes associated with being a successful academic on the other, are expected to cause lack of fit between the professional self-concept and the masculine standard of career success, particularly among female academics.

Third, we hypothesize that women's higher lack of fit with the agentic occupational stereotype in academia has negative consequences for well-being at work (Hypothesis 3). In academia, adhering to high agentic standards of success is increasingly taking its toll on both female and male academics well-being at university. A recent

survey by the Young Academy of Europe (Susi, Shalvi, & Srinivas, 2019) uncovered the extremely high work load and pressures that particularly early career academics deal with in terms of high job insecurity, high publication pressures and competitive personal research grant acquisition, combined with high teaching and administration loads. High job demands, combined with low job control in academia form a recipe for low work engagement and burnout (Schaufeli et al., 2002). Recent statistics in the Netherlands report that 8 out of 10 academics experience the workload as high to extremely high. For 6 out of 10 academics, this results in burnout-related symptoms and intentions to leave academia (FNV, 2019). As such, perceiving that one does not fit with the highly agentic expectations of success is expected to increase work stress and deplete work engagement in academia, particularly among women, but also among men, to the extent that they experience lack of fit too.

Fourth, beyond day-to-day work experiences, we hypothesize that the experience of lack of fit threatens the sustainability of female academics' careers, in terms of their career identification, career efficacy and career exit intentions in academia (Hypothesis 4). High career identification indicates that "being an academic" is a central part of the self-concept and provides a sense of self-definition and self-confidence that is needed to persist and succeed in a field (Ellemers, Spears, & Doosje, 2002; Hacket & Betz, 1981; Pratt, Rockmann, & Kaufmann, 2006). In educational sciences, research among high school students demonstrates that a high mismatch between girls' current and future self-image in STEM obstructs them from envisioning a future career in this occupation (career identity; e.g., "I see myself as an engineer"). This affects their ability to build self-confidence in career-related skills and abilities (i.e., career efficacy; "I feel competent to

be a successful engineer"), and thus from opting for STEM-related study programs (Hannover & Kessels, 2004; Takonis & Kessels, 2009). Among women striving for leadership too, psychological misfit with male-typed successful exemplars in leadership has been shown to form a barrier to their career advancement (Ellemers et al., 2012). We expect that in academia, women's higher lack of fit with the agentic stereotype of success relative to men's forms an important invisible barrier and threatens their career identity, efficacy, and exit intentions, herewith contributing to pervasive gender gaps in academia.

## **Method**

### **Participants and Design**

In the academic year 2017/18, 12.414 academics from all 14 Universities in the Netherlands were approached to participate in an online survey called "Working in Academia". A total of  $N = 4295$  academics responded to the questionnaire (response rate of 35%). The following exclusion criteria were applied: (1) participants who did not provide active informed consent or permission to use the data for scientific purposes were excluded (2) academics who did not fall in one of the hierarchical levels of Assistant Professor, Associate Professor or Full professor were excluded (e.g., PhD's or Post docs); (3) Academics who did not self-identify as man or woman were excluded and (4) academics older than 67 years (retirement age in 2018, according to the Collective Labour Agreement of Dutch Universities) were excluded. After applying these criteria,  $N = 3978$  participants remained in the dataset for further analyses (See Supplement Table S1 for Sample Characteristics).

The sample consisted of  $N = 2363$  men (59%) and  $N = 1615$  women (41%). Women in the sample were slightly overrepresented as compared to the approached



population (68% men / 32% women), which is common in response to online research participation (Smith, 2008). In terms of hierarchical level,  $N = 2034$  (51%) was Assistant Professor,  $N = 877$  (22%) was Associate Professor, and  $N = 1067$  (27%) was Full Professor. Signaling the leadership gap in academia, women were relatively overrepresented at the lowest function level, and underrepresented at the highest function level. Among the women, 63% was Assistant Professor (relative to 43% of men), 20% was Associate Professor (relative to 23% of men) and 17% was Full Professor (relative to 34% of men),

Men in the sample were older ( $M = 48.92$ ,  $SD = 9.87$ ) compared to women ( $M = 44.41$ ,  $SD = 9.12$ ),  $t = 14.45$ ,  $p < .001$ . In terms of academic age too (i.e., years since obtaining a PhD degree) men were older ( $M = 17.02$ ,  $SD = 9.27$ ) compared to women ( $M = 12.15$ ,  $SD = 7.56$ ),  $t = 17.19$ ,  $p < .001$ . Most academics  $N = 3215$  (82%) held a permanent contract. Signaling their higher job insecurity, women more often held a fixed-term contract (22% of women) than men (16% of men), and this effect was explained by women's younger academic age relative to men's. The vast majority  $N = 3032$  (82%) of academics worked fulltime (36 hours a week or more). Moreover, women more often held part-time contracts ( $N = 389$ , 26%) compared to men ( $N = 278$ , 13%).

Finally, based on the Dutch NARCIS-classification participants were categorized into eight academic disciplines, namely Science and Technology  $N = 990$  (25%), Life Sciences, Medicine and Health Care,  $N = 482$  (12%) Humanities  $N = 699$  (18%), Law and Public Administration  $N = 372$  (9%), Behavioral and Educational Sciences  $N = 491$  (12%), Social Sciences  $N = 435$  (11%), Economics and Business Administration  $N = 449$  (11%), and Interdisciplinary Sciences  $N = 60$  (2%). Female and male academics were not

equally represented across disciplines. For example, in Science and Technology, the percentage of men (32%) was more than two times higher than the percentage of women (14%). In contrast, in Behavioral and Educational Sciences the percentage of women (20%) was almost three times higher compared to the percentage of men (7%; Table S1).

The research had a cross-sectional design. In testing our hypotheses, our independent variables were gender (man/woman) and hierarchical level (assistant/associate/full professor). Because men and women differ in their background and employment conditions (Table S1), in testing hypothesis we included academic age (both linear and quadratic effects), academic discipline (7 dummy variables), contract type (fixed-term/permanent) and contract size (part-time/fulltime) as covariates.

### **Procedure**

The study was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences of Utrecht University (FETC17-010). Participants were approached via their university email address through the internal HR communication system in each university. The invitation email was signed by either the Rector or HR-director of the university. Participants could access the survey by clicking on a hyperlink in the email. The survey was available both in Dutch and in English. At each university, the survey was online for 2-3 weeks; after 1 week a reminder email was send out. At the start of the survey, participants read and agreed to an informed consent form, ensuring amongst others, anonymity, voluntary nature of participation, safety of data storage, the right to withdraw at any time and contact information. Subsequently, participants filled out questions about their demographic and job characteristics, and also answered questions about their time for tasks, support and resources in their work (Van Veelen & Derks,

2019). Subsequently, questions were asked about self-perceptions as a professional and perceptions of the typical 'successful academic within their own discipline', followed by questions about a future career in academia. In total, it took 15-20 minutes to complete the survey. respondents did not receive a reward for their participation. Insight into all survey questions can be requested from the first author. While sample size was determined/managed by internal communication systems of each university, sensitivity analyses on the most comprehensive statistical model (i.e., H4) within the smallest subgroup (i.e., associate professors  $N = 771$ ) indicated that the study was sufficiently powered to detect small effect sizes (e.g., Cohen's  $f^2 \geq 0.013$ ;  $\alpha = 0.05$ ,  $1 - \beta = 0.80$ )

## Measures

### *Agentic and communal attributions of the self and the occupational stereotype*

Attributions were measured by having participants rate both their professional self-image as well as their image of the prototypical successful academic within their own field on agentic and communal traits. All trait ratings were measured on a 5-point Likert-type scale (1 = totally not applicable; 5 = totally applicable). Self-ratings were measured prior to ratings about the occupational stereotype. The instruction for self-ratings was: *"The following questions relate to the person you are in your work at the university. If you had to describe yourself, to which extent are the following traits applicable to you when you are working?"*. The instruction for the occupational stereotype-ratings was: *"The following questions relate to your idea of a successful academic. Think about the academics in your field who are successful and have reached*

*top positions. Could you please indicate to which extent you believe that the following characteristics are important in order to become a successful academic?"*

To measure attributions of agency, the following trait-ratings were included (selected from: Abele, 2003; Bleijenberg et al., 2013; Cejka & Eagly, 1999): "performance-oriented", "self-confidence", 'wanting to be the best', 'professional networking', "assertiveness", "dare to take risks", and "focused on one's own academic output". The 7 agency items and were characterized by good inter-item consistency, both with respect to the self-ratings ( $\alpha = .72$ ) as well as the occupational stereotype ratings ( $\alpha = .79$ ). To measure attributes of communality, the following traits were included: "being a pleasant colleague", "being helpful", "being loyal", "contributing to a good working atmosphere", "devote a lot of attention to teaching", "being concerned with other colleagues", and "can cooperate well with other colleagues". The 7 communality traits were characterized by good inter-item consistency, both with respect to the self-ratings ( $\alpha = .76$ ) as well as the occupational stereotype ratings ( $\alpha = .92$ ). Two Confirmatory Factor Analysis on self- and stereotype-ratings confirmed the validity of the 2-factor structure of the items (agency and communality) showing good model fit (Supplement Table S2) Mean scores were computed to construct 4 variables measuring self- and stereotype-attributions on agentic and communal traits.

### ***Lack of fit index***

To calculate a "lack of fit" index, the items measuring agentic self- and prototype-ratings were averaged into 2 mean composite scores. To create a variable measuring lack of fit on agentic attributions, the mean score of agentic self-attributions was subtracted from stereotype-attributions. This means that positive scores indicate that attributions are

perceived to apply more strongly to the occupational stereotype than to the self, and vice versa for negative scores. The agentic lack of fit index ranged from -2.71 to 3.57 ( $M = .69$ ,  $SD = .76$ ). The positive mean score indicates that academics generally considered themselves to be less agentic than the stereotypical successful academic,  $t(3628) = 54.70$ ,  $p < .001$ ,  $CI_{95\%} = .663 - .712$ .

Note, that since being agentic is considered normative for career success in academia (and being communal is not), we focused specifically on lack of fit on agency and its consequences for work and career outcomes among male and female academics. Nevertheless, upon calculating a lack of fit index on communal trait ratings, results showed that academics generally considered themselves to be more communal than the stereotypical successful academic ( $M = -.97$ ,  $SD = .94$ ),  $t(3629) = -.62.50$ ,  $p < .001$ ,  $CI_{95\%} = -1.005 - -.943$ .

### ***Work and career outcomes***

Work engagement (6 items;  $\alpha = .89$ ) and stress (4 items;  $\alpha = .84$ ) were measured with 10 items on a 5-point Likert-type scale ((1 = totally disagree; 5 = totally agree); (Schaufeli et al., 2002)). Career identity (4 items;  $\alpha = .82$ ; [Ellemers, Spears, & Doosje, 2002]), efficacy (3 items;  $\alpha = .67$ ; [Hackett & Betz, 1981]) and exit intentions (2 items;  $r(3616) = .693$ ,  $p < .001$ ) were measured with 9 items on a 5-point Likert-type scale (1 = totally disagree; 5 = totally agree). A Confirmatory Factor Analysis on the 19 items confirmed the validity of the 5-factor structure showing good model fit (Supplement Tabel S3. Mean scores were computed to construct 5 variables (see Table 1 for descriptive statistics and correlations among model variables).

### Missing data

To adhere to ethical concerns, it was possible for participants to not answer questions should they wish so. The answer to the question about gender (woman/man) and function level (Assistant Prof. / Associate Prof. / Full Prof.) was a prerequisite to be included for further analyses. Yet due to its voluntary nature, we did deal with missing data on covariates and dependent variables in our model. In terms of covariates, we controlled for a priori gender differences in academic age (i.e., years since receiving PhD; women in academia are professionally younger than men;  $N = 143$  missing; 3.6% of the data), for academic discipline (women are more strongly underrepresented in STEM fields relative to other disciplines; no missing) for contract type (women less often held a permanent contract compared to men;  $N = 54$  missing 1.4% of the data), and for contract size (women more often worked part-time than men;  $N = 279$  missing, 7% of the data). To avoid losing a substantial number of participants due to the covariates in our statistical models, for the categorical covariates we created an extra dummy variable to participants with missing's on these variables (Contract Type and Size). For academic age (and the quadratic effect), we imputed the mean of age for the missing cases. With respect to the DV's the amount of missing data varied between 7.7% (agentic self-attribution) and 9.2% (career exit). Missingness on items to measure our DV's was completely at random (Little's MCAR test:  $\chi^2(1997) = 2048.41, p = .207$ ). We took a conservative stance and excluded missing cases on dependent variables in our analyses listwise in both SPSS and MPLUS statistical programs that were used to analyze the data.

## Results

The focus of the empirical research was two-fold: (1) To empirically demonstrate a psychological gap (i.e., lack of fit) between academics' self-image and the masculine occupational stereotype of the successful academic, as a function of gender (man versus woman) and hierarchical level (assistant. vs. associate vs. full professors). (2) To investigate the consequences of lack of fit for work outcomes (work engagement and stress) and career outcomes (career identification, career efficacy and career exit intentions), again depending on gender and hierarchical level. As stated before, in our hypothesis testing, we controlled for a priori differences in employment conditions among male and female academics (e.g., job security, academic age, academic discipline, position) to ensure that significant gender difference in lack of fit were not attributable to other gender gaps in academia. See also Box 1 (end of results section) for more information on establishing gender differences in lack of fit, work and career outcomes and a stepwise control for a priori gender differences in female and male academics' employment conditions.

### **The occupational stereotype of the successful academic is highly agentic**

A repeated measures ANCOVA was performed in SPSS with gender (man/woman) and hierarchical level (assistant/associate/full professor) as between-subject factors, and attributions of traits (agentic/communal) to the 'successful professional in academia as within-subject factor., and academic age (both linear and quadratic effects), academic discipline (7 dummy variables), contract type (fixed-term/permanent) and contract size (part-time/fulltime) as covariates. N = 3630 academics were included in this analysis (See Supplement Table S4).

In support for H1, results showed that when asked to rate the stereotypical successful academic on agentic and communal traits, regardless of their gender, academics emphasized agentic traits ( $M = 4.23$ ,  $SE = .01$ ) over communal traits ( $M = 3.27$ ,  $SE = .02$ ),  $F = 63.22$ ,  $p < .001$ ,  $\eta^2_p = .017$ . Interestingly, agentic traits were perceived as more important to academic success by academics at the lower compared to the higher levels in the academic hierarchy (assistant professors:  $M = 4.31$ ;  $SE = .02$ ; associate professors:  $M = 4.24$ ,  $SE = .02$ ; full professors:  $M = 4.14$ ,  $SE = .02$ ),  $F = 16.09$ ,  $p < .001$ ,  $\eta^2_p = .009$ ). Conversely, communal traits were perceived as less important for academic success by academics at the lower (i.e. assistant professors:  $M = 3.11$ ,  $SE = .02$ ; and associate professors:  $M = 3.21$ ,  $SE = .03$ ) compared to the highest level of the academic hierarchy (i.e., full professor  $M = 3.49$ ,  $SE = .04$ ),  $F = 33.71$ ,  $p < .001$ ,  $\eta^2_p = .018$  (Figure 1; Supplement Table S4).

### **Academics describe themselves as highly communal professionals**

A similar repeated measures ANCOVA, this time with attributions of traits (agentic/communal) to the professional self as within-subject factor ( $N = 3671$ ), showed that in contrast to the occupational stereotype, academics described themselves as more communal ( $M = 4.20$ ;  $SE = .01$ ) than agentic ( $M = 3.60$ ,  $SE = .01$ ),  $F = 23.67$ ,  $p < .001$ ,  $\eta^2_p = .006$ . Importantly, for both men and women, the tendency to describe the self as agentic *increased* with every step up in the hierarchy (i.e., assistant professor:  $M = 3.42$ ,  $SE = .02$ ; associate professor:  $M = 3.59$ ,  $SE = .02$ ; full professor:  $M = 3.81$ ,  $SE = .02$ ),  $F = 81.74$ ,  $p < .001$ ,  $\eta^2_p = .043$ . The three-way interaction between trait attribution (agentic vs. communal), gender (man vs. woman) and hierarchical level (assistant vs. associate vs. full prof.) was also significant,  $F = 5.67$ ,  $p = .003$ ,  $\eta^2_p = .003$  (Supplement Table S5). We



further disentangled this effect by investigating pairwise comparisons at each hierarchical level, and for each gender category separately.

At the lowest hierarchical level, female assistant professors described themselves as more communal ( $M = 4.26$ ,  $SE = .02$ ) than their male peers ( $M = 4.14$ ,  $SE = .02$ ), ( $F = 27.88$ ,  $p < .001$ ,  $\eta^2_p = .015$ , while no significant gender differences were found for agentic self-ratings,  $F = 1.32$ ,  $p = .250$ ,  $\eta^2_p = .001$ . In contrast, at the highest hierarchical level, female full professors described themselves as most agentic ( $M = 4.21$ ;  $SE = .03$ ) - even significantly more so than their male peers ( $M = 3.80$ ;  $SE = .04$ ),  $F = 4.26$ ,  $p = .039$ ,  $\eta^2_p = .004$ , while no significant gender differences were found for communal self-ratings,  $F = 1.28$ ,  $p = .248$ ,  $\eta^2_p = .001$ . This pattern confirms earlier demonstrations of female leaders' Queen Bee behaviors, such that their coping strategy to fit into male-dominated "old-boys' networks" is to portray a highly masculine self-image (Derks et al, 2016).

Finally, as stated before, while self-ascribed agency increased with every step up in the hierarchy among both female ( $F = 32.60$ ,  $p < .001$ ,  $\eta^2_p = .042$ ) and male academics ( $F = 51.27$ ,  $p < .001$ ,  $\eta^2_p = .045$ ), only among female academics self-ascribed communality decreased with every step up in the hierarchy (i.e., assistant professor:  $M = 4.29$ ,  $SE = .02$ ; associate professor:  $M = 4.24$ ,  $SE = .03$ ; full professor:  $M = 4.15$ ,  $SE = .03$ ),  $F = 6.22$ ,  $p = .002$ ,  $\eta^2_p = .008$ , while male academics' self-ascribed communality did not depend on hierarchical level,  $F = .41$ ,  $p = .662$ ,  $\eta^2_p = .000$ ). Combined, these results suggest that academics at higher hierarchical levels better fit the agentic occupational stereotype than academics at lower levels. This could be due to selection processes (i.e., the more agentic academics are more likely to receive promotion), as well as socialization

processes (i.e., academics learn that higher academic levels require more agentic behavior).

**Early career female academics experience the most lack of fit with the agentic occupational stereotype.**

A one-way ANCOVA was performed in SPSS on the lack of fit index on agency, with gender (man/woman) and hierarchical level (assistant/associate/full professor) as between-subject factors, and the earlier mentioned covariates. A total number of  $N = 3629$  academics were included in this analysis (See Table S6). Results showed that on average, academics tended to experience lack of fit such that they perceived their professional self as less agentic relative to the highly agentic prototype of success ( $M = .62$ ,  $SE = .01$ ),  $CI_{95\%} = .60 - .65$ . Lack of fit was higher the lower academics' own hierarchical level, such that assistant professors reported higher levels of lack of fit ( $M = .89$ ,  $SE = .02$ ), than associate professors ( $M = .65$ ,  $SE = .03$ ), and full professors reported the least lack of fit ( $M = .33$ ,  $SE = .03$ ),  $F = 103.47$ ,  $p < .001$ ,  $\eta^2_p = .054$ . In support for Hypothesis 2, female assistant professors reported the highest levels of lack of fit ( $M = .99$ ,  $SE = .03$ ) - significantly higher compared to male assistant professors ( $M = .79$ ,  $SE = .03$ ),  $F = 34.74$ ,  $p < .001$ ,  $\eta^2_p = .010$ . No evidence for gender differences was found at the associate ( $F = .44$ ,  $p = .507$ ,  $\eta^2_p = .000$ ) and full professor level ( $F = .02$ ,  $p = .887$ ,  $\eta^2_p = .000$ ; Figure 2; Supplement Table S6)

As stated before, our focus was on the investigation of a gender gap on lack of fit on agency as 'being agentic' is expectedly the standard to adhere to in academia. Indeed, no evidence for a gender gap was found on a lack of fit index based on communal self- and stereotype-ratings,  $F = .128$ ,  $p = .720$ ,  $\eta^2_p = .000$ . Being communal is thus not seen as

a key ingredient for success in academia nor do we find evidence for a gender gap in lack of fit based on communality. Instead, our data supports the premise that being agentic is perceived as a key ingredient for success in academia, more so than being communal. Yet when academics describe themselves as professionals, they see themselves as more communal than agentic. This results in a psychological gap, or lack of fit between academics' professional self-concept and how agentic they think they should be in order to be(come) successful. Interestingly, the more strongly academics embodied career success themselves (that is: being higher up in the hierarchy) the more they met the stereotypically agentic norm in how they described themselves professionally. Below we discuss consequences of experiencing lack of fit for work and career outcomes.

**Lack of fit explains lower work and career outcomes, particularly among early career female academics**

To test Hypothesis 3 and 4, a path model was tested to investigate the indirect effect of gender on work and career outcomes via lack of fit with structural equation modeling (SEM; MPLUS: Muthen & Muthen, 1988-2012). We built the conceptual SEM model by modeling regression paths from gender (0 = men; 1 = women; IV) to the agency lack of fit index (M), and from lack of fit (M) to all DV's. The covariates were modeled both on the mediator and the dependent variables. To investigate the direct paths in the SEM model, standardized parameter estimates were interpreted. We tested indirect effects by generating 95% bootstrapped confidence intervals (CI; 5000 iterations; MacKinnon, Lockwood, & Williams, 2004; Shrout & Bolger, 2002). To test whether the consequences of higher perceived lack of fit among female compared to male academics for work and career outcomes manifested within specific function levels we conducted

multigroup SEM modeling. Parameter estimates for the three function levels were thus estimated separately as with moderation analyses. A total number of  $N = 3585$  academics were included in this analysis.

The hypothesized model (Model 1; Figure 3) yielded good model fit,  $\chi^2(15) = 84.43, p < .001$  RMSEA = .062, SRMR = .007. CFI = .985, TLI = .697. In a second step, we tested whether multigroup modeling was justified, by comparing the model fit of the unconstrained multigroup model (Model 1), where the parameter estimates between the model variables were allowed to vary across hierarchical levels (1 = Assistant Prof.; 2 = Associate Prof., 3 = Full Prof.), to a model where the paths were constrained (that is, where parameter estimates are held constant across function level, assuming that there are no differences between groups; Model 2). The constrained model, ( $\chi^2(183) = 313.25, p < .001$ ) yielded worse fit than the unconstrained model,  $\Delta\chi^2(168) = 228.82, p = .001$ . This indicated that the parameter estimates were significantly different across hierarchical levels and multigroup modeling was justified. To test our hypothesis, we interpreted the standardized parameter estimates for the unconstrained Model 1, and calculated Wald's difference test to determine which specific direct and indirect effects were significantly different across hierarchical levels (Supplement Table S7).

As depicted in Figure 3 (and Table S7), regardless of gender or hierarchical position, academics who perceived lack of fit with the agentic occupational stereotype were significantly less engaged in their work, less identified with being an academic and less confident about their career in academia. Moreover, specifically for assistant and associate professors, lack of fit also predicted higher levels of work stress and a higher intention to leave academia. And because female assistant professors reported a

significantly higher level of lack of fit than their male peers, the negative consequences of lack of fit were particularly visible among early career female academics. Specifically, among assistant professors, the larger lack of fit reported by women compared to men, predicted women's significantly lower work engagement (*indirect effect:  $\gamma = -.03$ ,  $SE = .006$ ,  $p < .001$ ,  $CI_{95\%} = -.04/- .02$ ), higher work stress levels (*indirect effect:  $\gamma = .01$ ,  $SE = .004$ ,  $p = .004$ ,  $CI_{95\%} = .01/.02$ ), lower career identification (*indirect effect:  $\gamma = -.03$ ,  $SE = .0046$ ,  $p < .001$ ,  $CI_{95\%} = -.04/- .02$ ), lower career efficacy (*indirect effect:  $\gamma = -.05$ ,  $SE = .009$ ,  $p < .001$ ,  $CI_{95\%} = -.07/- .03$ ) and a higher intention to leave academia (*indirect effect:  $\gamma = .01$ ,  $SE = .004$ ,  $p = .015$ ,  $CI_{95\%} = .002/.02$ ) relative to men. In sum, although these results are correlational, they suggest that a lack of fit with the agentic superhero stereotype of academic success threatens the well-being and sustainability of careers of early-career academics, and particularly female early career academics.*****

**BOX 1: Are gender gaps in lack of fit and work and career outcomes (partially) attributable to the more precarious employment conditions of women in academia?**

*A stepwise analysis*

Results show that in their early careers, female academics experience more lack of fit with the highly agentic occupational stereotype of success than their male peers do, with negative consequences for their work and career outcomes. We take a conservative approach, and find evidence for these effects even after controlling for a priori gender inequalities in employment conditions in academia, for example referring to women's lower job status and higher job insecurity relative to men's (8). Yet how large are gender gaps on our model variables when we presume the 'real' situation and do not control for a priori gender inequalities in employment conditions? To investigate the size of statistical evidence for gender gaps on lack of fit, work and career outcomes with and without controlling for a priori gender differences in employment conditions, we took a three-step analytical approach (Table S8).

- Step 1: Calculate gender effects in lack of fit, work and career outcomes uncontrolled for a priori employment conditions
- Step 2: Add employment conditions as covariates to the model, namely academic position (years since receiving PhD, discipline and level) and job contract (fulltime/part-time contract and fixed/permanent contract) to calculate gender effects (See Materials and Methods section for further details on covariates)
- Step 3: Add interaction term between gender and hierarchical level, to investigate whether gender differences manifested specifically at certain hierarchical levels.

First, there was a significant a priori gender gap in *lack of fit*: women reported higher lack of fit than men ( $p < .001$ ,  $\eta^2_p = .010$ ). This gender gap was partially explained by gender differences in employment conditions, yet remained statistically significant ( $p < .001$ ,  $\eta^2_p = .006$ ). The gender gap in lack of fit specifically manifested among assistant professors  $p < .001$  ( $\eta^2_p = .010$ ). Second, there was a significant a priori gender gap in *work engagement*: women reported lower work engagement than men ( $p = .041$ ,  $\eta^2_p = .001$ ). This gender gap was completely attributable to differences in employment conditions; if women were to hold a similar amount of permanent contracts and were equally presented in higher positions in academia as men, they would no longer score significantly lower on work engagement ( $p = .148$  ( $\eta^2_p = .001$ )). Third, there was a significant a priori gender gap in *work stress*: women reported higher work stress relative to men ( $p < .001$ ,  $\eta^2_p = .016$ ). While this gender gap was partially explained by differences in employment conditions, it remained statistically significant after adding controls ( $p < .001$ ,  $\eta^2_p = .005$ ). Fourth, there was a significant a priori gender gap in *career efficacy*: women reported lower career efficacy than men ( $p < .001$ ,  $\eta^2_p = .015$ ). This gender gap was partially explained by a priori gender differences in employment conditions, yet remained significant ( $p = .002$ ,  $\eta^2_p = .003$ ). Moreover, women's lower career efficacy relative to men's manifested specifically at the assistant professor level ( $p < .001$ ,  $\eta^2_p = .006$ ). Fifth, no evidence for a priori gender gaps were found on *career identity* ( $p = .33$ ,  $\eta^2_p = .000$ ). Yet if women were to hold the same employment conditions as men in academia, their career identification would be significantly higher ( $p = .030$ ,  $\eta^2_p = .001$ ). Finally, there was a significant a priori gender gap in *career exit intentions*: women's inclination to leave academia was higher than men's ( $p = .019$ ,  $\eta^2_p = .002$ ). Importantly this gender gap was fully attributable to women's more precarious employment conditions relative to men's; if women were to hold the same employment conditions in academia, their exit intentions would in fact become significantly lower relative to men's ( $p = .006$ ,  $\eta^2_p = .002$ ).

Thus, systemic gender gaps in employment conditions, at least in part, account for psychological gender gaps in academia and therewith the work behaviors and career choices that men and women make in their academic careers

### General Discussion

The current work is the first to demonstrate that the subtle psychological process of perceiving that one is not agentic enough to adhere to the masculine superhero standard of academic success forms yet another gender gap that threatens the sustainability of women's careers in academia. Specifically, early career female academics' higher lack of fit contributed to lowered well-being at work, a lowered sense of career identity and efficacy, and a stronger intention to leave academia. Importantly, lack of fit effects were found above and beyond a priori gender differences in academics' employment conditions (i.e., academic age, discipline and level and job contract). Notably, while effect sizes in our data were small, they were structural. They confirm the invisible and intangible, yet highly pervasive nature of gender bias, and its subtle manifestation in many areas in academia (e.g., Bedi et al., 2012; De Goede et al., 2016; Leslie et al., 2015; Miller et al., 2015, 2018, Moss-Racusin et al., 2012; Shen, 2013; Van Veelen & Derks, 2019).

Our data also showed an interesting contrast effect: When academics were asked to describe themselves as professionals, they indicated to be more communal than agentic, while they held opposite views about the stereotypical standard for career success as being more agentic than communal. This contrast effect was particularly pronounced among early career academics indicating that young academics' current and future self-image do not align, which is related to lower persistence in their career (Hannover & Kessels, 2004). Also, our data suggests that as female academics climb the career ladder, they seem to go through more changes in their professional self-concepts than men do: The higher female academics' hierarchical status, the more strongly and

exclusively they conformed to the agentic occupational stereotype, by self-describing as highly agentic and relatively low on communality. In fact, female full professors considered themselves to be most agentic, significantly more than their male peers. This confirms earlier demonstrations of queen bee behaviors, where self-portraying as highly masculine is considered a coping strategy for women leaders to be accepted in male-dominated high-status positions (Derks et al., 2016).

The finding that lack of fit negatively affects early career female academics' intention to persist their careers in academia is especially disconcerting given a recent historical analysis that showed that over the past 60 years, women's vastly shorter career length in academia relative to men's is one of the key drivers explaining gender gaps in research productivity and impact (Huang et al., 2020). Every year and worldwide, the chance for a woman to drop out of academia is 19% higher relative to a man. And it is because of women's shorter career trajectories that for decades now, female academics have had significantly less time to generate the same level of productivity and impact as their male peers. In fact, it has been argued that if women were to have had the same amount of time and resources as men for their research, gender gaps in productivity and impact would have been non-existent (Huang et al., 2020). Therefore, in order to prevent early career exit and to build sustainable careers for young female academics, it is crucial to change the current masculine superhero model of success in order to reduce women's lack of fit with this academic culture. Interestingly, our data suggest that changing the superhero culture in academia would not only benefit women, but also men, as they too reported lack of fit that was related to lower work outcomes.



To date, many gender diversity initiatives to improve the position of women in academia take a targeted approach and aim to empower women in the highly agentic and male-dominant culture. There are many skill trainings and network events available targeted specifically at women in academia to learn to better self-promote on their CV's, to become tougher negotiators, or to become more confident leaders. While often well-intentioned, such a 'fix the women' approach places the onus on women and makes them responsible for resolving gender inequality. Moreover, it perpetuates the stereotype that women 'cannot negotiate', 'need extra help' or 'should become more like men' in order to advance their careers, while leaving the narrowly-defined agentic culture in academia unchanged. There is accumulating evidence that a women-only approach to foster gender diversity and equality is not only often ineffective, it can even result in backlash (Crosby et al., 2014; Unzueta et al., 2010). For example, if women display assertive or self-promotional behavior during job interviews or salary negotiations, they are penalized for it, because they are considered 'bossy' or 'bitchy' with negative consequences for their propensity to get hired or to get a raise (Bowles et al., 2007). Rather than a targeted approach to learn women how to fit better with the current superhero standard in academia, the findings in our research advocate for a systemic approach to increase gender diversity in academia. That is, to change the narrowly-defined masculine superhero standard of success, and move towards a more inclusive academic culture in which not only agentic but also communal behaviors are recognized and rewarded.

Following the guidelines of the San Francisco Declaration of Research Assessment (DORA), public knowledge institutions in the Netherlands have recently begun to reformulate the system of reward and recognition in academia, with the goal to

broaden the scope of what "academic excellence" means (VSNU, 2020). In line with the current research findings, this change in our reward and recognition systems entails a move away from the highly masculine and narrow-focus on competitive research funding acquisition and number of first-authored publications, and a move towards inclusion of team science, teaching, academic leadership, and collaborative practice as evaluation criteria of academic success. From research on implicit gender bias we know that agentic traits are more likely to be recognized in male rather than female academics (Eagly, Wood, & Diekmann, 2013). A more inclusive definition of academic success will create more space for diversity. And not because male and female academics are inherently different, but because when we have a more inclusive picture of what it means to be successful in academia, implicit gender biases will have less impact on selection and promotion procedures.

Broadening the standards of academic success means that multiple career paths can be chosen towards full professorship, which may ultimately result in more diverse role models and a more inclusive academy (Mitchneck, Smith & Latimer, 2016). Such change towards an inclusive culture in academia would not only have the potential to increase women's career opportunities in academia, therewith closing existing gender gaps, it also offers a more diverse set of career opportunities for men. Recent studies show that not only women, but men too may experience negative consequences of highly masculine work cultures. Specifically, in highly macho, masculine or male-dominated working cultures (e.g., The Royal Army, Police, Medical Surgeons, High-Tech, Finance), when both women and men sense that they themselves are not masculine enough to adhere to the stereotypical standard of success, this lowers their work engagement and

belonging (Peters, Ryan & Haslam, 2014, Van Veelen, Derks, & Endedijk, 2019). We see the same pattern of results in our data. While lack of fit is stronger for women compared to men, the consequences of experiencing lack of fit are actually the same across both genders as the correlational data suggests that lack of fit has negative consequences for work and career outcomes for men and women alike. As such, a narrowly-defined view on academic excellence based on individualism and competition, means that we do not only lose out on unique talent and innovative ideas of (young) women, but also men.

On a final note, of the limitations of the current research is that the data is cross-sectional: it is a snapshot approach to understand the current situation in academia in the Netherlands. This means that we need to be cautious in making causal inferences about the relationships between variables in our model. In the future, a longitudinal approach to follow up on this research is thus recommended. Longitudinal research can monitor whether initiatives discussed above, that aim to make recognition and rewards standards more inclusive will in fact change academic culture over time, and will change academics' perceptions of success from exclusively focusing on agency to including communality as well. It is also important to note that this research was carried out in the Netherlands only. A strength of the data is that with our sample covering 33% of the entire target population, we can be confident that results are generalizable to the Dutch context. Also, since the Dutch academic system is representative of the Anglo-Saxon academic system in for example the United Kingdom and North-America, results are likely generalizable to these countries as well. Nevertheless, investigating differences in academic cultures cross-nationally and their consequences for (gender) diversity is recommended. Importantly, while in the current research we demonstrated an overall

gender gap in lack of fit, notably there are differences in how agentic academic cultures are across disciplines. For example, in Economics and Business, the image of academic success is more agentic compared to in Behavioral Sciences (Derks, Van Veelen, & Handgraaf, 2019). In future research, it would be interesting to dive deeper into gender differences in lack of fit across disciplines and their connection to gender gaps in academics' careers.

**Author Contributions**

RvV and BD developed the conceptual model and design of the study. RvV and BD managed the set-up and administration of the survey. RvV handled all communication during the data collection processes. RvV performed literature searches, conducted the data analyses, interpreted the results, and wrote the manuscript. BD gave advice at all stages during this process and provided input on the manuscript.

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**Significance Statement**

Lack of fit with the masculine 'superhero' standard of success in academia limits early career female academics career advancement, therewith contributing to pervasive gender inequalities in this field. Using nationwide survey data, this work reveals that apart from well-known gender gaps regarding women's lower position, pay and availability of resources, there is yet another, more intangible psychological gap in that female (more than male) academics perceive themselves to fit less well with the highly masculine

standard of success in academia, contributing to their lower well-being and higher intentions to leave academia. Building more inclusive cultures, where not only agentic but also communal academic practice is recognized and rewarded is crucial to attain gender equality and profit from diversity in academia.

### **Data availability statement**

The data is not publicly available due to restrictions e.g. containing information that could compromise the privacy of research participants. Therefore, upon agreement with the Ethics Committee at Utrecht University and the Dutch Network of Female Professors, who commissioned this research, only the Principal Investigators (R. van Veelen and B. Derks) have access to the raw datafiles. The anonymized data to support the results of this study are available upon request from the corresponding author. Additional Materials (e.g., Ethics, Codebooks) and SPSS and MPLUS code and output for the analyses reported in this manuscript can be found at the Open Science Framework: Note that at present this is a reviewer-only link that will be made publicly available after publication of the manuscript.

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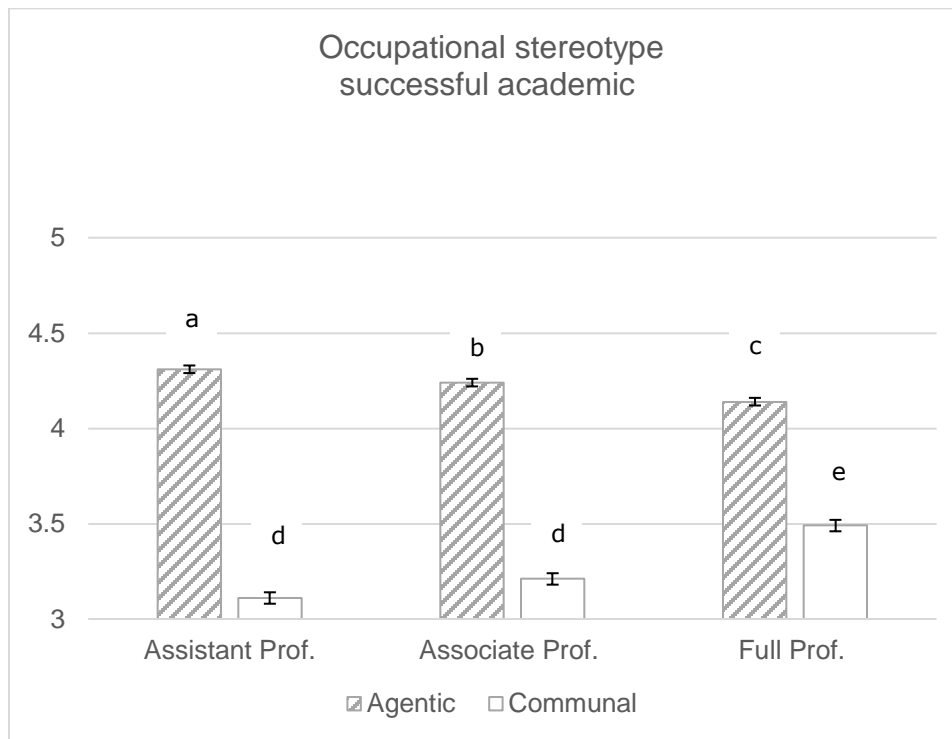
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**Table 1:** Descriptive Statistics Model Variables

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Pearson's r</i>												
				1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Gender (0=M; 1 = F)	3978	.41	.49	1	-.032*	-.182***	.101***	.030	-.028	.105***	.098***	-.034*	.128***	-.016	-.123***	.039*
Hierarchical level	3978															
2. F_D1 (assoc.)		.22	.41		1	-.322***	.011	-.037*	-.008	.014	.105	.017	-.056**	.019	.049**	-.071***
3. F_D2 (full)		.26	.44			1	-.079***	.123***	.178***	-.027	-.198***	.162***	-.144***	.133***	.278***	-.160***
4. Group Stereotype Agentic	3631	4.2 4	.56				1	-.221**	.145***	.211***	.632***	.096***	.007	.122***	.017	.013
5. Group Stereotype Communal	3631	3.2 3	.90					1	.238***	.169***	-.352***	.175***	-.067***	.121***	.183***	-.106***
6. Self Agentic	3672	3.5 5	.59						1	.179***	-.675***	.353***	-.108***	.387***	.496***	-.099***
7. Self Communal	3672	4.2 0	.47							1	.018	.271***	-.058***	.105***	.159***	-.033*
8. Lack of Fit agency	3629	.69	.76								1	-.207***	.092***	-.213***	-.376***	.089***
9. Work Engagement	3640	3.8 3	.69									1	-.544***	.324***	.454***	-.365***
10. Work Stress	3636	2.7 6	1.01										1	-.061***	-.268***	.343***
11. Career Identification	3625	3.7 1	.78											1	.423***	-.340
12. Career Efficacy	3621	3.7 7	.67												1	-.329***
13. Career Exit	3618	2.0 3	1.04													1

*Note:* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . Mean's (*M*) Standard Deviation's (*SD*) and correlations (*Pearson's r*). M = male; F = female. F\_D1 = Dummy variable with assistant professor as reference category (0) and associate professor as comparison group (1). F\_D2 = Dummy variable with assistant professor as reference category (0) and full professor as comparison group (1)

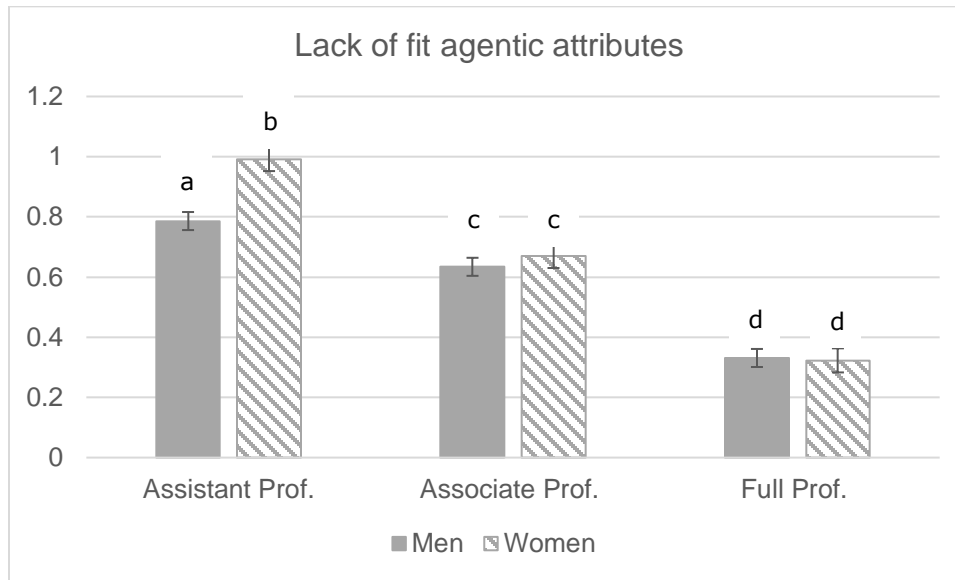
**Figure 1:** Occupational stereotype successful academic as function of gender and hierarchical level



*Note:* Error bars represent Standard Errors (SE). Likert scale (1-5) was cropped from 3 onwards scale (3.0-5). Bars with different labels (e.g. a, b, c) indicate that means are significantly different at the  $p < .05$  level, while no significant differences were observed for bars with the same (e.g., d)

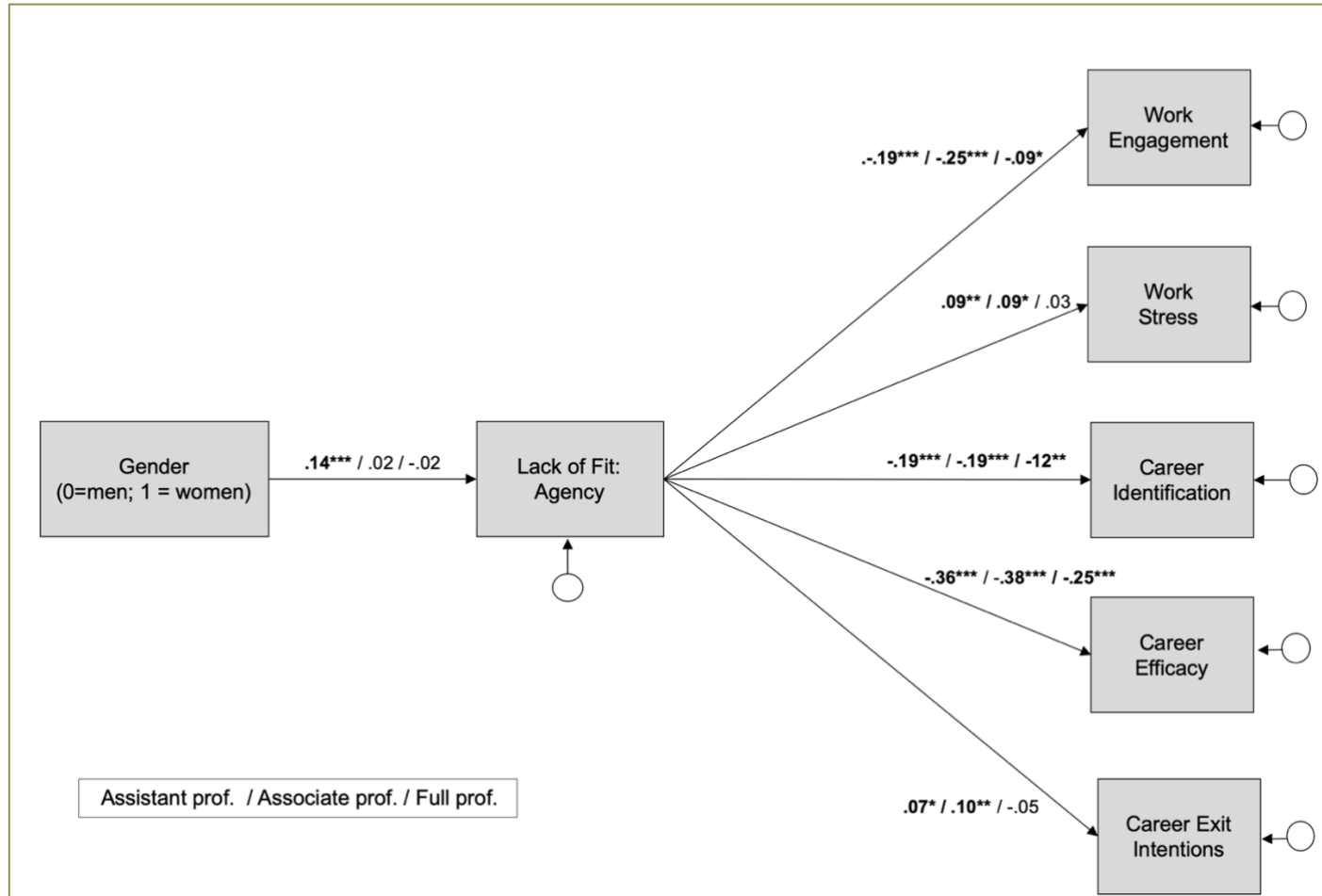


**Figure 2:** Lack of fit between the self and the agentic occupational stereotype as a function of gender and hierarchical level.



*Note:* Error bars represent Standard Errors (SE). Bars with different labels (e.g. a, b, c) indicate that means are significantly different at the  $p < .05$  level, while no significant differences were observed for bars with the same (e.g., d) labels).

**Figure 3:** Multigroup structural equation model on consequences lack of fit for male and female academics' work and career outcomes.



*Note:* Standardized Parameter Estimates between model variables are displayed for Assistant / Associate / Full Professors separately. Estimates marked in bold are statistically significant at either \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .