

Limitations to Gender Equality in Academia:
the Parenthood Penalty and Masculine Organizational Culture

Anne Lubbers (6877222)

Utrecht University, the Netherlands



Universiteit Utrecht

Master:	Social, Health, and Organizational Psychology
Supervisor:	Prof. Dr. Belle Derks
Second supervisor:	Prof. Dr. Elianne van Steenbergen
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Abstract

Gender inequality in the workplace, more specifically the way that women are still widely underrepresented in higher positions of organizations, is increasingly being addressed nowadays. The current study aims to examine if the parenthood penalty plays a role in motivating women to leave academia in higher numbers than men. In this two-wave longitudinal study ($N = 421$ and $N = 205$), it is hypothesized that experiencing a parenthood penalty negatively affects work outcomes one year later, with a stronger effect among women and for academics working in a masculine culture (like academia). Results indicate that women experience the parenthood penalty more strongly than men do. Moreover, a masculine culture predicted a stronger parenthood penalty for both male and female employees with children. In contrast to predictions, although the results show that the parenthood penalty is negatively related to work outcomes at T1, the results do not demonstrate an effect of the parenthood penalty on work outcomes over time (from T1 to T2). Yet, masculine culture is found to be a longitudinal negative predictor of estimated chance of staying in academia one year later. These findings reveal the importance of universities investigating exactly how the parenthood penalty experience is created and intervening to change their masculine culture in order to maintain female talent.

Keywords: parenthood penalty, academia, masculine organizational culture, gender inequality, work outcomes, universities, female underrepresentation

Introduction

Since 1911, the world has celebrated International Women's Day on the 8th of March each year with the aim of raising awareness for a more gender-equal society. A recurring topic on this day, as well as during the rest of the year, is the underrepresentation of women in higher positions of organizations. This situation is highly applicable to universities; in the Netherlands in 2019, only 23.1% of all full professors were women, while more than half of the students who graduated from Dutch universities were female (53.9%), and a significant percentage of the students that obtained their PhDs were female (43%; LNVH, 2019). The share of women is decreasing sharply when they climb the academic career ladder, resulting in a large gender difference at the top. There have been some improvements in this area and the percentage of female professors is growing, but ultimately, women are still strongly underrepresented in top positions in academia.

Academic gender diversity is of great importance; it advances innovation, creativity, and productivity (Van der Lee & Ellemers, 2015). Additionally, gender-diverse research teams address different research questions and methods, leading to a wider application of research findings and contributing to the progress of science (Schiebinger, Klinge, Sánchez de Madariaga, Paik, Schraudner, & Stefanick, 2011). Moreover, academic gender diversity ensures that the organizational culture is more open to change (Van der Lee & Ellemers, 2015). Nowadays, much talent is lost in the workforce due to gender inequality (Ellemers, Heuvel, Gilder, Maass, & Bonvini, 2004). According to the Landelijk Netwerk Vrouwelijke Hoogleraren (LNVH, 2019), progress is being made in this field, but it will take until 2042 for gender proportionality to be achieved in higher positions in academia. The question integral to this development is why so many women leave the academic world before reaching the top.

There are various important and interesting reasons to research why women are underrepresented in senior positions in academia. Striving for a more gender-equal world is an important issue in our society nowadays which must be tackled.

Although there may be multiple reasons for the underrepresentation of women in higher positions, in the current investigation, the focus is on the effects of childbirth on women's careers. In the present research, the role of the parenthood penalty experience in the work outcomes of female academics compared to male academics will be examined by analysing data from a longitudinal study conducted among assistant professors at Utrecht University. The research question is formulated as follows: will academics who experience a parenthood penalty report more negative work outcomes one year later?

The insights of this study may give more information on why women leave academia prematurely and are, therefore, underrepresented in top positions. This is important for universities in their search for information on and effective improvements for maintaining their female talent, which is beneficial for the universities and all women working in academia. Apart from this practical relevance, this paper is theoretically relevant as well. Numerous studies have been done on the underrepresentation of women and the experience of the parenthood penalty, but these studies did not investigate what the penalty experience precisely entails for the parents themselves and what it does to their specific work outcomes. The results of this study will contribute to the existing literature on the parenthood penalty, as not much is known of its long-term effect on work outcomes and whether this penalty could be an explanatory factor for the underrepresentation of female professors.

The Parenthood Penalty in Academia

Firstly, for this research, it is important to understand the definition and the facts of the parenthood penalty. In 1997, Waldfogel was the first to document the parenthood pay gap, which represents hourly wage differences between workers who have children and those who have not. In addition to this pay gap, it appears that mothers and fathers are often judged to be less committed, less driven, and less reliable than non-parents (Heilman & Okimoto, 2008). These various disadvantages together are called the parenthood penalty.

In recent decades, multiple studies have been done on the wage gap for parents, all of which specifically discussed the penalty for mothers (e.g. Waldfogel 1997; 1998; Neumark & Korenman 1994; Correll, Benard & Paik, 2007). Results show a wage drop of 7% per child for women, and the penalties are higher for married mothers than for unmarried mothers (Budig & England, 2001). Conversely, men who have children earn about 9% more compared to non-fathers (Lundberg & Rose, 2000; Cejka & Eagly, 1999). This phenomenon is named the ‘fatherhood premium’ and is relatable to Heilman’s Lack of Fit model (1983). This model describes how people think in a gender-biased way – associations with and expectations of others are based on stereotypes; for example, men are seen as breadwinners (so they should earn more) and women as caretakers (not agentic enough to be in the workplace; Heilman, 1983, 2001). The model further specifies that performance expectations of an individual are determined by the perceived fit between the individual’s characteristics and the job’s requirements in terms of skills and abilities. If the perceived fit is good, success will be expected; if the perceived fit is poor, failure will be expected (Heilman, 1983). These gender stereotyped beliefs are extremely persuasive, widely shared, and affect evaluation processes

(Heilman, 2001). When women deviate from the caretaker/housewife expectation by committing completely to their full-time job, they are perceived as cold (Cuddy, Fiske, & Glick, 2004) and less nurturing compared to full-time working fathers (Etaugh & Folger, 1998). Women are typically either liked (as a mother) or respected (on the work floor), but not both (Cuddy et al., 2004).

The main focus of the current study is to test whether there is a parenthood penalty among male and female assistant professors and whether this penalty predicts their work outcomes. This will be done by measuring the parenthood penalty *experience*, which was studied differently in earlier studies that focussed on the objective effect of being a parent on salary or on the amount of working hours. The current study focusses on the subjective experience, that is working parents' impression that their colleagues and supervisors expect them to be less involved and less committed to their work as a result of parenthood and assign them less responsibility in their work activities.

Notably, research shows that highly paid and highly skilled women experience the largest objective total penalty for being a mother (lower salary and lost experience; England, Bearak, Budig, & Hodges, 2016). This finding is significant given the fact that the current research group is comprised of highly skilled (female) academics. Based on the aforementioned studies, the first hypothesis is formed:

Hypothesis 1: among assistant professors, women will report a higher parenthood penalty experience than men.

The Role of a Masculine Culture

Since the 1980s, the content of masculine and feminine organizational cultures has been examined regularly in the organizational psychology field (Hofstede, 1998). Maier (1999) summarized the two dimensions into the following: masculine cultures include the promotion of independence, autonomy, competition, and the establishment of status and authority; whereas, the feminine culture promotes a relational self, a healthy work-life balance, participation, and collaboration within the organization (Van Vianen & Fischer, 2002). Hence, a masculine culture is seen as more competitive, and a feminine culture is seen as more cooperative.

Academia is generally judged as a masculine organizational culture because of the high value of competitiveness, the required analytical thinking, and the long working hours (Cejka & Eagle, 1999; Fletcher, Boden, Kent, & Tinson, 2007; Van Veelen & Derks, 2020). The meritocratic systems in academia tend to value and reward stereotypically masculine

traits, which is disadvantageous for women and some men (Knights & Richards, 2003; Derks, Van Veelen, & Handgraaf, 2018). Knights and Richards (2003) showed that the typical academic career path is, indeed, structured according to a male perception of success. They state that academia brings out competition, control, and strategies of conquest. Another aspect of masculine cultures is that gender stereotypes are strongly present in these work contexts (Cejka & Eagly, 1999). Gender stereotypes in the workplace can lead to the devaluation of performance and reduced opportunities, which are especially detrimental to women's careers.

Working in a masculine organizational culture as a parent can be hard due to the high competitiveness and long working hours. However, gender stereotypes in the workforce make the road to a successful career in academia for women even more difficult. The prediction is that the negative impact of a masculine culture will be greater for mothers than for fathers and that women, therefore, experience a stronger parenthood penalty in such a work culture. Hence, the second hypothesis is as follows:

Hypothesis 2: masculine culture acts as a moderator in the relationship between gender and parenthood penalty experience, so that the more masculine the organizational culture is, the larger the difference in parenthood penalty experience between men and women will be.

The Effect of the Parenthood Penalty Experience on Work Outcomes

For this research, it is predicted that a parenthood penalty experience will have a negative impact on the work outcomes of (a) work engagement, (b) career agency, (c) ambition, (d) sacrifices, and (e) chance of staying in academia. The fact that parents feel judged as less committed, less involved, less reliable and experience that they are assigned less responsibility is expected to negatively predict each of the work outcomes. Certain relevant studies are discussed below.

According to the job demands-resources model (JD-R model), job resources are the primary predictors of work engagement (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004). Social organizational support is considered a crucial job resource for employees. It is likely that parents do not feel socially supported by their work environment when experiencing a parenthood penalty; this lack of support will make them feel less engaged with their work (a). The term career agency refers to one's sense of control in actively applying strategically planned efforts to obtain career advancement (Terosky, O'Meara, & Campbell, 2014). Career agency is important in building a sustainable career and achieving career advancement. Thus, it is an important factor in this study. Parents

presumably feel less in control of their own career advancement due to the parenthood penalty (b). Spermon (2019) indicated that ambition on the work floor is improved by a feminine organizational culture. Since academia's organizational culture is considered to be masculine, ambition is expected to be negatively influenced in this study (c). When experiencing the parenthood penalty, some parents might have the urge to show their workplace that they are still very committed and trustworthy, which is associated with making personal sacrifices (d) in various domains (family, personal convictions, vacation). The results of Faniko, Ellemers, Derks, and Lorenzi-Cioldi (2017) showed that women must prioritize their work above everything else to become successful, which means making personal sacrifices. Lastly, an additional way in which the estimated chance of staying in academia is negatively affected (e) is through gender stereotypes, which are mainly present in masculine organizational cultures. When employees experience a misfit due to gender-based categorization, they may disidentify with their role and, therefore, want to exit the academic world (Peters, Ryan, Haslam, & Fernandes, 2012).

Based on all aforementioned information, the following hypothesis is formulated:

Hypothesis 3: assistant professors who experience the parenthood penalty more will report more negative work outcomes (a. lower work engagement, b. lower career agency, c. lower ambition, d. more sacrifices, and e. lower estimated chance of staying in academia) one year later, with a stronger effect for women and when working in a masculine culture.

Method

Design

For this study, a two-wave longitudinal study was used. The first measure moment took place in 2018 (T1) and the second in 2019 (T2). Each included the same participants, although due to dropout T1 had more participants than T2. To ensure participants' anonymity throughout the study, no names were registered. Instead, participants created individual codes during the first questionnaire by answering four personal questions. They were as follows: 'What is the first letter of your place of birth?', 'How many brothers and sisters do you have (include half-brothers and half-sisters)?', 'What is/was your mother's year of birth? Please enter two digits (e.g., 55 to denote 1955)', and 'What is/was the first letter of your father's name?'. A unique code arose through these questions, which participants filled in again in the

survey at T2. In such manner, it was possible to anonymously link the data of two different measure moments.

Participants and Procedure

To collect the data for the present study, all 910 assistant professors working at Utrecht University were approached by means of an e-mail invitation to an online questionnaire. The invitation stated that the focus of the questionnaire was to identify the factors that were stimulating or decelerating their academic careers. Participants accessed the survey by clicking on the link in the e-mail. The survey started after they gave their informed consent. The questionnaire was available in Dutch and English and took approximately 23 minutes to complete. In the survey, there were multiple scales to measure the different established constructs. In this paper, not all scales are used. The response rate for the questionnaire at T1 was 49% ($N = 421$) and 38.5% of the T1 participants responded at T2 ($N = 205$). Hence, we were able to match T1 and T2 measures for 205 participants. Participants could withdraw their responses at any moment, and full anonymity was ensured. The Utrecht University Ethics Committee of the Faculty of Social sciences gave approval for this study.

Sample

The sample at T2 was smaller than the sample at T1 due to participants dropping out.

At T1, 446 participants started to fill in the questionnaire. The answers from 23 participants were excluded, because 7 participants did not report their age, 1 participant reported to be 15 years old (which was not possible), 3 participants reported 'other' for gender, and 14 participants filled out neither age nor gender. Age is a control variable in this study, and gender is the independent variable. Thereafter, the final sample at T1 consisted of a total of 421 assistant professors (218 women and 203 men). The age of the participants varied between 28 years and 65 years ($M=42.09$, $SD=8.85$). A high percentage of the participants were parents (63.2%), and most of the participants were married or living with their partner (84.8%).

At T2, 350 participants responded to the follow-up questionnaire. All participants had to be linked to their responses on the first questionnaire, which was done by manually matching the unique personal codes. Besides examining these personal codes, some background variables – age, gender, and faculty – were also checked to ensure that the surveys were matched to the correct participant. Participants with only one mistake in their code were matched based on their age, gender, and faculty; participants with more than one mistake were not matched, because it was too uncertain whether they concerned the same

participant. In the end, the sample of T2 consisted of 205 assistant professors (89 men and 116 women) whose age varied between 28 years and 63 years ($M=41.45$, $SD=8.02^1$). The percentages of participants who were parents and who were married or living with a partner were distributed about the same as in the sample of T1.

For the current research, participants who did not complete the entire survey were not immediately removed. Much valuable data could then be lost, because for example, only the last five questions of the survey were not completed. Therefore, it is possible that the sample size slightly differs per analysis. Since we are investigating the parenthood penalty, only the participants with children will be examined in this study (T1: $N = 266$ and T2: $N = 127$). Analyses for Hypotheses 1 and 2 will be conducted using the sample of T1 only; analysis for Hypothesis 3 will be conducted using both samples of T1 and T2.

Measures

Since the questionnaire is quite large, only the parts used for this study are described in this section. The questionnaire consists of several scales containing multiple self-reported items. All items, unless specified otherwise, were measured with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Appendix A presents a complete overview of all scales and corresponding items.

Background variables. In the first part of the survey, we measured demographic characteristics to use as control variables later. Those included the age of the participant, age of the youngest child, and number of working hours.

Parenthood penalty experience. The parenthood penalty experience was measured with three items ($\alpha = .86$): ‘*Since I became a mother/father, I sometimes have the impression that I am assigned less responsible tasks in my work*’, ‘*Ever since I became a mother/father, I sometimes have the impression that my manager thinks that I am less ambitious than before*’, and ‘*Ever since I became a mother/father, I sometimes have the impression that my colleagues expect me to be less involved in my work*’.

Organizational culture (masculine-feminine). To measure organizational culture, this study uses the scale by Van Vianen and Fischer (2002). Masculine organizational culture and feminine organizational culture are measured with different subscales. Example statements of masculine culture are ‘*It is customary for employees to be busy with their work in their spare time*’, ‘*High demands are placed on employees*’, and ‘*There is an atmosphere of*

¹ The difference in gender and age distribution between T1 and T2 is due to the dropout of participants.

competition between the employees'. Feminine organizational culture includes items such as 'Managers and employees trust each other', 'Employees are given the opportunity to develop themselves', and 'Employees can influence the decisions that need to be made'.

Next, we created one organizational culture scale that included all feminine and masculine items. To do this, all feminine organizational culture items were recoded – a high score on the item now corresponded with a low feminine organizational culture – and added to the masculine organizational value. Reliability analyses revealed that this resulted in a highly reliable scale ($\alpha = .91$)².

Work engagement. This construct was measured with a three-item scale ($\alpha = .89$; Schaufeli & Bakker, 2004): 'My job inspires me', 'I am enthusiastic about my job', and 'I am proud of the work I do'.

Career agency. A scale including six items ($\alpha = .72$) was used to measure career agency (Campbell & O'Meara, 2014). These items included statements like 'I have been strategic in achieving my career goals' and 'I have little control over whether I move up in my career' (reverse scored).

Ambition. Ambition was measured with the five-item scale of Dikkers, van Engen, and Vinkenburg (2010; $\alpha = .83$). Example items are 'I am ambitious' and 'My career does not have a priority in my life' (reverse scored).

Sacrifices. Career sacrifices were measured with three items (Faniko et al., 2017; $\alpha = .67$), including 'I have dedicated time to my work when I actually wanted or needed to be with my family or friends', 'I cancelled, shortened, or postponed holidays to get my work done' and 'In my decision whether and when I want/wanted children, the demands my career places on me plays a big role'.

Estimated chance of staying in academia. One item was used to measure the chance of participants staying in academia: 'On a scale from 0% to 100%, how high do you estimate the chance that you will still be in academia in 5 years' time?'. To respond to this item, participants could drag a slider to the percentage they wanted to answer.

Results

Data Preparation

² A factor analysis on the 39 items confirmed that there were three main factors. All items loaded for the associated factors.

Scales were created by taking the average of the scales' corresponding items. There were a few cases where only one or two items of the scale were not answered; to still create the scale and not lose the remaining answers, the mean value of the other items was manually completed in the open spots. If there were more than two blank items, the value of the scale was automatically recorded as missing by IBM SPSS Statistics. Furthermore, all assumptions of the performed analyses have been checked, and no violations were found for the assumptions of no multicollinearity, homoscedasticity, and independent errors. The assumption of normality was not met. Only career agency tended to be normally distributed in this sample; the rest of the variables were non-normally distributed. This is not a problem, since the sample size is quite large ($N > 20$). It merely means that the data occurs within a wider range of values, including more outliers on the high and low ends of the range (Field, 2009), which is not unexpected when examining the content of scales. There were, indeed, some outliers identified, but there was no theoretical reason to exclude those results from this study.

Descriptive Results

In Table 1 (Appendix B), the corresponding means, standard deviations, and Pearson correlations between all variables are represented. In the analyses, the data will be controlled for age of the participant, age of their youngest child, and number of working hours. Table 1 shows that parenthood penalty significantly positively correlates with age ($r=.29$) and significantly negatively correlates with age of the youngest child ($r=-.14$) and working hours ($r=-.17$). Organizational culture significantly negatively correlates with age ($r=-.17$) and age of the youngest child ($r=-.13$) and non-significantly correlates with working hours ($r=.07$). Furthermore, the organizational culture was scored as more masculine than feminine ($M=4.55$ on a 7-point scale), therefore, hereinafter the organizational culture variable will be referred to as "masculine culture". Lastly, individual measures correlated strongly between T1 and T2, as expected.

Additional Descriptive Gender Differences

Several independent t-tests and chi-square tests were conducted to map possible differences in the background variables between the male and female assistant professors with children. Firstly, the independent t-tests (Table 2) showed no significant gender differences in age of the youngest child, years at UU, or number of children *not* living at home. Further, it was found that male assistant professors are significantly older than female, $t(245.87)=2.53$, $p=.01$, and that men worked more (official) hours than women, $t(262)=3.65$, $p<.01$. With

regards to the number of children living at home, a significant gender difference was found between men and women: $t(264)=2.29, p=.02$.

Table 2

Results of t-test and Descriptive Statistics for Background Variables by Gender

	Female			Male			<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	n	<i>M</i>	<i>SD</i>	n		
Age (of the participant)	42.21	7.88	141	44.88	9.19	125	2.53*	245.87
Age youngest child	7.62	7.07	140	8.40	8.65	125	.81	263
Working hours	33.84	6.67	140	36.61	5.52	124	3.65**	262
Years at UU	10.20	7.53	139	12.34	10.04	124	1.93	226.59
Children at home	1.62	.76	141	2.11	2.44	125	2.29*	264
Children not at home	.21	.60	141	.34	.77	125	1.54	231.79

Note. All measures measured at T1. * $p < .05$, ** $p < .01$

Thereafter, a set of chi-square tests revealed no significant gender differences in position (Table 3) or in an obtained PhD (Table 5). In type of contract (permanent vs. temporary), a significant variation was found; the greatest difference occurred in the distribution of temporary contracts wherein females have 8.6% chance to have a temporary contract versus 1.6% chance for males ($\chi^2(3)=11.79, p=.01$; Table 4). The distribution of participants over faculties also differed significantly, as shown by the percentages in Table 6: $\chi^2(6)=15.46, p=.02$. The greatest differences appeared in the science faculty (women: 15.7%; men: 27.2%) and the social and behavioural faculty (women: 28.6%; men: 11.2%).

Table 3*Results of Chi-square Test and Descriptive Statistics for Function by Gender*

	Female	Male
UD 1	54.7%	50.8%
UD 2	38.1%	41.2%
Other	0%	2.4%
I am not sure	7.2%	5.6%

Note. $N = 263$. All measures measured at T1. $\chi^2 = 3.94$, $df = 3$. Percentages indicate % within gender. $*p < .05$, $**p < .01$

Table 4*Results of Chi-square Test and Descriptive Statistics for Contracts by Gender*

	Female	Male
Tenure (permanent)	86.3%	84.7%
Temporary	8.6%	1.6%
Temporary, with prospect	3.6%	11.3%
Other	1.4%	2.5%

Note. $N = 263$. All measures measured at T1. $\chi^2 = 11.79^{**}$, $df = 3$. Percentages indicate % within gender. $*p < .05$, $**p < .01$

Table 5*Results of Chi-square Test and Descriptive Statistics for obtained PhDs by Gender*

	Female	Male
PhD obtained	93.6% (N=131)	90.3% (N=112)
No PhD obtained	6.4% (N=9)	9.7% (N=12)

Note. $N = 264$. All measures measured at T1. $\chi^2 = .95$, $df = 1$. Percentages indicate % within gender. * $p < .05$, ** $p < .01$

Table 6*Results of Chi-square Test and Descriptive Statistics for Faculty by Gender*

	Female	Male
Science Faculty	15.7%	27.2%
Veterinary Medicine Faculty	8.6%	9.6%
Humanities Faculty	13.6%	17.6%
Geosciences Faculty	12.9%	16%
Law, Economics and Governance Faculty	19.3%	17.6%
Social and Behavioural	28.6%	11.2%
University College	1.4%	0.8%

Note. $N = 265$. All measures measured at T1. $\chi^2 = 15.46^*$, $df = 6$. Percentages indicate % within gender. * $p < .05$, ** $p < .01$

Hypothesis Testing

For all hypothesis testing, the Statistical Package for the Social Sciences was used (IBM SPSS Statistics, 2019). With Hypothesis 3, the analyses made use of model 4 of PROCESS v3.5 for SPSS, which is a mediation model (Hayes, 2012). All conditional indirect

effects were computed with a 95% confidence interval and 5,000 bootstrapped samples. Each analysis controlled for age of participant, age of the youngest child, working hours (all T1), and the measures of T1 for the work outcomes.

Hypothesis 1. A multiple regression model was used to test the first hypothesis. Table 7 (Block 1 and 2) shows the results of this hypothesis in which it was stated that gender predicted the experienced parenthood penalty at T1. In Block 1, the control variables' significant prediction of a (small) part of variance in parenthood penalty is displayed ($F(3,231)=4.58, p<.01, R^2=.06$), showing that only working hours significantly predict the parenthood penalty at T1. When gender was added in the second block, this effect was no longer significant. Gender and working hours correlate significantly negatively (see Appendix B), so the effect of working hours is subsumed in the effect of gender. The regression analysis shows a main effect of gender ($b=.75, t(230)=3.82, p<.01$), indicating that female assistant professors, on average, reported a stronger parenthood penalty than male assistant professors. Hence, gender is a better predictor than working hours and the gender effect is more than working hours only, this is because over and above the effect of working hours, gender predicted a stronger parenthood penalty. Consequently, Hypothesis 1 is confirmed.

Hypothesis 2. Next, it was predicted that a more masculine culture at T1 would act as a moderator in the relationship between gender and parenthood penalty, with a stronger effect for women. Thus, the difference in experienced parenthood penalty between male and female assistant professors was expected to be particularly large in a masculine culture (compared to a more feminine culture). The results show a significant interaction effect between culture and gender ($b=.57, t(224)=2.96, p<.01$). Masculine culture and gender amplify each other, and therefore, the moderation effect of culture was found on the relationship between gender and parenthood penalty experience. Hypothesis 2 could, therefore, be confirmed. Additionally, results in Block 3 revealed as well a main effect of masculine culture on experienced parenthood penalty ($b=.67, t(225)=6.68, p<.01$); the more masculine the organizational culture, the higher the parenthood penalty reported by both male and female assistant professors.

Table 7*Results of the Three Hierarchical Regression Analyses*

		Parenthood penalty experience			
Block	Variables	1	2	3	4
1	Age, participant	-.01	.01	-.01	-.01
	Age, youngest child	-.03	-.04	-.03	-.04
	Working hours	-.05**	-.03	-.04*	-.03*
2	Gender		.75**	.53**	.55**
3	Masculine culture			.67**	-.21
4	Masculine Culture X Gender				.57**
R₂		.06**	.11**	.13**	.14**
ΔR₂		.06**	.06**	.02**	.01**

Note. $N = 233$. All measures measured at T1. Display of the unstandardized regression coefficients of all blocks. * $p < .05$, ** $p < .01$.

Hypothesis 3. The third hypothesis stated that the parenthood penalty experience would have a negative impact on work outcomes one year later. First, it is examined whether there was any relationship between the parenthood penalty and the work outcomes at T1. Second, the negative predictive effect of the parenthood penalty_{T1} on work outcomes_{T2} is tested, as stated in the third hypothesis. This is done by performing two separate mediation analyses instead of one moderated mediation analysis, as it became clear during this research that a (possible) effect is difficult to capture in a moderated mediation model. In these mediation analyses, the examined work outcome_{T2} acts as the dependent variable, the parenthood penalty_{T1} is the mediator, and the independent variable is either gender or culture_{T1}. Thus, for each work outcome, two different mediation models were tested, with gender or culture_{T1} acting as the independent variable. The results of all mediation analyses are discussed below per separate work outcome.

Work engagement_{T1}. No significant mediation effect of parenthood penalty_{T1} was found on the relationship wherein gender predicts work engagement_{T1} ($b=-0.07$, 95% CI [-.18, .01]). The model, including the slope coefficients, is shown below in Figure 1a.

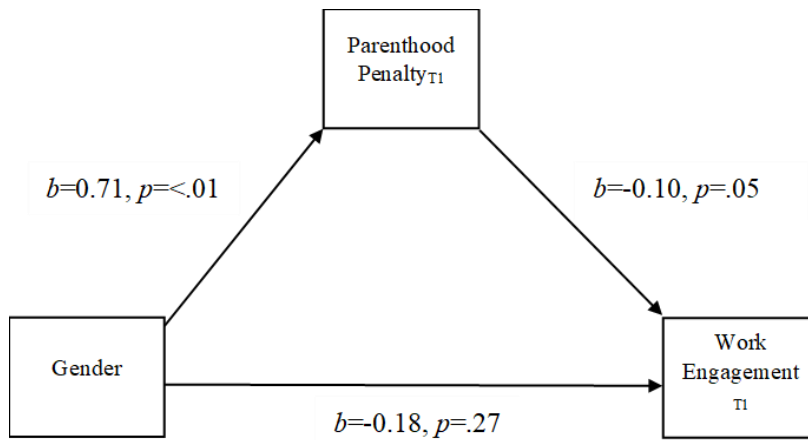


Figure 1a. Mediation model with gender as predictor of work engagement_{T1}, mediated by parenthood penalty_{T1}.

Work engagement_{T2}. Figure 1b and 1c show the relevant models of the two mediation analyses with work engagement_{T2} as dependent variable. There is no significant mediation effect of parenthood penalty_{T1} found on the relationship wherein gender predicts work engagement_{T2} ($b=0.02$, 95% CI [-.05, .12]). Parenthood penalty_{T1} also did not mediate the relationship between culture_{T1} and work engagement_{T2} ($b=-0.01$, 95% CI [-.10, .05]). Therefore, hypothesis 3a, with work engagement_{T2} as dependent variable, is not confirmed.

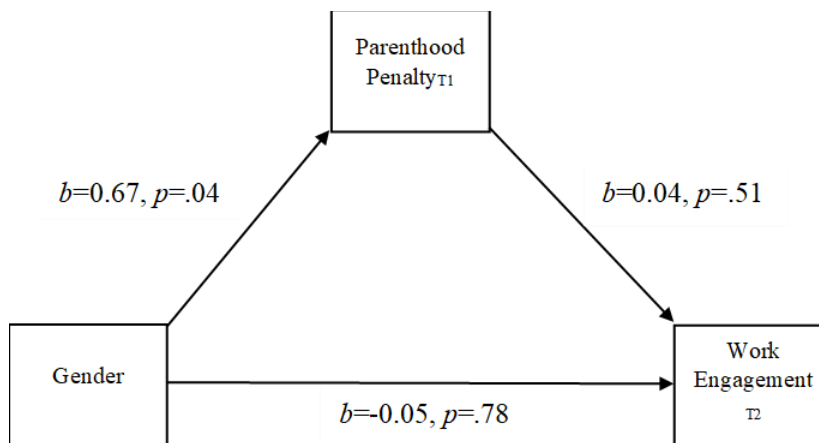


Figure 1b. Mediation model with gender as predictor of work engagement_{T2}, mediated by parenthood penalty_{T1}.

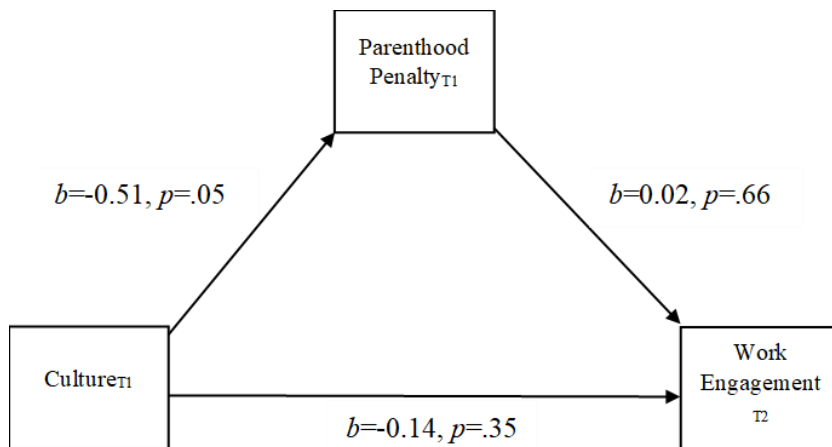


Figure 1c. Mediation model with organizational culture_{T1} as predictor of work engagement_{T2}, mediated by parenthood penalty_{T1}.

Ambition_{T1}. A significant mediation effect of parenthood penalty_{T1} on the relationship between gender and ambition_{T1} is indicated ($b=0.07$, 95% CI [.01, .16]; see Figure 2a). This means that the parenthood penalty negatively correlates with ambition at T1; the higher the experienced parenthood penalty, the lower the reported ambition. Working hours is also found to be a significant predictor of ambition_{T1} ($b=0.04$, $p<.01$).

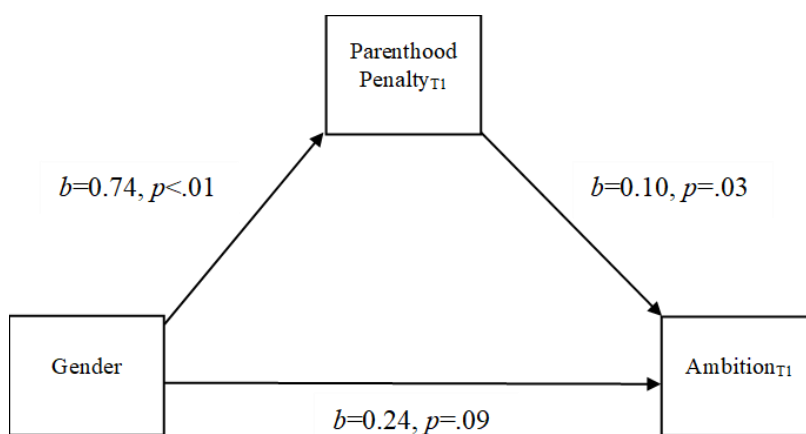


Figure 2a. Mediation model with gender as predictor of ambition_{T1}, mediated by parenthood penalty_{T1}.

Ambition_{T2}. No significant mediating effect of parenthood penalty_{T1} is shown in the relationship between gender and ambition_{T2} ($b=0.00$, 95% CI [-.04, .07]; see Figure 2b). Additionally, there is no significant mediating effect of parenthood penalty_{T1} found in the relationship between culture_{T1} and ambition_{T2} ($b=-0.01$, 95% CI [-.07, .06]; see Figure 2c). Therefore, hypothesis 3b, with ambition_{T2} as dependent variable, is not supported.

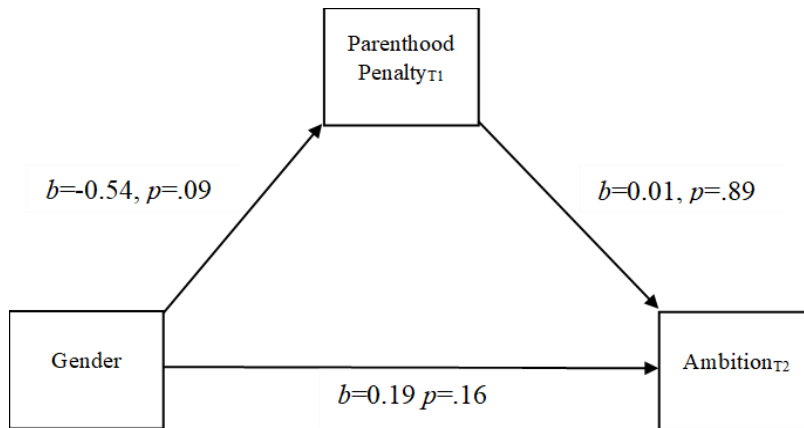


Figure 2b. Mediation model with gender as predictor of ambition_{T2}, mediated by parenthood penalty_{T1}.

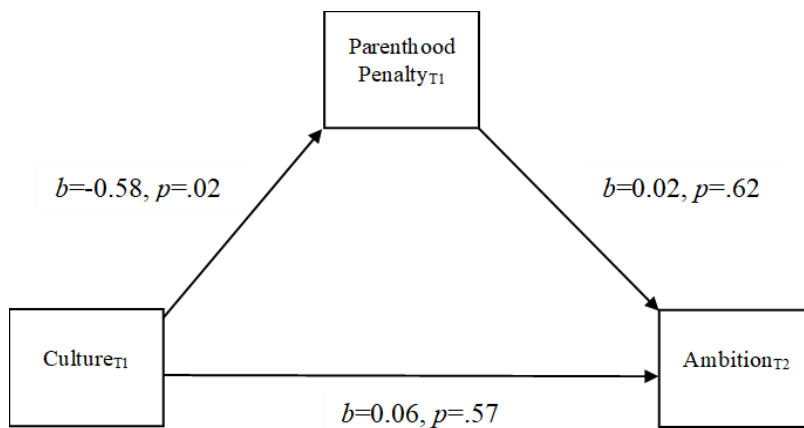


Figure 2c. Mediation model with organizational culture_{T1} as predictor of ambition_{T2}, mediated by parenthood penalty_{T1}.

Career agency_{T1}. Parenthood penalty_{T1} is found to be a significant mediator in the relationship between gender and career agency_{T1} ($b=-0.09$, 95% CI [-.18, -.02]; see Figure 3a). These results indicate that parenthood penalty has a negative relationship with career agency at T1; participants reported a lower career agency when they experienced a higher parenthood penalty. Age is also found to be a significant predictor of career agency_{T1} ($b=-0.09$, $p<.01$).

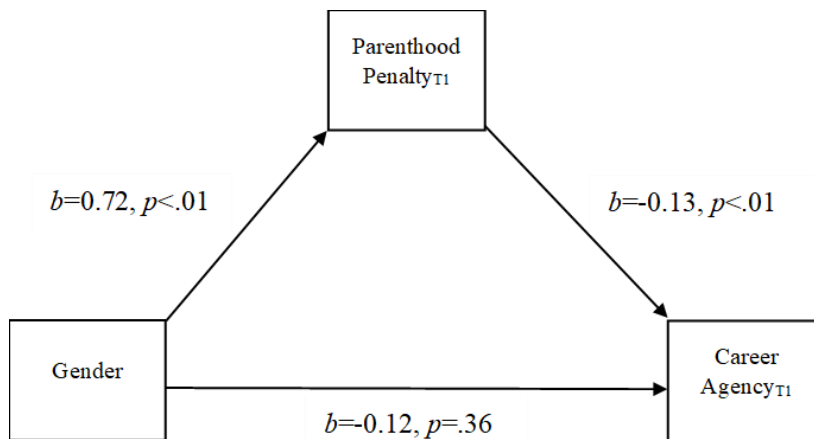


Figure 3a. Mediation model with gender as predictor of career agency_{T1}, mediated by parenthood penalty_{T1}.

Career agency_{T2}. Figure 3b and 3c show the relevant models for this hypothesis, including the slope coefficients. No significant mediating effect of parenthood penalty_{T1} on the relationship of gender and career agency_{T2} is found ($b=-0.04$, 95% CI [-.13, .04]). Parenthood penalty_{T1}, again, did not mediate the relation between culture_{T1} and career agency_{T2} ($b=0.02$, 95% CI [-.03, .11]). Thus, hypothesis 3c, with career agency_{T2} as dependent variable, is not confirmed.

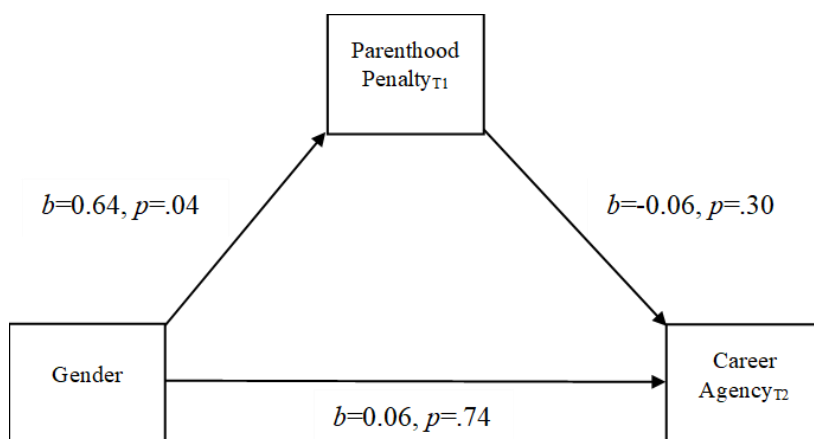


Figure 3b. Mediation model with gender as predictor of career agency_{T2}, mediated by parenthood penalty_{T1}.

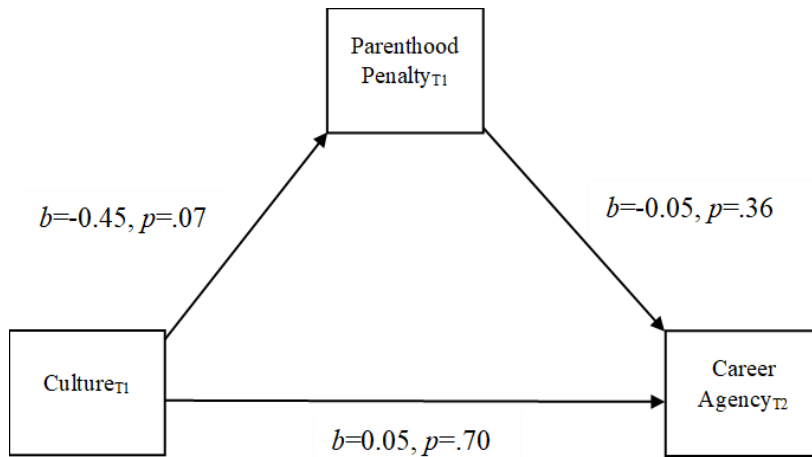


Figure 3c. Mediation model with organizational culture_{T1} as predictor of career agency_{T2}, mediated by parenthood penalty_{T1}.

Sacrifices_{T1}. Results show a significant mediation effect of parenthood penalty_{T1} on the relationship between gender and sacrifices_{T1} ($b=0.11$, 95% CI [.01, .22]) and a direct significant effect of gender on sacrifices_{T1} ($b=0.78$, $p<.01$; see Figure 4a). These results indicate that parenthood penalty negatively correlates with sacrifices at T1, and that being a woman has a significant correlational relationship with higher sacrifices. Working hours is also found to be a significant predictor of sacrifices_{T1} ($b=0.04$, $p=.02$).

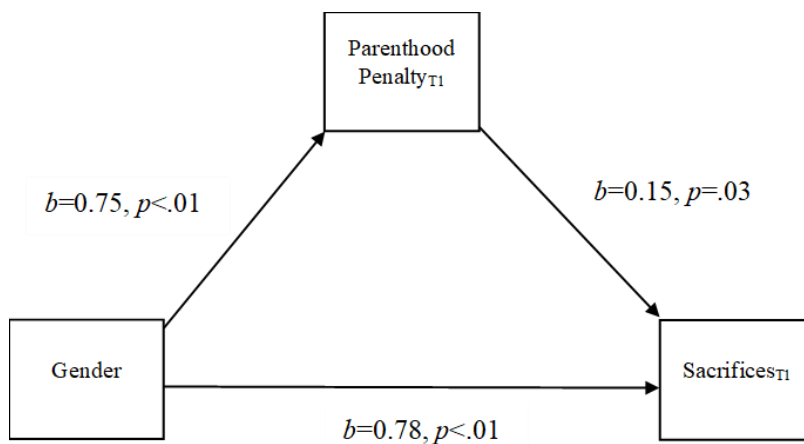


Figure 4a. Mediation model with gender as predictor of sacrifices_{T1}, mediated by parenthood penalty_{T1}.

Sacrifices_{T2}. No significant mediating effect of parenthood penalty_{T1} on the relationship between gender and sacrifices_{T2} is indicated ($b=0.08$, 95% CI [-.05, .25]; see Figure 4b). Being a woman (gender) is no predictor of higher sacrifices at T2. Again, parenthood penalty_{T1} did not significantly mediate the relation between culture_{T1} and

sacrifices_{T2} ($b=-0.06$, 95% CI [-.20, .04]; see Figure 4c). Thus, hypothesis 3d, with sacrifices_{T2} as the dependent variable, is not confirmed.

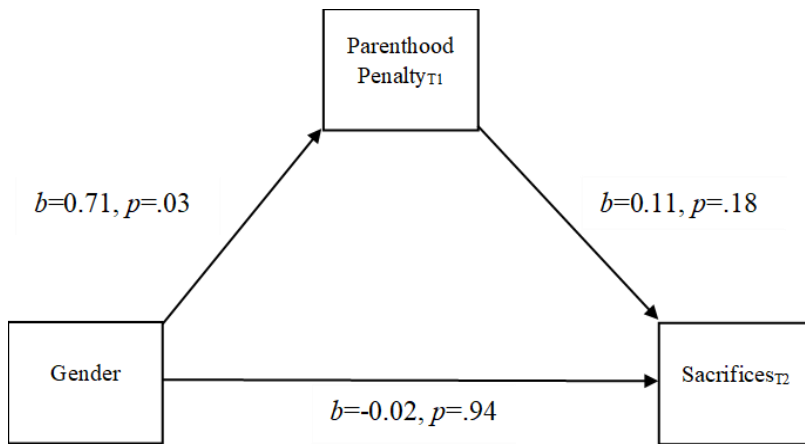


Figure 4b. Mediation model with gender as predictor of sacrifices_{T2}, mediated by parenthood penalty_{T1}.

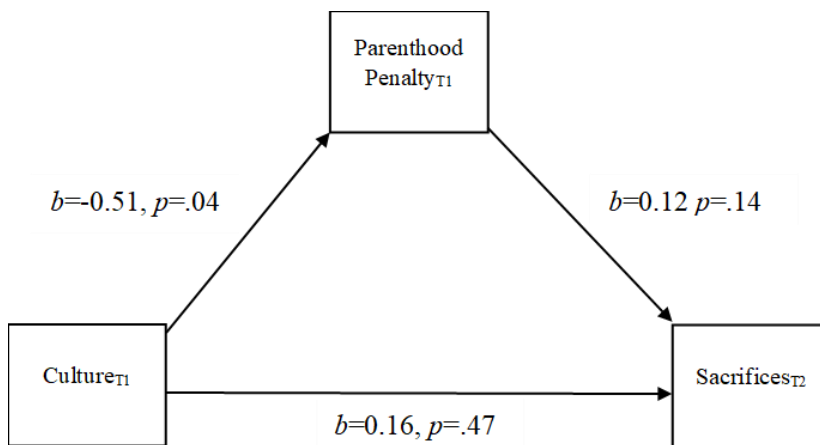


Figure 4c. Mediation model with organizational culture_{T1} as predictor of sacrifices_{T2}, mediated by parenthood penalty_{T1}.

Estimated chance of staying in academia_{T1}. Parenthood penalty_{T1} is found to be a significant mediator in the relationship between gender and chance of staying in academia_{T1} ($b=-3.25$, 95% CI [-6.17, -1.03]; see Figure 5a). This means that a higher experienced parenthood penalty significantly correlates with a lower reported estimated chance of staying in academia at T1. Another significant predictor of the chance of staying in academia_{T1} found is working hours ($b=0.70, p=.03$).

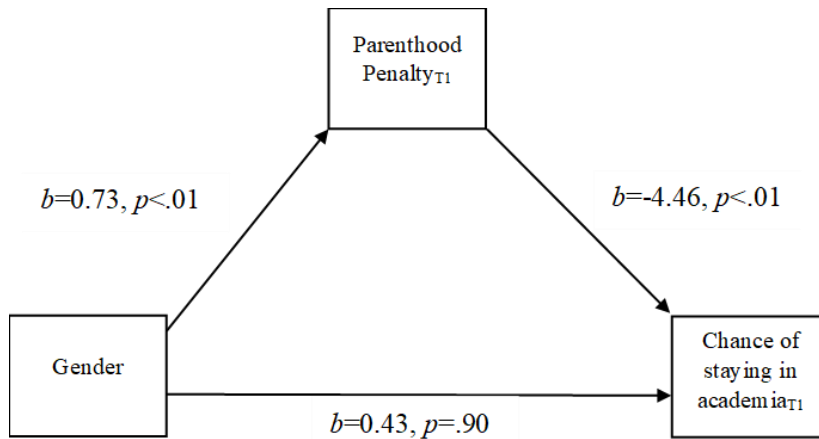


Figure 5a. Mediation model with gender as predictor of chance of staying in academia_{T1}, mediated by parenthood penalty_{T1}.

Estimated chance of staying in academia_{T2}. Figure 5b and 5c show the relevant models for this work outcome. There is no significant mediating effect found of parenthood penalty_{T1} on the relation of gender and chance of staying in academia_{T2} ($b=-0.57, 95\% \text{ CI} [-2.79, 1.27]$). This means that parenthood penalty of T1 is no predictor of the estimated chance of staying in academia of T2. Parenthood penalty_{T1}, again, did not mediate the relationship between culture_{T1} and chance of staying in academia_{T2} ($b=0.44, 95\% \text{ CI} [-.70, 1.81]$). However, a significant direct effect is indicated between culture_{T1} and chance of staying in academia_{T2} ($b=-5.67, p=.03$). This result shows that the masculine culture of T1 negatively predicts the estimated chance of staying in academia at T2. Nevertheless, hypothesis 3f, with chance of staying in academia_{T2} as dependent variable, is not confirmed.

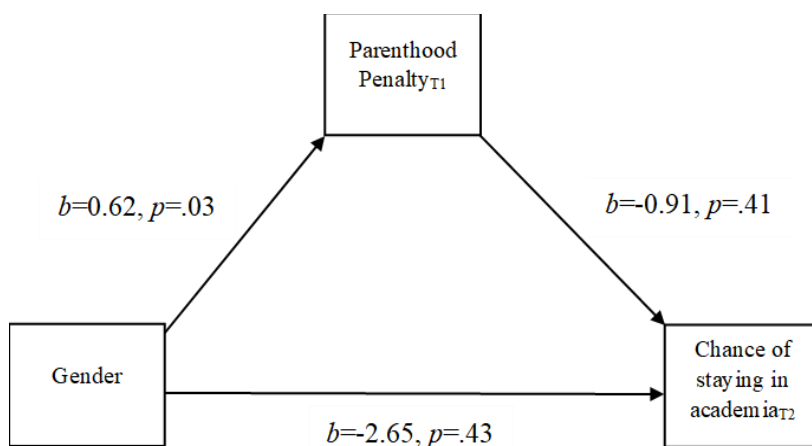


Figure 5b. Mediation model with gender as predictor of chance of staying in academia_{T2}, mediated by parenthood penalty_{T1}.

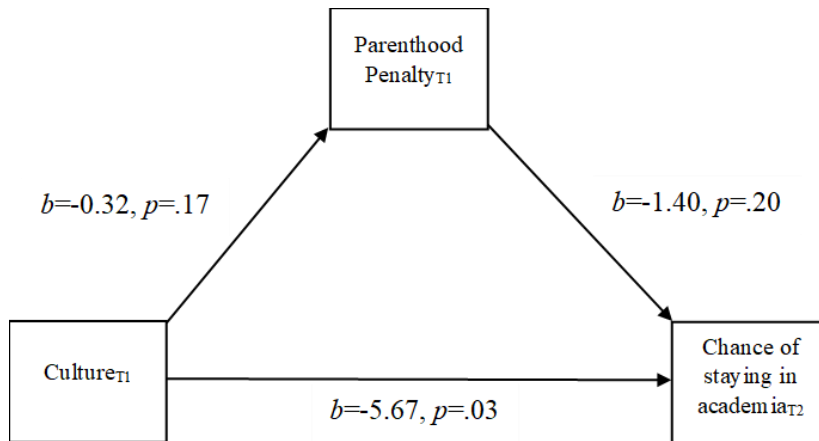


Figure 5b. Mediation model with organizational culture_{T1} as predictor of chance of staying in academia_{T2}, mediated by parenthood penalty_{T1}.

For all work outcome_{T2} mediation analyses wherein gender was the independent variable, no control variables had a significant impact. In all mediation analyses with culture_{T1} as the independent variable, the control variable working hours was always significant.

Additional analyses

Additionally, multiple t-test were performed to investigate whether the dropout of participants was random and not because of, for example, strong parenthood penalty experiences. Results show that participants who participated only in T1 (dropouts) did not generally report higher parenthood penalty experiences ($M=2.41, SD=1.29$) than participants who participated in both T1 and T2 ($M=2.55, SD=1.59; t(233)=.75, p=.46$). As well for the outcomes career agency, sacrifices, ambition, work engagement, and estimated chance of staying in academia, no significant mean differences were found between the participants who only participated in T1 and participants who participated in both T1 and T2 (all $ps > .07$). These results suggest that the dropout of participants was random.

Discussion

The ‘Monitor Vrouwelijke Hoogleraren 2019’ provides insight into the current gender distribution in science and the percentages of female scientists at Dutch universities (LNVH, 2019). The Monitor of 2019 brings good news: never before has the percentage of female professors increased faster than in the year 2017–2018 – from 20.9% to 23.1%, the highest total percentage ever achieved in the Netherlands. Unfortunately, the Monitor also shows less bright results: with every step on the academic ladder, the proportion of women still decreases, women are nevertheless in lower salary scales, and women still hold fewer board

positions (LNVH, 2019). Moreover, when comparing the number of female professors in Europe, the Netherlands ranks 24th in the EU-28 (European Commission, 2018). Therefore, the collective attention for gender proportionality in academia must remain high.

The current study aimed to test whether there is a parenthood penalty experience among female and male academics and whether this negatively affects their work outcomes one year later, with a focus on the effect on women and in a masculine organizational culture. The outcome of this research could provide insight into important reasoning for the underrepresentation of women in academia, which could help create effective interventions.

First, the academics in this research perceived the organizational culture as more masculine, which is consistent with earlier research (Knights & Richards, 2003). There was no difference in perception of the culture between men and women. As expected, the results of this study show a significant difference in the parenthood penalty experience between men and women; female assistant professors reported a higher parenthood penalty experience than male assistant professors. One interesting additional finding is that the more hours someone works, the less parenthood penalty is experienced. However, our analyses revealed that gender was a stronger predictor of parenthood penalty because it predicted experienced parenthood penalty over and above the effect of work hours. This means that even when women work many hours, they experience a stronger parenthood penalty than men who work the same amount of hours. Further, results showed a moderating effect of masculine culture on the relationship between gender and parenthood penalty; the difference in parenthood penalty experience between men and women becomes even larger in a masculine organizational culture. Interestingly, results also reveal that a masculine culture predicted a higher parenthood penalty experience for women and men alike. Correspondingly, we could say that, for all employees, a masculine work environment is negative, forming a higher parenthood penalty experience. This notable finding contributes to the existing literature on parenthood penalty and on masculine organizational cultures.

Furthermore, the current findings indicate a negative correlational relationship between the parenthood penalty and all work outcomes measured at T1 except for work engagement. Thus, assistant professors who experience a higher parenthood penalty are more likely to report lower ambition, a lower sense of career agency, a higher degree of sacrifices made for their career, and a lower estimated chance of staying in academia. Due to the fact that this is a correlational relationship, this effect could be interactive, which in this matter means that the parents with, for example, a lower ambition could therefore experience less

responsibility (which is a higher parenthood penalty). Unexpectedly, the results do not confirm any processes whereby parenthood penalty predicts negative work outcomes over a longer period of time. Likewise, no predictive effects of culture on work outcomes at T2 were indicated, except for one important result that revealed a direct negative effect of culture on estimated chance of staying in academia. The higher the masculine culture score at T1, the lower the estimated chance of staying in academia at T2 even when controlling for the chance that people perceived to stay in academic at T1. Because of the longitudinal research design, we can now draw a causal pathway wherein masculine culture causes a lower perceived chance of staying in academia for all academics over time. This finding is an outstanding addition to the existing literature on masculine organizational cultures, and it further supports the claim of masculine organizational cultures having a negative influence on (women's) careers.

Theoretical and Practical Implications

On a theoretical level, the results confirm that women in academia experience the parenthood penalty more strongly than men and that the masculine organizational culture is a factor associated with stronger parenthood penalty for both men and women. Furthermore, this study demonstrates that the parenthood penalty is negatively related to the T1 measures of ambition, career agency, sacrifices, and estimated chance of staying in academia and that there is a causal pathway between masculine culture and lower estimated chance of staying in academia over time. Contrary to these successful findings, this study failed to provide evidence for the main prediction, which claimed the parenthood penalty would be a predictor of worse work outcomes for assistant professors a year later.

The main reason why this research was unable to demonstrate the predictive nature of parenthood penalty on work outcomes is maybe because the work outcomes were already negatively influenced by the parenthood penalty at or before T1. Namely, the age of the youngest child was, on average, between 7 and 9 years, which means that it was 7–9 years since these participants first encountered the parenthood penalty. Consequently, there is a high probability that their work outcomes were already affected before this study began, and therefore, we cannot measure the predictive effect over time. Since this is a longitudinal research design, we must control for T1 measures, but with that, we also controlled for the existing impact of the parenthood penalty, and no predictive effect of the parenthood penalty was found from one year to the next.

To provide the most complete impression of this research and to present the most efficient practical recommendations, the Bacchini (2018) and Spermon (2019) studies, which used the same data as the current research, are also discussed and incorporated in this section. Firstly, Bacchini (2018) revealed that career agency is a crucial aspect for women, because it affects their ambition, work engagement, and estimated chance of staying in academia. Evidence was also found that the sense of career agency is positively predicted by family supportive supervisory behaviour (FSSB). Spermon (2019) elaborated further on these results and showed that FSSB and a feminine organizational culture resulted in higher general ambition and higher ambition to become a full professor through stimulating work engagement and improving work-life balance. Unexpectedly, it was found that there is no significant difference for these effects between male and female assistant professors.

When examining these obtained results, practical recommendations should focus on multiple factors. First, in order to increase the career agency of female academics, supervisors should all be trained in improving their FSSB. Hammer, Kossek, Anger, Bodner, and Zimmerman (2011) showed that this training enables supervisors to provide emotional support and role modelling behaviours to their employees (Spermon, 2019). Secondly, it is imperative to shift the organizational culture toward more feminine. It is recommended to focus on improving or implementing characteristics such as positive feedback, peer cohesion, and participation, since these factors are feminine orientated (Van Vianen & Fischer, 2002). Thus, the standards of academic success should be broadened (Van Veelen & Derks, 2020). This change entails a move towards focussing on inclusion of team science, academic leadership, teaching, and collaborative practice as evaluation criteria of academic success (Van Veelen & Derks, 2020). To conclude, the current study confirms the presence and negativity of the parenthood penalty in academia. Universities must investigate exactly how the experience of a parenthood penalty is created. This study provides a first clue in showing that the parenthood penalty is most strong in masculine organizational cultures. The reasons behind this phenomenon could, for example, be revealed to have never started with bad intentions. Investigating this could be done through conducting surveys and interviews within the university.

Strengths, Limitations, and Future Research

In this study, there are strengths and weaknesses, and in this section, a few will be discussed. The first strength is the longitudinal research design, which increases the chance of finding cause-and-effect relationships. However, a limitation of this design is that participants

tend to drop out over time, which happened with the current study (e.g., parenthood penalty T1: $N = 235$; parenthood penalty T2: $N = 120$). The resulting disadvantage is that the analyses are then performed with a smaller sample. Future research could aim to create an even larger sample size to combat this problem.

The second strength of this research is the high amount of different examined variables, resulting in a more complete image of (possible) predictors and outcomes. However, one limitation is that there is a chance that variables influence each other in another way: reciprocally (X and Y influence each other equally; De Lange, Taris, Kompier, Houtman & Bongers, 2003) or reversed (Y influences X; Zapf, Dormann, & Frese, 1996). For example, it could be that ambition is the predictor of how much parenthood penalty is experienced, or maybe, work engagement influences how the culture (M-F) is perceived. Spermon (2019) already recommended investigating these relationships in future research, but performing analyses with these types of structures was unfortunately not feasible for the current study, as IBM SPSS Statistics is not the appropriate software for these models. However, it is recommended that future research examine those relationships in other software to trace the different links and relations between variables.

The last considerable limitation of this research is that the effect of the parenthood penalty is difficult and less accurately measurable when it has been some time since the participants had children. A recommendation for future research is to create a sample with participants who do not have children yet at T1 but do at T2. In this way, a life changing event is measured, and there is more certainty and accuracy about the effects of the parenthood penalty experience.

Conclusion

The aim of the current study was to examine if the parenthood penalty experience negatively influences work outcomes one year later, which could be a reason why women leave academia. Results showed that the parenthood penalty had no negative effect on work outcomes one year later, yet it was found that the parenthood penalty had a negative relationship with work outcomes measured in the same year. Moreover, it was shown that masculine organizational culture is related with an even greater difference in parenthood penalty experience between men and women, with a worse parenthood penalty experience for both men and women, and that this culture causally decreases the estimated chance of staying in academia. It can be concluded that, to maintain female academics, how the parenthood penalty experience is precisely created and how to change the organizational culture should be

on investigated further. Universities should focus on improving aspects like women's career agency, implementing family supportive supervisory behaviour, and changing the meritocratic systems in academia (Van Veelen & Derks, 2020).

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Appendix A

Complete scales

All scales were self-reported and rated on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Parenthood penalty (Derks, 2018)

You have indicated that you have a child / have children. How do you think your work viewed the fact that you became a mother / father?

Ever since I became a mother / father...

1. I sometimes have the impression that my colleagues expect me to be less involved in my work
2. I sometimes have the impression that I am assigned less responsible tasks in my work
3. I sometimes have the impression that my manager thinks that I am less ambitious than before

Male organizational culture (Van Vianen & Fischer, 2002)

The department in which I work is a department where...

1. Work is considered more important than leisure time
2. Employees are expected to commit themselves more to their job than is strictly necessary
3. Working overtime is considered normal
4. It is customary that employees are still busy with their work during their time off
5. Employees are willing to work more hours than is in their contract
6. Performance comes first
7. There are clear performance standards
8. There is performance pressure
9. Emphasis is on 'wanting to excel'
10. People demand a lot from each other
11. High demands are placed on the employees
12. Employees themselves want to be 'the best'
13. An atmosphere of competition exists between employees
14. Mutual competition is allowed

15. Employees strive to perform better than others
16. Employees do a lot to make their mark
17. Employees are challenged to compete with others
18. You have to prove yourself

Female organizational culture (Van Vianen & Fischer, 2002)

The department in which I work is a department where...

1. There is a collegial, supportive atmosphere
2. The unity of the group comes first
3. Employees not only meet the job requirements, but also fit in the group
4. Team membership is important
5. An atmosphere of loyalty is present
6. There is a clear 'team membership'
7. Managers and employees trust each other
8. Employees are interested in each other's work
9. There is a lot of laughter
10. Attention is paid to introducing new employees
11. When taking decisions, the interest of all employees are taken into account
12. Employees are given the opportunity to develop their own initiatives
13. Employees can influence the decisions that need to be made
14. Employees are encouraged to contribute to decision-making
15. Communication is a 'two-way street' between management and employees
16. There are few secrets for employees
17. Development of employees' potential is seen as important
18. Challenging tasks are offered
19. The management thinks along with the wishes and expectations of employees
20. The capacities of employees are carefully monitored to allow for career advancement
21. Employees are given the opportunity to further develop themselves
22. Individual wishes and needs for development are taken into account

Sacrifices (Faniko et al., 2017).

We would now like to ask you some questions about possible sacrifices you have made for your career

1. I have dedicated time to my work when I actually wanted or needed to be with my family or friends
2. I cancelled, shortened or postponed holidays to get my work done
3. In my decision whether and when I want / wanted children, the demands my career places on me plays a big role

Career agency (Campbell & O'Meara, 2014).

To what extent do the following statements apply to you?

1. I have been strategic in achieving my career goals
2. I seize opportunities when they are presented to me to advance in my career
3. I have intentionally made choices to focus my career in ways that are personally meaningful to me
4. I am in charge of the direction of my research agenda
5. I feel stuck in my ability to advance in my career (REVERSED)
6. I have little control over whether I advance in my career (REVERSED)

Work engagement (Schaufeli & Bakker, 2004).

To what extent do the following statements apply to you?

1. I am enthusiastic about my job
2. My job inspires me
3. I am proud of the work that I do

Ambition (Dikkers, van Engen, & Vinkenburger, 2010).

To what extent do the following statements apply to you?

1. I like to be challenged in my work
2. I am ambitious
3. A career is important for my self-actualization and self-development
4. I have set high goals for my career

5. My career is not a priority in my life (REVERSED)

Appendix B

Table 1. Correlations, means and standard deviations

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Gender	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Age participant	42.09	8.85	-.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Age youngest child	7.98	7.85	-.05	.86**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Working hours	35.75	6.26	-.11*	-.15**	-.07	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Parenthood penalty ₁	2.49	1.45	.29**	-.14*	-.17**	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Culture ₁	4.55	.68	.03	-.17**	-.13*	.07	-.12	-	-	-	-	-	-	-	-	-	-	-
7. Work engagement ₁	5.29	1.11	-.11*	-.13**	-.16*	.09	-.13*	.30**	-	-	-	-	-	-	-	-	-	-
8. Ambition ₁	5.49	.98	.07	-.30**	-.27**	.17**	.18**	.10*	.32**	-	-	-	-	-	-	-	-	-
9. Sacrifices ₁	4.68	1.49	.17**	-.19**	-.17**	.10*	.21**	.02	-.09	.20**	-	-	-	-	-	-	-	-
10. Career agency ₁	4.41	1.05	-.06	-.49**	-.43**	.13*	-.11	.20**	.43**	.40**	.04	-	-	-	-	-	-	-
11. Change to stay in academia ₁	76	23.56	-.07	-.10	-.03	.23**	.29**	.11*	.34**	.17**	.07	.30**	-	-	-	-	-	-
12. Parenthood penalty ₂	2.58	1.46	.19*	-.07	-.09	-.09	.59**	.02	-.10	.24**	.10	-.12	-.41**	-	-	-	-	-
13. Work engagement ₂	5.20	1.11	-.08	-.12	-.02	-.01	-.01	.21**	.67**	.24**	-.16*	.41**	.41**	-.24**	-	-	-	-
14. Ambition ₂	5.38	1.03	.14	-.25**	-.17	.10	.24**	.12	.37**	.78**	.08	.39**	.17*	.23**	.34**	-	-	-
15. Sacrifices ₂	4.20	1.55	.14	-.01	-.08	.01	.21*	.03	-.02	.26**	.63**	.00	-.02	.20*	-.07	.18*	-	-
16. Career agency ₂	4.34	1.06	-.15*	-.36**	-.28**	.10	-.23*	.23**	.38**	.27**	-.09	.64**	.40**	-.24**	.47**	.43**	-.02	-
17. Change to stay in academia ₂	77.81	21.31	-.07	-.06	-.16	.10	-.41**	.04	.36**	.16*	-.04	.33**	.67**	-.43**	.46**	.15	.00	.45**

Note. Ns are ranging from 131-421. * $p < .05$, ** $p < .01$.