



Deutsches Zentrum für
Hochschul- und Wissenschaftsforschung ■

Gender differences in higher education from a life course perspective

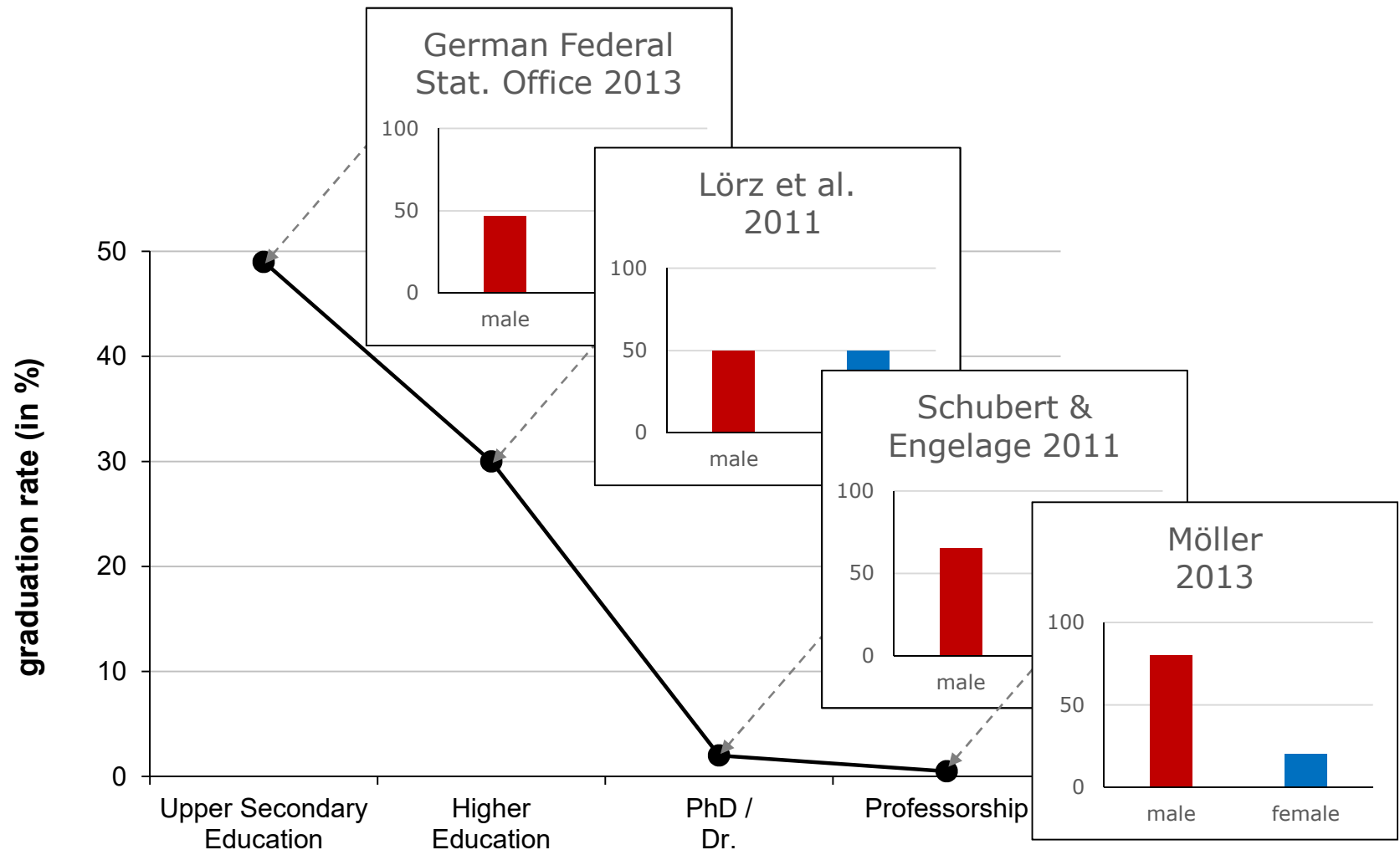
Transitions and social inequality between enrolment and
first post-doc position

1st Forum Higher Education and the Labour Market (HELM)
Nuremberg, September 18th 2018
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Research problem

- Rising levels of female participation in higher education
(Buchmann et al. 2008)
 - Majority of persons with higher education entrance qualification female
(Autorengruppe Bildungsberichterstattung 2018)
 - About half of persons accessing higher education female
(Autorengruppe Bildungsberichterstattung 2018)
 - Participation of women smaller at higher levels of academic careers
(Schubert & Engelage 2011; Jungbauer-Gans & Gross 2013)
- The ‚leaky pipeline‘ of higher education

Previous research



Research questions

1. At **which stages** do gender differences emerge?
2. Which transitions are **most salient**?
3. What are the **factors explaining** gender differences in academic careers?
4. Do the **mechanisms differ** by gender?

Theoretical approach

- Start and continuation of an academic career as interplay of **individual decisions** and **context conditions**
- **Rational Choice Theory:** Individual decisions based on expected benefits, costs, and success probabilities
(Stocké 2007)

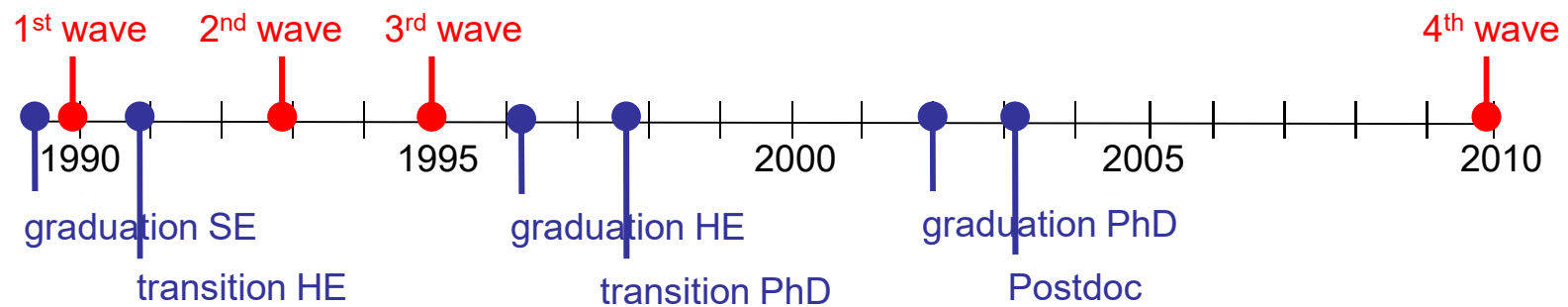
(1) performance, (2) motivations

- **Life Course Perspective:** Individuals act within contexts
(Elder et al. 2003; Pallas 2003)

(3) educational context, (4) work context, (5) family context

Data

■ DZHW School Leaver Panel 1990-2010



- Pathway of graduates from end of upper secondary education
- Age: 20 in the beginning (1990) up to the age of 40 (2010)
- 4th wave sample representative for Germany
- $n = 6,646$ cases

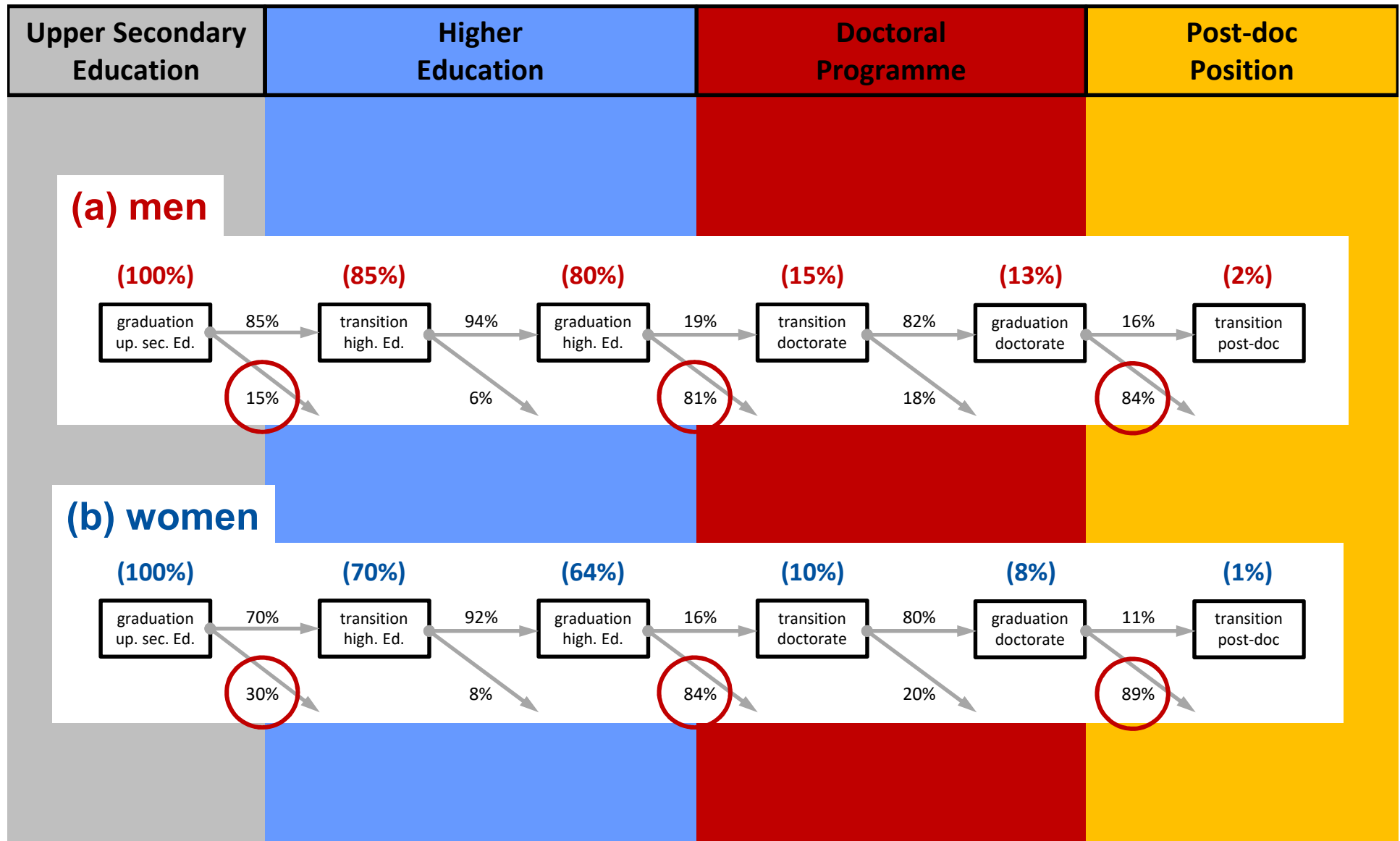
Dependent variable

1. Transition 1	Enrol in higher education	} <i>0 = no; 1 = yes</i> wave 1-4
2. Graduation 1	Complete higher education	
3. Transition 2	Start a doctoral programme	
4. Graduation 2	Complete the doctorate	
5. Transition 3	Start a post-doc position	

Independent variable

Gender	sex	<i>0 = female</i> <i>1 = male</i>	wave 1
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Descriptives



Independent variables

Performance	Final school grade	<i>-2.5, below average to +2.5, above average</i>	wave 1-4
	Final exam grade		
	Final doctoral grade		
Motivations	Professional prestige	<i>0, not important to 6, very important</i>	wave 1
	Financial independence		
	Interest in scientific work		
	Local bonds		

Independent variables

Educational context	Type of school	<i>0 = vocational; 1 = general</i>	
	Vocational training	<i>0 = no; 1 = yes</i>	
	Field of study	<i>1 science 2 engineering 3 medicin 4 economics/law. 5 humanities</i>	time-varying
<hr/>			
Work context	Volume of work	<i>0 to 1, 100%</i>	time-varying
<hr/>			
Family context	Having children	<i>0, no; 1, yes</i>	time-varying

Methods

- **Logistic Regressions**
 - at which steps do women leave the academic career?
 - can we explain gender differences with the considered variables?
- **Logistic Regressions by gender**
 - do mechanisms differ between women and men?
- Results presented as **average marginal effects** (AME)

Results of logistic regressions (AME)

	Higher Education		Doctoral Programme		Post-doc	
	<i>transition</i> M1	<i>graduation</i> M1	<i>transition</i> M1	<i>graduation</i> M1	<i>start</i> M1	
Gender						
Male (vs. female)	.15***	.02*	.09***	.06*	.04	
<i>Pseudo R²</i>	.03 .23	.00 .10	.01 .29	.01 .13	.00 .10	
<i>n</i>	6646 6646	5255 5255	3140 3140	835 835	622 622	

Data Source: DZHW-School-Leaver-Survey 1990-2010

Significance Levels: + p<0.10 * p<0.05; ** p<0.01; *** p<0.001

Results of logistic regressions (AME)

	Higher Education				Doctoral Programme				Post-doc	
	<i>transition</i>		<i>graduation</i>		<i>transition</i>		<i>graduation</i>		<i>start</i>	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Gender										
Male (vs. female)	.15***	.12***	.02*	.02**	.09***	.05**	.06*	.05	.04	.05+
Performance		X		X		X		X		X
Motivations		X		X		X		X		X
Educational context		X		X		X		X		X
Work context		X		X		X		X		X
Family context		X		X		X		X		X
<i>Pseudo R²</i>	.03	.23	.00	.10	.01	.29	.01	.13	.00	.10
<i>n</i>	6646	6646	5255	5255	3140	3140	835	835	622	622

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	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Gender										
Male (vs. female)	.15***	.12***	.02*	.02**	.09***	.05**	.06*	.05	.04	.05+
Educational context										
Prior training		.13***		.01		-.06**		.01		-.01
Type of school		.16***		.02		-.05+		-.00		-.00
Field of study										
- Science				-.01		.26***		.09*		-.03
- Engineering				.02+		.11***		-.00		-.06
- Medicine				.00		.50***		.11*		.11
- Humanities				.00		-.00		-.10+		.18*
(vs. Economics)										
Pseudo R ²	.03	.23	.00	.10	.01	.29	.01	.13	.00	.10
n	6646	6646	5255	5255	3140	3140	835	835	622	622

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	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Gender										
Male (vs. female)	.15***	.12***	.02*	.02**	.09***	.05**	.06*	.05	.04	.05 ⁺
Family context										
Birth of child	-0.10*		-0.06***		-0.03		-0.11**		.01	
<i>Pseudo R²</i>	.03	.23	.00	.10	.01	.29	.01	.13	.00	.10
<i>n</i>	6646	6646	5255	5255	3140	3140	835	835	622	622

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Do mechanisms differ by gender?

	Higher Education				Doctoral Programme				Post-doc	
	<i>transition</i>		<i>graduation</i>		<i>transition</i>		<i>graduation</i>		<i>start</i>	
	F	M	F	M	F	M	F	M	F	M
Performance										
Motivations	X	≠ X	X	≠ X						
Educational context	X	≠ X	X	≠ X						
Work context							X	≠ X	X	≠ X
Family context	X	≠ X	X	≠ X						
<i>Pseudo R²</i>	.25	.16	.10	.12	.33	.27	.26	.07	.11	.15
<i>n</i>	3242	3404	2364	2891	1489	1651	329	506	226	396

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	<i>transition</i>		<i>graduation</i>		<i>transition</i>		<i>graduation</i>		<i>start</i>	
	F	M	F	M	F	M	F	M	F	M
Performance										
Motivations	X	≠ X	X	≠ X						
Educational context	X	≠ X	X	≠ X						
Work context							X	≠ X	X	≠ X
Family context	.03	-.09**	-.07***	-.02	-.02	-.04	-.13*	-.05	-.06	.02
Pseudo R ²	.25	.16	.10	.12	.33	.27	.26	.07	.11	.15
n	3242	3404	2364	2891	1489	1651	329	506	226	396

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Conclusions & Outlook

1. Gender differences are more pronounced in the beginning of the academic career and fade out at later stages
2. Gender differences occur most strongly at transitions to the next educational stage rather than being due to different graduation rates
3. Gender differences are partially explained by the considered variables but a large proportion of variance is left unexplained
4. Differing mechanisms: Men and women differ in their reasons to start or stop an academic career; in particular family circumstances have different consequences
5. Repetition with more recent data, e.g. to check whether the effect of traditional gender roles diminishs

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Overview of hypotheses

	Higher education		Doctoral programme		Post-doc
	Transition	Graduation	Transition	Graduation	Transition
Performance	♀	♀	♂	♂	♂
Motivation					
<i>Extrinsic</i>	♂		♂		
<i>Cost sens.</i>					
<i>Intrinsic</i>					
<i>Family or.</i>	♂		♂		♂
Education					
<i>Voc. edu.</i>	♂		♀		
<i>Gen. school</i>	♀	♀	♀		♀
<i>Study field</i>		♀/*	*	*	*
Vol. of work				*	
Birth of child	*	*	*	*	

♀ = increases female part., ♂ = increases male part., * = effects differ by gender

Results of logistic regressions (AME)

	Higher Education				Doctoral Programme				Post-doc	
	<i>transition</i>		<i>graduation</i>		<i>transition</i>		<i>graduation</i>		<i>start</i>	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Gender										
Male (vs. female)	.15***	.12***	.02*	.02**	.09***	.05**	.06*	.05	.04	.05+
Work context										
Volume of work			-.05***		.02		-.06***		.02	
Family context										
Birth of child	-.10*		-.06***		-.03		-.11**		.01	
<i>Pseudo R²</i>	.03	.23	.00	.10	.01	.29	.01	.13	.00	.10
<i>n</i>	6646	6646	5255	5255	3140	3140	835	835	622	622

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	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Gender										
Male (vs. female)	.15***	.12***	.02*	.02**	.09***	.05**	.06*	.05	.04	.05 ⁺
Performance										
school grade		.04***		.04***						
exam grade					.11***		.06***			
doctorate grade									.09***	
<i>Pseudo R²</i>	.03	.23	.00	.10	.01	.29	.01	.13	.00	.10
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	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Gender										
Male (vs. female)	.15***	.12***	.02*	.02**	.09***	.05**	.06*	.05	.04	.05+
Motivations										
Professional prestige		.00		.00		.01+		.01		-.01
Financial independ.		-.05***		-.00		-.01*		-.00		-.00
Scientific work		.05***		.00		.03***		.01		.01
Local bonds		-.01***		-.01**		-.01**		-.02+		.01
<i>Pseudo R²</i>	.03	.23	.00	.10	.01	.29	.01	.13	.00	.10
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Independent variables

Performance	Final school grade	<i>-2.5, below average to +2.5, above average</i>	wave 1-4
	Final exam grade		
	Final doctoral grade		
Motivations			
Extrinsic mot.	Professional prestige	<i>0, not important to 6, very important</i>	wave 1
Cost sensitivity	Financial independence		
Intrinsic mot.	Interest in scientific work		
Family orientation	Local bonds		