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Is there a Gender Training Gap and if yes, why?

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Abstract

Gender differences in access to continuing training are often argued to be a central cause of persisting gender inequalities in occupational attainment. Yet, existing empirical work has presented rather mixed evidence regarding a potential gender gap. With the aim to gain a better understanding of the mechanisms underlying training participation, this paper carries out an empirical test of the central theoretical models commonly used to explain the (alleged) gender gap. Using data from the European Social Survey, we find that working men are more likely to train than working women, controlling for worker and job characteristics. Moreover, common theoretical approaches to understanding gendered training behaviour show some explanatory power for male workers, while they largely fail to predict women's training incidence.

Zusammenfassung

Geschlechterunterschiede im Zugang zu beruflicher Weiterbildung gelten weiterhin als wichtige Ursache weiter bestehender Ungleichheiten zwischen den Geschlechtern in Bezug auf deren Chancen am Arbeitsmarkt und deren beruflichen Erfolg. Allerdings schaffen empirische Studien bis dato keine Klarheit darüber, ob bzw. welche Geschlechterunterschiede im Weiterbildungsverhalten tatsächlich bestehen. Die vorliegende Analyse untersucht, auf Basis harmonisierter Survey-Daten des European Social Survey 2004, berufsbezogene Weiterbildungsaktivitäten in Europa und testet eine Reihe von mikroökonomischen und soziologischen Theorien (z.B. Humankapitaltheorie, Geschlechtersegregation am Arbeitsmarkt, Diskriminierung durch den Arbeitgeber etc.), die häufig zur Erklärung von Geschlechterunterschieden in der Teilnahme an Weiterbildung herangezogen werden. Der Beitrag untersucht die Mechanismen, die einem potenziell geschlechtsspezifischen Teilnahmeverhalten an beruflicher Weiterbildung zugrunde liegen. Die Ergebnisse der Analyse zeigen, dass männliche Arbeitnehmer, *ceteris paribus*, häufiger an berufsbezogener Weiterbildung teilnehmen als weibliche Arbeitnehmer. Als Fazit kann festgestellt werden, dass die vorherrschenden theoretischen Ansätze mehr Erklärungskraft für das Weiterbildungsverhalten von Männern als für jenes von Frauen haben. Vor allem in Bezug auf weibliches Weiterbildungsverhalten bei Präsenz von Betreuungspflichten für kleine Kinder zeigen sich vorherrschende Erklärungsmodelle als wenig valid.

Contents

1. Introduction

Research has presented consistent evidence of an unequal distribution of employment opportunities and socioeconomic rewards between men and women in the economically active labour force. In the literature we find an ample debate over the causes of the persistence of gender inequalities in labour market outcomes and the role of on-the-job training as a potential contributing factor is increasingly acknowledged (e.g. Evertsson 2004; Havet & Sofer 2008; Olsen & Sexton 1996; Tam 1997; Tomaskovic-Devey & Skaggs 2002). Related research builds on the basic assumption that family responsibilities, discontinuous employment and discriminatory employer practices create barriers to women's access to continuing on-the-job training and that the resulting gender training gap explains a substantial part of observed gender differences in occupational attainment. However, to date, there is a lack of consensus in the literature as to whether men or women train more. Whilst some studies find significant gender differences in access to continuing on-the-job training to the disadvantage of women (e.g. Evertsson 2004; Knoke & Ishio 1998; Schömann & Becker 1995), other work suggests that, overall, gender differences in continuing training participation are rather muted in most countries (Arulampalam et al. 2004; Dieckhoff et al. 2007). Some research even finds that women are more likely to train than men (Green & Zanchi 1997; Jones et al. 2008; Simpson & Stroh 2002). Evidently, all of this research focuses on working men and women. Once we look at the whole working age population we do find a pronounced gender gap in training participation to the disadvantage of women as most training is done on-the-job and women continue to be underrepresented in the labour market in most Western societies. So, while the answer to the question whether there is an overall gender gap in training participation is straightforward, we still do not know whether or not working women train less than working men.

This paper aims at enhancing our understanding of the mechanisms underlying training participation. Testing the central theoretical models commonly used to explain the (alleged) gender gap in continuing training opportunities, we hope to gain insights into the origins of potential gender inequalities in access to training. The data at hand – Round 2 of the European Social Survey – provide an impressive range of variables suited to test common theoretical models of gender differences in training participation. Besides commonly available variables pertaining to human capital, work-life history, family and firm-level characteristics, they also provide information on individuals' fertility plans, their career aspirations and gender attitudes. The data also allows us to test for cross-national differences in training predictors, something which has not yet been attempted by previous work concerned with the gender training gap.

2. Theoretical Perspectives

Sociological and economic theories of the labour market provide a range of reasons as to why female workers may participate less in continuing on-the-job training than their male counterparts. Some of these models focus on the investment rationale of the worker; others focus on the employer as the provider of training, while some concentrate on the broader organizational context in which inequality is produced.

Human Capital Theory: The Logic of 'Horizons of Return'

Human capital theory is concerned with the incentives of economic actors to invest in education and further training (Becker 1975). From this theoretical perspective, it is the expected returns to training relative to its costs that are most central in the skill investment decisions of both workers and employers.[1] With regard to gender differences in continuing training participation, human capital theory emphasises the differences between men and women in training investment decisions due to differences in their labour force participation over the life-cycle (Blau & Ferber 1992). The fact that care responsibilities still lead to more discontinuous patterns of participation among women than men means that women tend to have shorter periods of (working) time during which returns to training can be recouped. Therefore, women who plan to have children should theoretically have lower training odds – especially if they plan to temporarily or even permanently leave the labour market in connection to child birth. Work interruptions per se reduce the time in the labour market during which training investments can be recouped in the future. Furthermore, in times of rapid technological change, women who return to the labour market after a prolonged period of care leave also face the problem of skill depreciation. This should severely reduce the incentives of women with plans to have children in the near future to invest in training, as they cannot be sure that an investment in their job-related skills will give any returns after a career break (especially when it is an investment in firm-specific skills and the female worker is not sure that she will return to work with the same employer). While human capital theory would thus predict that women's training odds are negatively affected by fertility plans, the underlying logic of anticipated returns to training does not entail a prediction for the actual presence of childcare responsibilities. However, this should only be the case if we account for the fact that mothers are much more likely to work part-time than non-mothers thereby reducing the effective time during which returns to any training investment can be recouped (cf. Nelen & de Grip 2008).

The major implications of the logic of 'horizons of return' are assumed gender differences in training determinants. While planned fertility would be expected to adversely affect women's training propensity, there is no expectation

that it would negatively affect men's. To the contrary, (anticipated) fatherhood may even strengthen men's job attachment, make them more risk-averse and reduce their inclination to job changes. This would lead to the anticipation of a long duration of their current job and thereby increase their willingness to invest in further skill development. This thesis has received empirical support by a recent study which shows that marriage and the arrival of children tend to make men more reluctant to separate from their jobs (Frederiksen 2008).

The human capital model also provides insights into employers' investment rationales as their decisions also depend on the (expected) pay-off period of any human capital investment. How the employer perceives his/her worker's job attachment is therefore crucial. Yet, employers normally have no insight into their workers' fertility plans; and may therefore be reluctant to invest too heavily in any woman of reproductive age (statistical discrimination, see below). Men, by contrast, will not be discriminated against for potential fertility plans as employers do not anticipate that male workers leave the labour market with the arrival of a child. One might even expect that fathers get preferential treatment over non-fathers as employers assume them to have a stronger job attachment (see above).

Gender Role Explanations

The gendered division of labour in society is the backdrop against which human capital theory formulates its predictions about sex differences in skill investment choices. Moreover, the identification with and performance of culturally prescribed gender roles (England 2005) could itself be a crucial mechanism underlying gender differences in training rationales. From this (sociological) perspective, the focus is not on 'rational' investment choices. Instead, it is argued that the birth of a child tends to revitalise traditional gender roles and often leads couples to assume models in which the woman acts as the primary carer and homemaker while the man acts as the main breadwinner – even in couples where both partners have a strong labour market attachment (Bielby & Bielby 1989)[2]. From a gender role perspective, one would thus predict that the actual presence of care responsibilities is the central mechanism negatively affecting women's training participation – while positively affecting men's.

Also Becker (1985) has theorised about why women may be less likely to train than men with reference to gender roles. He argues that women with family responsibilities specialise in reproductive work with the implication that they allocate less effort to market work and are thus also less likely to invest in job-related training – even when they formally work the same hours as men. Men, by contrast, specialise in market work (with their female partners taking over most of the unpaid work at home) and are therefore held to have more energy left for market work and continuing training activities. Notwithstanding the well-documented persistence of the unequal division of paid and unpaid work between the sexes, it should be noted that existing empirical work chal-

lenges Becker's claim that women's work effort suffers more strongly from family demands than men's (Reskin & Bielby 2005; 79-80).

Discrimination

A sex gap in training participation can also be the consequence of employers' discriminatory practices. There are two central theories of discrimination: taste and statistical discrimination. Taste discrimination (Becker 1957) is based on a sheer distaste (often driven by cultural stereotypes) for a particular labour market group leading to a labour market disadvantage for that group. By contrast, statistical discrimination has an economic rationale. If employers believe that women have, on average, a weaker labour market attachment than men (irrespective of whether this assumption is correct), and for this reason offer lower rewards (e.g. wages or opportunities for development) also to women for whom this expectation is incorrect, this is referred to in the literature as statistical discrimination (Blau & Ferber 1992). As becomes evident, theories of statistical discrimination and human capital are interlinked. Empirically, it has proven difficult to distinguish between the two variants of discrimination (e.g. Correll et al. 2007). However, a general prediction that can be made is that in the event that employers discriminate against women in the allocation of training opportunities (be it based on employers' tastes or their assumptions about lower returns to training investments in the case of women), we would find a sex gap in training participation even once worker and job characteristics are controlled for. Technically, if we could be sure that our analyses contain "perfect" measures of productivity and job attachment (both being central predictors of returns to training for the employer), any observed residual sex gap in training participation could be attributed to statistically unfounded taste discrimination. Since we cannot be sure, however, that we have such perfect controls, the observation of a residual sex gap in training could be due to either statistical or taste discrimination, or both.

There are reasons to believe that discrimination against women and men's privileges relative to women may increase in the presence of children (Ridgeway & Correll 2004). Employing a laboratory experiment, Correll et al. (2007) find that mothers tend to be rated as less competent and committed to work than non-mothers with similar qualifications and backgrounds. By contrast, fathers are often assumed to have a stronger work commitment and productivity than otherwise similar non-fathers. Such deeply gendered perceptions of parenthood have been found to result in a wage penalty for motherhood and a wage premium for fatherhood that cannot be explained away by worker characteristics and that can therefore be assumed to be caused mainly by employers' discriminatory practices (Budig & England 2001). Similar mechanisms may affect the allocation of training opportunities. If employers discriminate against mothers and privilege fathers, we should find a motherhood gap and a fatherhood premium in training opportunities even when worker and job characteris-

tics are held constant. Again, empirical evidence for pure taste discrimination is hard to come by, given that we would only be able to safely conclude that a residual motherhood gap in training participation is attributable to employers' taste for discrimination against women under the condition that we are able to control for all differences between childless women and mothers that affect employers' economic training rationales (see above).

Gender Segregation

The theories just outlined provide insights into the mechanisms that would be expected to result in a gender training gap, which in turn could be seen as contributing to gender segregation in the labour market. However, the above theories have also been used to explain vertical and horizontal gender segregation more directly. Polachek (1981), for example, proposes a variant of human capital theory whereby women – because they anticipate career interruptions – choose occupations that require skills with lower atrophy rates. Lower requirements for continuing skill investment in female-dominated occupations would, in turn, explain the (alleged) gender gap in training participation. In a similar vein, also gender role theories would predict that women self-select into occupations that are less competitive and require lower levels of on-going skill investment – the so-called "mommy track" (Schwartz 1992). Finally, one could assume that employers' discriminatory practices in hiring decisions prevent women from access to privileged positions (e.g. Maume 1999; Smith 2002) – that are associated with greater opportunities for continuing on-the-job training (Pfeffer & Ross 1990). If women are denied access to "men's" jobs they also do not have access to the training opportunities that these jobs entail (Tomaskovic-Devey & Skaggs 2002).

Overall, all of these approaches emphasise the importance of the type of job for training access over and above worker characteristics. The assumption is that once selected into certain occupations workers' training volume will be shaped more by the skill requirements of their jobs than by their own skill profiles and incentive structures. The literature on occupational sex segregation suggests that the proportion of male workers in an occupation is positively related to the employment rewards that both male and female job occupants obtain, while high shares of women in an occupation tend to come along with lower levels of rewards such as pay, promotions or training opportunities (Baron et al. 1986; Reskin & Bielby 2005). We would thus predict that both women and men are less likely to train if they are in a female-dominated occupation when compared to occupations with a good gender balance. Male-dominated occupations are often portrayed as being more training intensive (especially with regard to firm-specific skills) than occupations with higher shares of female workers (Tam 1997). We may therefore predict that both men and women in male-dominated occupations enjoy the best training opportunities.

Institutional Context

Cross-country comparative work concerned with gendered labour market behaviour and the gender gap in occupational attainment has regularly noted the importance of institutions in observed cross-national differences. Family policies that encourage women's continuous participation in the labour market over the family life-cycle (e.g. public childcare provision) have shown to positively affect mothers' rates of labour market participation (e.g. Gornick & Meyers 2003) and to significantly reduce the motherhood wage penalty (Gash 2009). Moreover, a lower prevalence of traditional gender role behaviour may have a spill-over effect on discrimination practices – in societies where we find a high continuity of female employment over the life course, we should expect that discrimination of female workers is less marked. In light of these expectations, we would predict that supportive policies will lead to less pronounced negative effects of children and anticipated motherhood on women's training participation. Moreover, they can also be expected to reduce the overall gender gap in access to training. Given the well-documented cross-country differences in the degree to which policy is supportive of women's continuous employment (Plantenga & Remery 2005), we would expect that children and medium-term fertility plans have markedly less pronounced effects in the Nordic countries as compared to countries, where family policies are either underdeveloped or predominantly focused on the provision of paid leave for the home care of children. Due to the aforementioned spill-over effect on discrimination, we would also expect the overall gender gap in access to training to be least pronounced in Scandinavia.

3. Hypotheses

If *human capital theory from the worker perspective* with its focus on investment rationales has explanatory power for understanding training decisions, then we would expect that women who plan to have a/nother child in the near future are less likely to train than other women (H 1a). This is because for women, the arrival of children tends to imply a career break. For men, by contrast, *human capital theory from the worker perspective* would predict that fertility will increase workers' motivation for training participation – since (anticipated) fatherhood tends to strengthen men's attachment to their current job and thereby increases their incentives to invest in training (H 1b). Also *human capital theory from the employer perspective* would predict a training advantage of fathers compared to non-fathers as fatherhood signals stronger job attachment (H 2a). Moreover, if *human capital theory from the employer perspective* is crucial for the allocation of training opportunities, we would expect younger childless women (with presumed incomplete fertilities) to face a training disadvantage as compared to women who remained childless throughout their reproductive age (cf. also statistical discrimination) (H 2b). If *gender role explanations* are relevant for understanding women's training behaviour, we would expect the presence of dependent children – and especially of children below schooling age – to reduce women's training odds (H 3a). For men, gender role theory would predict the presence of children to have a positive rather than a negative effect on training participation (H 3b). Following the main thrust of the *occupational gender segregation* literature, we would expect women as well as men in female-dominated occupations to be less likely to train than their counterparts in more gender balanced occupations (H 4a). Conversely, we expect women and men in male-dominated occupations to have the highest training odds (H 4b). If *sex discrimination* is prevalent, we would expect to find a training gap to the disadvantage of women even after controlling for central variables pertaining to workers' human capital, their attitudes and the characteristics of their jobs (H 5a). Moreover, if employers mostly discriminate against mothers and privilege fathers, we would expect to find lower training odds among mothers when compared to childless women, and higher training odds of fathers compared to non-fathers, even when controlling for differences in workers' productivity and job attachment and the skill requirements of their jobs (H 5b).

As becomes evident here, some of the theories arrive at exactly the same prediction. We have to keep in mind though that these theories – though most work treats them as separate conceptual approaches – are heavily interlinked. Together, they constitute one central societal mechanism that is based on the gender arrangement in most Western societies (i.e. the traditional division of paid and unpaid work and care between women and men that is maintained and reproduced by gender norms). Human capital theory when applied to predict gender differences in training investments, for example, is formulated

against the backdrop of traditional gender roles which shape the differential investment rationales of men and women as well as of their employers. Sex discrimination theories, in turn, reason about the causes of the differential treatment of women and men in the labour market that may be due either to unobservable differences in productivity and/or may be motivated by cultural stereotypes. Acknowledging the interlinked nature of our hypotheses, the aim of the following analysis is to determine – as far as this is possible – the underlying mechanisms that are most relevant in explaining gendered training behaviour.

4. Data and Method

Our analyses draw on the second round of the European Social Survey fielded in 2004/05 (ESS2e03). We are using data from 23 countries. These are Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK. Our sample consists of 2,392 women and 2,565 men, aged 25-45, who live in co-residential union with a partner and who are in dependent employment. The labour market behaviour of single women has been shown to be differently shaped when compared to those who live in cohabiting unions (Drobnic 2000) and are therefore excluded from the analysis (as are single men). The age restriction is warranted because information about future fertility plans is only available for women and men aged up to 45 years. The restriction of the sample to employees is due to the lack of information on some of our key predictors for the self-employed. Furthermore, our sample excludes executive employees as the set of theories that is based on employers' perspective is less applicable to them. Since we also want to exclude the possibility that the reported training incidence took place during a spell of unemployment (and may thus fall into the category of activation rather than regular continuing training), we only include workers who have been with the same employer for more than one full year.[3] Finally, we exclude women who were (potentially) on parental leave when the reported training took place (those with children below age one).[4] This is to preclude the possibility that we include training incidences of women who trained when they were temporarily away from paid work. To allow for comparability of our male and female samples, also men whose children were aged below one during the training reference period are excluded from the analyses.

The training measure used in this study comes from a survey question asking: During the last twelve months, have you taken any course or attended any lecture or conference to improve your knowledge or skills for work? While this clearly is a measure of work-related training, it unfortunately contains no information about the funding and duration of training incidences. The first set of explanatory factors that we test pertains to childcare responsibilities and fertility plans: First, we test whether the presence of dependent children in the home affects their parents' training propensity, distinguishing between children below the national school-going age (henceforth: pre-school children) and older children (between the national school-starting age and below age 18 at the time when the reported training actually took place). The distinction was made according to the country-specific age of starting school, as this plausibly is a more important dividing line for children's care needs and arrangements than a common cut-off at six years for all countries. The reference category comprises childless couples and parents of grown-up children (i.e. those who are aged 18 or older when the reported training occurred). Moreover, to test whether an-

ticipated parenthood already affects workers' training behaviour; we also look at the effect of respondents' medium-term fertility plans (for details on construction of the child and fertility variables see footnotes below Overview 1). The second set of variables included in our models allows us to test potential effects of occupational sex segregation. In particular, we look at the effect of the sex composition of occupations. Following Polavieja (2007), this is calculated as the share of women in respondents' occupation. For this we use the 4-digit International Standard Classification of Occupations (ISCO-88), unless case numbers are below 50, when we resort to the 3-digit or 2-digit classification. Due to restrictions in terms of sample sizes, these calculations cannot be done on a country per country basis but need to be based on the whole ESS sample for 23 countries. In spite of evidence on cross-national differences in the level of occupational sex segregation (e.g. Charles 1992; Charles & Grusky 1995), the assumption of similar segregation patterns across countries that is underlying our approach is tenable in the light of prior research that has shown pronounced cross-national similarities in the sex-typing of occupations (e.g. Blau & Ferber 1992: 311; Nermo 2000). In addition to these core variables that are used to test our theoretical predictions, we also control for workers' education, household income, part-time or full-time status, past unemployment experience, firm size and the sex of their boss/supervisor. Unfortunately, the data do not allow us to distinguish between employees working in the private or public sector. Moreover, we test for respondents' career orientation and gender attitudes (for details on the coding and sample distributions of variables, see Overview 1).

We run logistic regression models to predict women' and men's training incidence. To estimate the gender training gap, we run our models on a pooled sample of male and female workers. Additionally, we estimate sex-specific models of training participation. Moreover, given non-random selection into employment, we also estimate the sex-specific models controlling for potential sample selection bias (Heckman model). The variables used to identify the selection equation (probit model for paid work participation) include information on respondents' marital status and their partners' work status (in paid work or not), as it is reasonable to assume (and empirically shown) that these two variables are not related to respondents' training participation, while they have a significant impact on work participation. The selection equation furthermore includes controls for all variables contained in the outcome equation that are measured also for the non-working population. Yet, to further enhance model fit, it contains a different specification of the age variable (linear and quadratic). Moreover, the selection equation accounts for cross-national differences in parental employment and for this reason also contains interaction effects between the age/presence of children and the country dummies.

5. Results

What determines training participation?

Heckman probit estimation was carried out to test whether sample selection bias that may stem from the fact that our dependent variable – work-related training – is only observed for a restricted, non-random sample of currently employed women and men (see above for details on exclusion restrictions). Since we find no evidence for such bias either for our female or male sample (once we introduce respondents' career orientation, gender attitudes and unemployment experience into the training equation), we show models without Heckman correction.

Our models of training determinants displayed in Table 1 behave as would be expected in the light of previous work. In line with expectations, those with lower educational attainment and those with previous unemployment experience are shown to be less likely to participate in training, while we find that workers in larger establishments are more likely to train. Female part-time work is shown to reduce training odds, due to the concentration of low skilled workers in part-time jobs. Going beyond previous work on this matter, we are also able to test the impact of attitudinal variables. As evidenced by the higher training odds of workers with stronger career orientations and less traditional views on gender roles, attitudes seem to matter in training decisions.

To test our hypotheses deriving from human capital and gender role theories, we investigate the effects of medium-term fertility plans and the actual presence and age of children in the home. The results suggest that the presence of dependent children as well as plans to have a child within the next three years significantly increase men's training odds. These effects of fatherhood and medium term fertility plans are in line with the logic of human capital theory if we assume that current job attachment strengthens during the years of family formation (H1b). Alternatively, they can also be explained by gender-typed role behaviour associated with fatherhood (H3b) or positive discrimination of fathers (H5b). Surprisingly, we do not find the predicted negative effect of fertility plans for female workers (H1a).[5] A possible explanation for the non-significant effect of planned fertility are counter-acting signalling dynamics (Spence 1974). Women who plan to have a child in the near future may want to signal their job-attachment and career orientation exactly because they know they will temporarily leave their job in the foreseeable future. Arguably, they believe that sending the right signal before leaving the labour market will result in a smoother re-entry and reduced "leave penalty". Moreover, contrary to our expectations, the analyses further suggest that the presence of dependent children does not affect female workers' training odds either (H3a). This goes against the predictions of gender role specialisation approaches that would assume that women act as the main carers in families and for this reason have less time or energy left for work-related training.

Table 1: Logit Models of Training Participation, Employees as Part of Couples

	Male				Female			
	M1	M2	M3	M4	M1	M2	M3	M4
Age	0.01	0.00	0.00	-0.01	0.01	0.00	0.00	0.02
No dependent children	Ref	Ref	Ref	-	Ref	Ref	Ref	-
Young childless (likely future fertility)	-	-	-	Ref	-	-	-	Ref
Older childless (less likely future fertility)	-	-	-	0.23	-	-	-	**-0.63****
Pre-school children	0.08	0.10	0.11	0.24	0.14	0.07	0.06	-0.29
Older children < age18	0.19	0.30 °	**0.30***	**0.47***	-0.13	0.04	0.03	-0.43 °
Fertility plans	**0.45*****	**0.33****	**0.32****	**0.33****	**0.45****	0.19	0.18	0.16
Part time	0.06	0.05	0.09	0.09	**-0.27***	-0.23	-0.18	-0.18
Size of firm	**0.18*****	**0.16*****	**0.16*****	**0.16*****	**0.17*****	**0.15*****	**0.15*****	**0.15*****
Sex of boss/supervisor: male	-0.15	-0.07	-0.04	-0.03	-0.11	-0.05	-0.06	-0.07
Male occupation (<10% women) [(a)]	**-0.83*****	**-0.42***	**-0.38***	**-0.38***	**-**	**-**	**-**	**-**
Male occupation (10<30% women)	-0.26	-0.15	-0.12	-0.12	-	-	-	-
Male occupation (<30% women) [(a)]	-	-	-	-	**-0.68****	**-0.54***	**-0.53***	**-0.52***
Male occupation (30<40% women)	-0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.07
Integrated Occupation (40<50%)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Integrated Occupation (50<60%)	0.12	0.12	0.12	0.13	-0.03	-0.16	-0.15	-0.14
Female Occupation (60<70% women)	-0.03	-0.03	-0.05	-0.04	-0.02	-0.01	0.00	0.00
Female Occupation (70<80% women)	0.05	0.13	0.14	0.14	-0.04	0.06	0.09	0.10
Female Occupation (80<90% women)	-	-	-	-	**-0.64****	-0.24	-0.18	-0.17
Female Occupation (80-100% women) [(a)]	-0.17	0.10	0.14	0.13	-	-	-	-
Female Occupation (90-100% women)	-	-	-	-	-0.07	0.25	0.28	0.29

	Male				Female			
	M1	M2	M3	M4	M1	M2	M3	M4
Lower secondary		**0.52***	**0.50***	**0.51***		0.38	0.36	0.34
Upper and post-sec		**0.86*****	**0.81*****	**0.81*****		**1.01*****	**0.95*****	**0.92*****
Tertiary		**1.71*****	**1.58*****	**1.60*****		**2.27*****	**2.14*****	**2.10*****
Unemployment experience		-0.36 °	-0.36 °	-0.36°		**-0.55****	**-0.52****	**-0.53****
Feel about household income (cope)		**-0.23***	**-0.21***	**-0.21***		-0.19	-0.17	-0.17
Feel about household income (difficult)		**-0.56*****	**-0.51****	**-0.51****		**-0.58*****	**-0.54****	**-0.54****
Career orientation			**0.09***	**0.09***			**0.13****	**0.13****
Traditional gender attitude			**-0.17*****	**-0.16*****			**-0.14****	**-0.14****
Constant	-0.36	-0.70	-0.97	-0.90	-0.43	-0.71	-1.17	**-1.48***
R-Squared	0.10	0.15	0.15	0.15	0.11	0.18	0.19	0.19
Observations	2,562	2,562	2,562	2,562	2,392	2,392	2,392	2,392

Sample: Men and women aged 25-45, cohabiting with a partner, time with current employer at least one year

Country fixed effects (dummies) included in all models. *** p<0.001 ** p<0.01 * p<0.05 ° p<0.07

(a) Due to sample size restrictions, we cannot analyse the implications of being in almost exclusively male occupations (with less than 10% women) for women's training odds or of being in strongly female dominated occupations for men's training odds. For this reason, some of the categories have been merged for the sex-specific analysis (for details, see Overview 1 in the technical appendix).

It could be argued that a potential negative child effect on mothers' time and energy for training is masked by a counter-acting "catching-up effect", in the sense that mothers with young children resuming their career may want to invest in training to compensate for the time they spent away from the labour market on maternity leave.

To test for the presence of discriminatory practices (H2a), childless women are split into two groups that differ with regard to their presumed fertility plans. The expectation from statistical discrimination theories would be that younger childless women (here aged below 33 - reflecting the fact that less than 10% of European women had their first child after age 30, cf. MacInnes 2006) are disadvantaged in terms of training access when compared to their older counterparts for whom future fertility – and career breaks – can be assumed less likely and therefore employers' returns to any training investment safer and higher. Yet, in stark contrast to this prediction, we find younger childless women to have *higher* training odds than their counterparts in the older age group. Note that the strong training disadvantage of older childless women cannot be interpreted as an age effect (i.e. discrimination against older workers) – given that we do not find a similar pattern for men (see Models 4 in Table 1).

To test our predictions derived from the segregation literature, we investigate sex differences in training participation that may emerge at the level of occupations (H4a and H4b). Our results suggest that being employed in male-dominated occupations reduces training opportunities, for both women and men. And this training disadvantage originates at the job level as it remains significant even when we control for worker characteristics such as educational attainment or unemployment history. This would suggest that in almost exclusively male occupations (with a share of female workers of less than 10 percent), which mainly consist of low-skilled manual occupations (labourers, plant and machine operators) there is less need for continuous skill updating than in other occupations. For women, we find that those working in male-dominated occupations (with a share of female workers of less than 30 percent) as well as those working in female-dominated occupations (with a share of 80-90 percent female workers) are significantly less likely to train than their counterparts in more gender balanced occupations. This female-dominated occupational group contains mainly low-skilled clerical workers (office clerks, secretaries, cashiers). The group of women in almost exclusively female occupations (90 percent women or more), which mainly consists of more highly skilled associate professionals, such as midwives, medical assistants, and primary school teachers, by contrast, does not appear to be disadvantaged. The observed effects of female-typed jobs are driven by skill composition – and therefore disappear once education is controlled for. All in all, we conclude that our results do not support theories of sex segregation asserting that it should be women rather than men who are more often concentrated in occupations and industries with lower rates of technological change and thus lower requirements for continuous skill upgrading.

In sum, the prevalent theoretical approaches for understanding gendered training behaviour are not supported by our data and analyses. Human capital theory predicts that the plan to have children (and at least temporarily leave the labour market) would reduce women's inclination to invest in training. Taking employers' perspective, one would predict that it is especially young women with incomplete fertilities who are disadvantaged when training opportunities are distributed. Sociological gender role theory as well as discrimination approaches would assume that the presence of dependent children negatively affects female workers' training odds. And theories of occupational gender segregation tend to suggest that female-typed jobs offer fewer training opportunities than other occupations. However, none of these predictions received confirmation. By contrast, our results would suggest that prevalent theoretical approaches have some explanatory power for male training behaviour. The significant effects for fatherhood can be interpreted as supporting evidence for human capital theory (and is in line with both employer und worker rationales, H1b and H2a). Moreover, the observed child effect for male workers is also corroborating gender role theories (H3b) as well as discrimination approaches that focus on parental status (H5b). The fact that in addition to significant child effects we also find the mere plan to have a child within the next three years to positively affect men's training odds suggests that observed fertility effects on men are co-determined by workers' training rationale (assuming that employers will normally have no insights into their workers' future family planning).

Is there a gender training gap?

To test our predictions regarding sex discrimination (H5a), we investigate a potential sex gap in training participation that cannot be explained away by worker or job characteristics. As shown in Overview 1, about 54% of women and 53% of men in our sample participated in work-related training within a time span of 12 months. This is also reflected in the non-significant gender dummy in Model 1 shown in Table 2.

Overall, we thus find that the average working man and woman have very similar training odds. Yet, when we control for the composition of our male and female samples of workers and in particular for the fact that the female sample has characteristics that have been shown to be associated with a higher propensity to train in the sex-specific analyses, such as higher average levels of education, more modern gender attitudes and a lower share of workers in strongly male-dominated occupations (see Overview 1), our results suggest that working men are more likely to train than working women (see Model 2). Thus, controlling for the extent to which men occupy jobs offering fewer training opportunities or to which they hold attitudes that are associated with a lower training propensity (so-called suppressor variables), has revealed a significant gender gap in training to the disadvantage of women. In a last step, we control for the higher incidence of part-time work and of past unemployment as well as for the

Table 2: Logit Models of Training Participation, Male and Female Employees as Part of Couples (pooled)

	Female	(Additional) controls	Obser-vations	R-Squared
M1	0.10	Age, presence and age of children, fertility plans	4954	0.07
M2	**-0.27****	+ suppressors masking the female training disadvantage (sex composition of occupations, sex of boss/supervisor, education, household income, gender attitudes)	4954	0.15
M3	**-0.20***	+ variables associated with a female training disadvantage (part-time work, size of firm, unemployment experience), career orientation(a)	4954	0.16

Sample: Women and men aged 25-45, cohabiting with a partner, time with current employer at least one year

Country fixed effects (dummies) included in all models. *** p<0.001 ** p<0.01 * p<0.05

(a) Note that although career orientation is slightly higher in our male than in our female sample (see Overview 1 for means), the sex difference in this regard is not statistically significant.

slightly lower average firm-size observed for our female sample – work/er characteristics that have been found to be associated with significantly lower training opportunities. Yet, as can be seen from Model 3, the statistical adjustment for these variables is not able to account for much of the training disadvantage of women. Overall, our findings would thus suggest that women are less likely to train than men, all else being equal.[6]

Is there evidence for significant cross-national variation?

We tested whether we find significant cross-country differences with regard to the overall gender gap and/or child and family planning effects. For this purpose, countries have been clustered into five different groups (the Nordic, the Continental European, the Anglo-Saxon, the Central and Eastern European, and the Southern European countries) and analyses have been carried out separately for each of them. The results (not presented here) do not show any evidence of significant cross-country differences. According to our data, women thus appear to be less likely to train than men, all else being equal, in all European countries considered. Moreover, cross-national variation in family policies does not translate into differential effects for children and planned fertility. This result could arguably be explained by findings of Mandel and Semyonov (2005; 2006) which have shown that while supportive family policies have positive effects on female labour force participation; this is not the case for occupational rewards such as wages or occupational prestige.

6. Discussion

The objective of this paper has been to examine whether there is a gender gap in continuing training participation and if so why. While overall, working women and men tend to have similar training incidence rates, we did find evidence for a gender gap to the disadvantage of women, once we control for the composition of our sample in terms of workers' human capital and attitudes as well as for the characteristics of their jobs. Under the condition that we were able to control for all of the factors that would affect employers' and workers' investment rationale (e.g. workers' human capital, preferences and abilities to learn new skills, the attachment to their current job and the requirements for continuous skill upgrading in their jobs), this finding would suggest that female workers are discriminated against in terms of training opportunities. Moreover, if discrimination of women by the employer is in fact driving the observed gender training gap, then this gap should be even larger if we focused on employer-funded training only. Indeed there is evidence that would suggest that women's training disadvantage is even greater in terms of employer-provided training (Bassi et al. 1997). Also, with the data at hand we were unable to assess whether men and women differ with regard to training intensity – another aspect potentially leading to an underestimation of women's training disadvantage (O'Halloran 2008). Overall, the sex gap in training that has been revealed in the analysis is therefore a conservative estimate. We can thus rather safely conclude that there is a sex gap in training in Europe – and evidence suggests that such is present in all of the countries contained in the analysis.

By providing a larger array of variables, the European Social Survey allowed us to more thoroughly examine the gender gap in training participation and the underlying mechanisms than most other data sources. The availability of information on workers' career orientation and gender attitudes allowed us to go further than previous work in testing the robustness of the gender gap (i.e. we were able to control for worker characteristics that are normally unmeasured and thus remain a source of unobserved heterogeneity in most prior work). Moreover, the richness of the data made possible the thorough testing of central theoretical models commonly used to explain gender differences in training behaviour. Somewhat unexpectedly, we found that conventional theories fail to predict female training participation, while they seem to have more power in explaining men's training behaviour. Most importantly, we did not find negative effects on women's training odds either of children or of medium-term fertility plans (used as a proxy for anticipated career breaks/tenure). Together with the lack of evidence on employer discrimination of young childless women for whom medium-term fertility (accompanied by career breaks) is likely, our results challenge common expectations based on the human capital perspective. Evidently, it would be an interesting avenue for future research to carry out the analyses using data that allow us to better differentiate between

worker and employer rationales. In particular, it would be important to know whether the reported training is (mainly) financed by the employer, the worker or a third party. Even more so, interesting advances in future research could be expected from data that would allow us to measure both employer and worker preferences with regard to life long learning.

Notes

1. Human capital theory is therefore also central in research concerned with the skills gap in continuing training access. Since the cost of training is lower for quick learners (employees with higher cognitive abilities signalled by educational credentials) more highly educated employees are more likely to invest in continuing training and to be offered training opportunities by their employers (O'Connell 2002).
2. There is ample research demonstrating the effect of parenthood on the traditionalisation of gender relations in couples. Yet, it is still debated whether this effect works only via (temporary) changes in parents' employment behaviour (e.g. as found by Grunow et al. 2007) or whether the arrival of children still leads to a more gender unequal division of unpaid work in the home, once we control for the couples' labour market involvement.
3. Tenure is calculated as the difference between the year during which the interview took place (2004 or 2005) and the year in which the respondent (first) started to work for his/her current employer. A difference of 2 suggests that the respondent has been with the same employer for at least 1 month when the reported training took place (i.e. at any point during the past 12 months). In focusing on women/men for whom this difference amounts to 2 or more, we can thus ensure that during the past 12 months the respondent was in paid work and with the current employer.
4. The year at which the youngest child was born is subtracted from the year at which the interview took place. When this difference amounts to 0 or 1, this indicates that at the time when the reported training took place (at any time during the past 12 months) the youngest child may not have been born yet. For this reason, it was decided to exclude them from the sample. When the difference between the interview year and the birth year of the youngest child is 2, this suggests that, at the time of training, this child was aged between 1 and 35 months. As there is thus the possibility that at the time of training mothers have been on parental leave, also this group of parents is excluded from our sample.
5. Before we control for education, we even find a positive effect of fertility plans for women. However, this is driven by skill composition (i.e. in our sample, more highly educated women are more likely to have such plans).
6. This finding is not affected by sample selection bias, given that any bias deriving from the fact that our sample is restricted to currently employed women would lead to an overestimation of women's training odds in the general population. The revealed sex gap in training is thus a conservative estimate.

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Appendix

Overview 1: Model Description

Variable	Description		N		Mean or %		Standard deviation	
			♀	♂	♀	♂	♀	♂
Training	Dependent variable: During the last twelve months, have you taken any course or attended any lecture or conference to improve your knowledge or skills for work? (Yes or No)		2,392	2,562	54.4	53.2	-	-
Age	Range: 25-45		2,392	2,562	36.6	36.6	5.6	5.5
Children*	No dependent children		613	611	25.6	23.8	-	-
	Pre-school children		398	458	16.6	17.9		
	Older children <18		742	609	31.0	23.8	-	-
	Missing		639	884	26.7	34.5	-	-
Fertility plans	Do you plan to have a child within the next three years? (1-definitely yes; 2-probably yes, 3-probably no; 4-definitely no). Dummy with 1=probably/definitely yes.	Yes	604	767	25.3	29.9	-	-
		No	1,721	1,689	71.9	65.9	-	-
		Missing	67	106	2.8	4.1	-	-
Part-time work	Defined as working between 1 and less than 30 hours per week		463	91	19.4	3.6	-	-
Education	Primary education or less (baseline)		140	161	5.9	6.3	-	-
	Lower secondary		316	468	13.2	18.3	-	-
	Upper and post-secondary		1,112	1,183	46.5	46.2	-	-
	Tertiary		824	750	34.4	29.3	-	-
Occupational sex-composition	Share of women in respondents' occupation (4-digit ISCO; when sample size in 4-digit occupation <50, then 3- or 2-digit ISCO).							
	Male occupation (<10% women)		27	652	1.1	25.4	-	-
	Male occupation (10%-20% women)		62	374	2.6	14.6	-	-
	Male occupation (20%-30% women)		89	325	3.7	12.7	-	-
	Male occupation (30%-40% women)		106	216	4.4	8.4	-	-
	Integrated Occupation (40%-50% women)		213	274	8.9	10.7	-	-
	Integrated Occupation (50%-60% women)		189	175	7.9	6.8	-	-
	Female Occupation (60%-70% women)		247	147	10.3	5.7	-	-

	Female Occupation (70%-80% women)		590	232	24.7	9.1	-	-
	Female Occupation (80%-90% women)		381	80	15.9	3.1	-	-
	Female Occupation (90%-100% women)		452	49	18.9	1.9	-	-
	Category with missing values		36	38	1.5	1.5	-	-
Sex of boss/ supervisor	Is your immediate supervisor/boss a man or a woman?	Male boss/supervisor	1,285	2,277	53.7	88.9	-	-
		Female boss/supervisor	1,029	217	43.0	8.5	-	-
		Missing information	78	68	3.3	2.7	-	-
Firm size	Continuous variable that corresponds to logged firm size and takes on the values 1.6 (natural log of 5 employees), 3 (natural log of 20 employees), 3.91 (natural log of 50 employees), 5.5 (natural log of 250 employees) and 6.6 (natural log of 750 employees).		2,392	2,562	3.8	4.1	1.7	1.7
Gender role attitude	When jobs are scarce, men should have more right to a job than women (0-disagree strongly to 4-agree strongly)		2,392	2,562	1.2	1.4	1.1	1.2
Career orientation	Summative index of two statements: a) Important to show abilities and be admired and b) Important to be successful and that people recognise achievements (scale of resulting variable: 1-not like me at all; 6- very much like me)		2,392	2,562	3.8	3.9	1.1	1.1
Unemployment experience	Dummy 1=spell of unemployment of more than three months within the past 5 years		181	174	7.6	6.8	-	-
Household income	How do you feel about your household's income nowadays?	Living comfortably on present income (ref)	934	958	39.0	37.4	-	-
		Coping on present income	1,103	1,185	46.1	46.3	-	-
		Finding it (very) difficult on present income	355	419	14.8	16.4	-	-

* The category *'pre-school'* includes children for whom the difference between the year at which they were born and the year during which the interview took place, amounts to between 3 and 6: When this difference amounts to 3 or 4, the child was between 1 and below 5 years of age at the time when the reported training took place. Children, for whom this difference amounts to 5 are included in this category in countries where children start school at age 6 or 7 – and when this difference amounts to 6, they are included in countries where children start school at age 7.

The category *'older children'* includes children for whom the difference between the year at which they were born and the year during which the interview took place, amounts to between 9 and 16. This indicates that at the time when the reported training took place, the child was aged between 7 and below 18. In countries where children start school at age 5 or 6 we also include those for whom the difference amount to 8, and in countries where children start school at age 5, we include those for whom the difference amounts to 7. Those for whom this difference amounts to 5 or 6 (or 7-8 in countries where school starts at age 6+) are excluded from the sample as the data does not allow for a decision of whether or not the child already went to school at the time of training. Finally, we exclude those for whom the difference amounts to between 17 and 19, as the data does not allow for a decision on whether or not the child has already reached age 18 at the time of training (some time during the 12 months preceding the interview).

The models also include missing categories for children whose age at the time of the reported training cannot be estimated with sufficient accuracy. These categories include a) workers whose children may not yet have been born at the time of reported training or who may have been on parental leave at the time of reported training (see endnote iv for details), b) parents of children for whom the data do not allow to decide on whether or not they already went to school at the time of training (see above), and c) parents whose children who may or may not have surpassed age 18 at the time of training (see above).

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