

**BUSINESS OWNERS' EDUCATIONAL SKILLS AND ENTREPRENEURIAL  
TEAMS ON WORKERS WAGES:  
THE ROLE OF BUSINESS OWNERS GENDER**

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Abstract

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**Introduction**

Entrepreneurship has been viewed as means of access to the labor market and an alternative form of professional transition, particularly important for highly qualified individuals. Particularly, the transition of doctoral graduates into the private sector in certain countries has grown in recent years due to the recognition of their value on the development of non-academic sectors such as industry, government agencies or nonprofit organizations (Auriol, 2010).

One reason behind the mobility from academia to other sectors may be the incapacity of academic sector to absorb highly qualified workforce (Auriol, 2010). Due to these changes, some doctorate holders look at new firm creation as an alternative to the existing opportunities in the labor market, leading to a growth in the number of start-ups

generated by doctorates. Despite this growth, there are still few studies looking at doctorate business owners (Jennings & Brush, 2013). In particular, very few looked at the role of gender in this recent trend, as the percentage of male-doctorate business owners is higher and the phenomenon of female-doctorate as business owner is relatively new (Brush, De Bruin, & Welter, 2009).

Analysing the role of gender among doctorate business owners is pivotal to challenging the prevailing implicit assumption that entrepreneurship is gender-neutral (Jennings & Brush, 2013). In this vein, the issue we are raising is concerned with finding out how the impact of female highly qualified business owners and mixed-sex entrepreneurial teams on workers' wages.

The current research was conducted as part of a longitudinal study on career trajectories of doctorates, focusing on the career paths of doctorates in the private sector and looking for their entrepreneurial activities, and intends to contribute to the literature on female entrepreneurship by shedding some light about the implications of gender in entrepreneurial teams. Using detailed longitudinal matched employer–employee, we will focus on the role played gender on the relationship between holding a PhD degree and workers wage and the relationship between mix-gender entrepreneurial team and workers wage.

### **Theoretical Basis and Literature Review**

Theorizing and research on female entrepreneurship has centered on personal and organizational characteristics of women-owned businesses (Carter & Shaw, 2006), showing that businesses owned by women tend to be predominantly service-oriented (Carter & Shaw, 2006); women-owned businesses tend to be smaller, with less capital, have lower revenues and fewer employees (Fairlie & Robb, 2009), and reside in lower-profit industries (Bird, 1989); young – less than five years old (Robb & Wolken 2002)

and, when compared to men they often choose sole proprietorships as a preferred form of business structure (Cuba, Decenso & Anish, 1983); or tendency toward same-sex partnership (Godwin, Stevens & Brenner, 2006) or even have less managerial experience (Hisrich & Brush 1984).

One of the explanations for the concentration of women entrepreneurs in services is based on the argument that women attained less academic degree or lack specific technical skills, and this tends to dissuade them from starting businesses in other sectors (e.g. Bruni, Gherardi & Poggio, 2004).

During the past decades the numbers and proportions of women receiving doctoral degrees have increased markedly (OECD, 2011), however, women are less likely than their male counterparts to perceive themselves as entrepreneurs (Verheul, Uhlaner & Thurik, 2005). Despite the motivations behind the decision to become an entrepreneur, research has highlighted that female inter-sectoral mobility patterns may reflect a higher balance between men and women in positions of power and decision, especially in the innovation and technology sector (Dautzenberg, 2012). For example, compared with 25 years ago, women are more likely to have a degree in STEM fields. Therefore some authors argue that the impact of this change in women's educational choices might be related with an increased training, confidence and skills necessary for establishing their own businesses (Kuratko & Hodgetts, 2001). Langowitz and Minniti's (2007) reinforced this claim on their cross-countries analysis about women propensity to engage in entrepreneurial ventures, by concluding that the perception of having sufficient skills is a dominant variable that seems to have an effect independent of institutional settings, culture, and overall level of entrepreneurial activity.

## **Gendered entrepreneurship and co-entrepreneurial teams**

The literature on female entrepreneurship as a gendered phenomenon (Jennings & Brush, 2013) has been developed within two stream lines of research on the role of gender to explain differences between women and men in terms of their propensity to engage in entrepreneurial activity and their financial resource acquisition.

With respect to the propensity to engage in entrepreneurial activity, to related sets of factors seems to influence entrepreneurial behavior, namely, contextual factors and perceptual factors. It is true that entrepreneurship has traditionally been a male-dominated field (Ahl, 2006), with men owning more businesses than women (Marlow, 2002) and that this collective shared gender beliefs (Heilman, 2001) are reproduced at the perceptual level by having women to perceive themselves and their business environment in a less favorable light compared to men (Langowitz & Minniti, 2007), it also true that empirical evidence support the idea that gender has no moderating effect on the relationship between the perceived fear of failure barrier and the entrepreneurial intention (Shinnar, Giacomini, & Janssen, 2012). This is consistent with the research stream stressing that traits, or at least traits alone, are not determining factors in the explanation of entrepreneurship (Gartner, 1988). Nevertheless we account the existence of gender stereotypes that can help explain the tendency for women to evaluate business opportunities less favorably, to possess lower levels of entrepreneurial self-efficacy and/or to express lower intentions of becoming an entrepreneur (e.g. Gupta & Turban, 2012).

With respect to the existence of gender differences related to financial resource acquisition, an early article on women's entrepreneurship, Schwartz (1976) reported that unlike their male counterparts, women entrepreneurs reported experiencing credit discrimination during the capital formation stage. One study found that women business

owners were also significantly more likely to perceive disrespectful treatment by lending officers (Fabowale, Orser, & Riding, 1995). Examining men and women-owned businesses with similar organizational characteristics, another study found that while women secured larger loans than males in their study, they were charged higher interest rates (McKechnie, Ennew, & Read, 1998). Others have suggested that women entrepreneurs are less likely to obtain a loan than male applicants (Fay & Williams, 1993), and are more likely to start out with less initial capital (Rosa, Hamilton, Carter, & Burns, 1994). Buttner and Rosen (1992) concluded that women were more likely to attribute the denial of a bank loan to sex-based bias than were men, but there was evidence that some of the differences were actually based on the stereotypes held by the capital providers. A study by Carter, Shaw, Lam, and Wilson. (2007), which explores the differences in bank lending decisions, bolsters the initial findings of Buttner and Rosen (1992). Results from their work suggest that while there are similarities in the criteria used to assess men and women applicants, the greatest difference between the sexes is seen in the lending officers who are actually negotiating the loan applications. These findings strengthen the argument that it is the sex of the lender, rather than the sex of the applicant, which has implications for the outcome of the loan process and decision. However, some studies also suggest that sex differences in venture funding and outcomes may begin to disappear when confounding issues such as industry type, business size, and age are controlled for (Coleman, 2000; Fabowale et al., 1995). The mixed findings of previous research with regard to access to financial resource acquisition highlight a lack of certainty about the impact of sex on entrepreneurial ventures, and the need to better understand the challenges that women face when starting a new venture or when starting co-ventures.

In fact, research suggests that the majority of new ventures are often founded by teams of entrepreneurs rather than by individuals (Cooper & Daily, 1997). In this regard, recent explanations tend to go beyond the dichotomization male-female business owners, moving forward to address how the compositional characteristics of entrepreneurial teams affect performance (e.g Amason, Shrader, & Tompson, 2006); Chandler, Honig, & Wiklund, 2005; Chowdhury, 2005), organizational structure and access to financial (Beckman, Burton, & O'Reilly,2007).

For example, Godwin and colleagues (2006) developed a series of theoretical premises delineating the multiple ways in which establishing a mixed-sex founding team is likely to benefit female entrepreneurs, especially in male-dominated industries or cultures. As the authors posit the tendency toward same-sex partnership when creating the new venture may perform unique challenges to women entering a male-dominated industry, as women in these contexts often find themselves on the outside of important networks that hold opportunities for financial resource acquisition. A possible strategy to succeed in such challenge is a mixed-sex partnering approach that may provide opportunities to women entrepreneurs. Such opportunities includes access to informal funding networks, intellectual capital and a greater access to the resources needed for new venture success. Others studies had focus on entrepreneurial teams providing evidence that the founding management team can make a positive contribution to venture success, depending on the nature of the relationship between entrepreneurial founders. One study found that “copreneurial” teams tend to possess complementary skills beneficial for success (O’Connor, Hamouda, McKeon, Henry & Johnston, 2006), others have documented how they tend to reify traditional gender roles such that it is the male who tends to act as the primary decision-maker, with the female playing a supporting role behind the scenes, typically associated with the role of women as working spouses in small family

firms. (Yang & Aldrich, 2014). Additional studies indicate that spousal teams are less likely to launch high-potential ventures (Davidsson, Steffens, Gordon, & Seyard, 2008) and more likely to exhibit poorer business performance when the copreneurs divide tasks more equitably within the family sphere (Sharifian, Jennings, & Jennings, 2012). Despite the emerging line of research on implications of gender in entrepreneurial teams, questions regarding to the impact of a team's sex composition associated with mixed-sex teams are yet to answer (Jennings & Brush, 2013). One of the limitations of research on gendered entrepreneurial team is that is mainly focus on qualitative research of some small groups of entrepreneurs (Godwin, Stevens, & Brenner, 2006; O'Connor et al., 2006).

There are several reasons to explore the issue of entrepreneurial teams: they are more common than research and statistics suggest; they are often more successful than single ventures; and they are more likely to increase growth, thereby increasing wealth contribution in the economy (O'Connor, et al., 2006). An entrepreneurial team is often characterized as two or more individuals with equity interest jointly launching and actively participating in a business (Kamm et al., 1990; Watson, Ponthieu, & Critelli, 1995) and tend to consist of friends, relatives and work colleagues.

When creating a business the copreneurial team chooses which workers to hire. In the case of highly qualified co-entrepreneurs, it could be assumed that more skilled entrepreneur will probably hire more skilled workers (Baptista, Lima & Preto, 2013). To understand the interplay between entrepreneurial characteristics and the skills of the workers hired by the entrepreneur, one needs to analyze the matching between the two kinds of skills, looking at the effect of educational level, gender and team composition. The present paper proposes a model to analyses the effect of entrepreneurs' skills, gender and team composition on workers' wages.

## **Method**

We use a Portuguese data drawn from the 'Quadros de Pessoal' (QP) dataset, gathered annually by the Portuguese Ministry of Social Security on the basis of a mandatory survey. This is a longitudinal matched employer-employee data covering the Portuguese economy, for the period 1986-2012. It includes an extensive information on all private firms, establishments and workers in the Portuguese economy.

We use the 2006-2012 period covering XXXXXX firms and a total of 6823328 million workers and 368537 thousands of entrepreneurs.

Worker information includes gender, tenure, schooling, job assignment, wages and hours of work. The survey contains the same individual information for the business owners, excluding earnings and hours of work. Firm information includes firm sector, firm size, total sales, initial capital and type of ownership.

The variables measuring business owners characteristics are educational attainment (stratified into two types of educational degree: doctoral degree and college degree) gender. Business owner's samples comprises a total of 368537 thousands individuals for the period for the 2006-2012. Only 0.39 % of business owners completed a doctoral degree, and 18.12 % completed at least a college degree. Business owners are on average 43.16 years (SD=11.57) and 30.69 % are female. Among business owners with a college degree (N=66052) 36.87% are women and among those with a doctoral degree (N=1409) 33.64% are women. Within business owners with no higher education (N=296993) women account for 29.30%.

For the variable measuring entrepreneurial team composition was computed a dummy variable where 1 correspond to firms with at least two business owners and 0 for sole ownership. Given the fact that is more likely that small businesses are owned by just one entrepreneur than by an entrepreneurial team (Baptista, Lima & Preto, 2013) , we

included all firms within the sample, controlling in addition for firm's size class (number of employees).

Moreover we introduce controls both for workers and firms which are likely to affect the relationship between entrepreneur's qualifications gender and teams on workers' wages. The variable measuring workers skills are educational attainment, gender and tenure. Education measures individual investment in acquiring skills typically carried out before entering the labor market. Table 1 shows worker descriptive statistics for the sample with 6823328 million for the 2006-2012 time period. Workers are on average 35.63 years old and 46% are female. For dummy variables measure schooling: 9-year education, corresponding to compulsory schooling in Portugal during the period under study; secondary education, corresponding to 12-years school enrolment (high-school); college education, corresponding to at least a college degree; doctoral education, corresponding to a doctoral degree.

We introduce dummies for the business sector to account for the effects of the type of business activity and we introduce year dummies to account for time-specific influences.

**Table 1.** Descriptive statistics

<b>Variables</b>	<b>Obs.</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Worker wage per hour (log)	6237953	1.433	.516	-.762	7.53
Entrepreneur PhD	6823328	.002	.050	0	1
Entrepreneur Higher Education	6823328	.010	.101	0	1
Femmale Entrepreneur	6823328	.087	.293	0	1
Co-entrepreneurial team	6823328	.095	.2813	0	1
<i>Control variables</i>					
9-Year Education <sup>a</sup>	6823328	.628	.483	0	1
Secondary Education	6823328	.223	.416	0	1
Colleague Education	6823328	.136	.343	0	1
Doctoral Degree	6823328	.001	.040	0	1
Female Employee	6825221	.427	.494	0	1
Tenure	6815256	3.587	6.728	0	65
firm's size(log)	6597016	3.82	2.41	0	9.637
Agriculture <sup>a</sup>	6597360	.023	.149	0	1
Industry	6597360	.196	.397	0	1

Construcion	6597360	.128	.334	0	1
Trade	6597360	.532	.498	0	1
Public Administration	6597360	.008	.092	0	1
Education	6597360	.022	.148	0	8
Health, Cultural and Social Activities	6597360	.038	.192	0	1

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<sup>a</sup> Reference case in all regressions

## Results

Table 2 presents the estimated results for entrepreneurs' education, gender and entrepreneurial team composition on worker's wages and Table 3 shows the interaction for gender on entrepreneurs' education and on the entrepreneurial team composition. Estimation of others factors affecting wages were controlled in order to verify that there is no significant changes in the coefficients when estimating the effect of entrepreneurs' education, gender and entrepreneurial team composition on worker's wages. The control measures for workers skills were gender, educational level and tenure. The control measures for firms was firm size. The results show that entrepreneur educational skills positively affects workers' wages, revealing that entrepreneurs with at least higher education, tend to reward their employees with larger wages. Although being significant, the impact of holding a doctoral degree is 2% and holding a college degree is 5%.

On the other hand, being a female entrepreneur negatively affect workers' wages. The results reveals that being a female business owner is indicative of a shorter wage premium collected by the worker. The negative impact of being female entrepreneurs is 4%.

The results concerning entrepreneur's skills and workers' wages are in line with previous empirical evidence set by Batista et al (2012) where the authors found a positive sorting between workers and entrepreneurs, that is the higher the level of education the higher wage premium for workers.

The results concerning entrepreneur's gender and workers' wages may be to some extent be explain by the already recognized fact that women start ventures that grow at a slower rate than those owned by men (Hisrich & Brush 1984). Additionally it has been also observed that, compared to males, female entrepreneurs tend to set lower business size thresholds beyond which they prefer not to expand, and to be more concerned with risks attached to fast growth (Cliff, 1998).

Regarding entrepreneurial team, firms run by with at least two entrepreneurs (entrepreneurial teams) negatively affect workers' wages, with a negative impact of 5%. The results are somewhat surprisingly given the fact labour economics literature that looks at the relationship between wages and firm size, mostly show that larger firms pay higher wages to workers (Stolzenberg, 1978; Melow, 1982). If larger firms are run by multiple business ownership (Rosa, 1999), than workers in entrepreneurial teams would be expected to earn higher wages.

**Table 2.** Worker's wages and entrepreneurs education, gender and team composition (OLS), 20016-2012

	(1)	(2)	(3)	(4)	(5)
<b>Entrepreneur</b>					
PhD	0.0171*** [0.00361]				0.0295*** [0.00366]
College		0.0185*** [0.000821]			0.0519*** [0.000872]
Female			-0.0527*** [0.000611]		-0.0412*** [0.000703]
Team (= ≥2 members)				-0.0509*** [0.000608]	-0.0462*** [0.000709]
<b>Employees</b>					
Female	-0.215***	-0.215***	-0.214***	-0.215***	-0.214***

	[0.000360]	[0.000359]	[0.000360]	[0.000359]	[0.000360]
Tenure	0.0211*** [3.47e-05]	0.0211*** [3.47e-05]	0.0211*** [3.47e-05]	0.0211*** [3.47e-05]	0.0210*** [3.48e-05]
Secondary Education	0.212*** [0.000423]	0.212*** [0.000423]	0.211*** [0.000422]	0.211*** [0.000422]	0.210*** [0.000422]
College Education	0.778*** [0.000686]	0.778*** [0.000687]	0.777*** [0.000686]	0.777*** [0.000685]	0.775*** [0.000687]
Doctoral Degree	0.941*** [0.00809]	0.941*** [0.00809]	0.940*** [0.00808]	0.940*** [0.00809]	0.940*** [0.00808]
Firm size	0.0285*** [7.06e-05]	0.0285*** [7.06e-05]	0.0280*** [7.10e-05]	0.0281*** [7.08e-05]	0.0279*** [7.10e-05]
Constant	1.138*** [0.000677]	1.137*** [0.000679]	1.144*** [0.000682]	1.144*** [0.000683]	1.145*** [0.000684]
Observations	6,016,225	6,016,225	6,016,225	6,016,225	6,016,225
R-squared	0.391	0.391	0.392	0.392	0.392

Dependent variable is the logarithm of hourly wage. Robust standard errors are in parentheses. Dummies defined for the education, gender and team variables. Tenure measured in years; firm simple measured by the number of employees. All regressions include year and business economic activity dummies. Significance level of 1% (\*\*\*), 5% (\*\*), and 10% (\*). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 3 presents separately the coefficients of the interaction variables introduced in Table 2. Because we wanted to test the moderating effect of entrepreneur gender on entrepreneur educational skills and on entrepreneurial team, three different interactions account for specific effects on workers wages. Overall, we found that entrepreneurs' education is a better predictor of higher wages, regardless entrepreneurs' gender. In fact, results suggest that the impact of entrepreneurs' educational level on wages equation is stronger than gender. Specifically when considering the interactions full model, when looking at the most qualified entrepreneurs, the impact of holding a PhD increases up to 15% on works wages, while interaction with gender becomes non-significant. In this regard, when looking at the determinants' of firms success one should account for educational entrepreneur skills, rather than gender because men and women operated in much the same way suggesting that, when looking the at the most qualified

entrepreneurs, processes underlying wages premium are similar irrespective of an entrepreneur's gender (Kalleberg & Leicht 1991).

Surprisingly, the estimation results for entrepreneurial team reveals that the fact of having a female entrepreneur in the team composition, positively impacts on workers' wages. The impact on workers' wages is 6% when a firm has at least two entrepreneurs, being one of them a women.

Despite the fact that wage premium collected by workers is higher in firms (1) with a solo ownership and (2) a male entrepreneur, when a firm includes at least two entrepreneurs and one of the members is a female entrepreneur, these tend to reward their workers with higher wages. Moreover, the coefficients remain significant when controlling for business activity and firm size, precluding an explanation based on the nature of business sector or on the number of employees on the firm.

The evidence seems to resonate with what has been highlighted as an important factor in the performance of groups. The collective intelligence is the inference one draws when the ability of a group to perform one task is correlated with that group's ability to perform a wide range of other tasks. This kind of collective intelligence is a property of the group itself, not just the individuals in it. In this regard, researchers in the business management and organizational psychology field has been examining what makes a team reliably smarter than others (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010; Engel, Woolley, Jing, Chabris, & Malone, 2014).

Woolley and colleagues (2010;2014) support the assumption that collective intelligence in the group is correlated with the proportion of females in the group.

In the light of this assumption our findings may raise many additional questions. For example, what is the role of women on entrepreneurial teams? Could a mix-sex entrepreneurial team impact on worker's long-term performance? More importantly,

could the success of an entrepreneurial venture be increased by, for example, a mixed-sex entrepreneurial team?

**Table 3.** Interaction of entrepreneurs' education, team composition and gender (OLS), 20016-2012

	(1)	(2)	(3)	(4)
<b>Entrepreneur</b>				
PhD	0.0207*** [0.00402]	0.0368*** [0.00367]	0.0361*** [0.00366]	0.156*** [0.00751]
College	0.0520*** [0.000873]	0.0316*** [0.00111]	0.0564*** [0.000876]	0.00432 [0.00828]
Female	-0.0414*** [0.000705]	-0.0542*** [0.000750]	-0.0680*** [0.000901]	-0.0166*** [0.000824]
Team (= ≥2 members)	-0.0461*** [0.000709]	-0.0430*** [0.000711]	-0.0676*** [0.000873]	0.0154*** [0.000768]
<b>Interaction terms</b>				
<b>Entrepreneur</b>				
PhD*Female	0.0289*** [0.00867]			0.001
Higher Education*Female		0.0560*** [0.00174]		0.046*** [0.00871]
Team*Female			0.0621*** [0.00142]	0.055*** [0.00143]
<b>Employee</b>				
Femmale	-0.214*** [0.000360]	-0.214*** [0.000360]	-0.214*** [0.000360]	-0.208*** [0.000777]
Tenure	0.0210*** [3.48e-05]	0.0210*** [3.48e-05]	0.0210*** [3.48e-05]	0.0138*** [5.97e-05]
Secondary Education	0.210*** [0.000422]	0.210*** [0.000422]	0.210*** [0.000422]	0.178*** [0.00101]
College Education	0.775***	0.775***	0.775***	0.635 ***

Doctoral Degree	[0.000687] 0.940*** [0.00808]	[0.000687] 0.940*** [0.00808]	[0.000687] 0.939*** [0.00808]	[0.00196] 0.617*** [0.0239]
Firm size	0.0279*** [7.10e-05]	0.0278*** [7.11e-05]	0.0277*** [7.11e-05]	0.0296*** [0.000225]
Constant	1.145*** [0.000684]	1.146*** [0.000684]	1.146*** [0.000685]	1.113*** [0.00193]
Observations	6,016,225	6,016,225	6,016,225	6,016,225
R-squared	0.392	0.392	0.393	0.403

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Discussion and Implications

In this paper we analyze whether a more skilled women entrepreneur or a mix-sex entrepreneurial team affects worker's wages. We test a model considering the education, gender and team composition of the entrepreneur on wages equation.

We use a longitudinal matched employer-employee dataset with information on workers, firms and entrepreneurs.

We provide evidence on the role of entrepreneurs' skills and on the impact on women for the entrepreneurial team. The model assumes that the higher the level of entrepreneurs' education the higher wage premium for workers, regardless entrepreneur gender.

Interestingly, the estimated model also assumes that having a female entrepreneur in the team composition, positively impacts on workers' wages. When a firm includes at least two entrepreneurs and one of the members is a female entrepreneur, these tend to reward their workers with higher wages.

To our knowledge, this is the first quantitative study that addresses the implications of gender in entrepreneurial teams regarding workers' wages reward. Despite the interest, questions regarding to the impact of a team's sex composition associated with mixed-sex teams are yet to answer (Jennings & Brush, 2013). Our empirical analysis shed

some light on the importance of looking at entrepreneurial team sex composition, as an important factor to consider for topics related to gendered entrepreneurship performance and entrepreneurial venture success. While elsewhere was found that copreneurial teams tend to possess complementary skills beneficial for success (O'Connor, et al., 2006) others claim that social interaction is a determinant of entrepreneurial team venture success (Lechler, 2001). Our empirical results seem to partially support the idea that teams of women and men are more likely to have complementary skills, insofar as rewarding their workers with higher wages, may ultimately contribute to business venture success.

It is recognized that women play an important role in the growth process of a country (Minniti et al., 2005). There is also broad agreement that new business creation is a fundamental component of the growth process (Acs, Arenius, Hay, & Minniti, 2005). If women are important for growth and entrepreneurship is important for growth, it is particularly important that we understand the impact of women on an entrepreneurial team for business growth.

Important implications can be drawn from this study, namely in the development of female entrepreneurship policies. For example, government policies can improve the regulatory environment for entrepreneurship by offering incentive programs and preferential treatment for new and small mix-sex ventures in procurement using public taxes.

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