Female Creativity in Organizations: What is the Impact of Team Composition in Terms of Gender during Ideation Processes?

La créativité des femmes dans les organisations: Quel est l'impact de la composition de l'équipe en termes de genre durant le processus d'ideation ?

La creatividad de las mujeres en las organizaciones: ¿Cuál es el impacto de la composición de género del equipo durante el proceso de las ideas?

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ABSTRACT

This paper questions the impact of team gender composition on idea generation and idea evaluation? Based on econometric analyses of evaluations of 100 product ideas proposed by 463 students, it shows that ideas supported by teams mostly composed of either males or females are as creative as ideas supported by mixed teams when they are evaluated by experts. When these ideas are evaluated by peers, the ideas supported by mixed teams are perceived as being less creative than ideas supported by teams that are predominantly composed of either males or females.

Keywords: Gender mixity, gender effects, team diversity, creative results, convergence phase of creativity

RÉSUMÉ

Cet article examine l'impact de la composition des équipes créatives, en terme de genre, sur la génération et l'évaluation des idées. Une analyse économétrique réalisée sur l'évaluation de 100 idées de produits nouveaux proposées par 463 étudiants montre que les idées proposées par des équipes majoritairement composées de garçons ou de filles sont aussi créatives que les équipes mixtes quand elles sont évaluées par des experts. Quand elles sont évaluées par des paires, les idées proposées par des équipes mixtes sont perçues comme moins créatives que les idées proposées par des équipes majoritairement composées de garçons ou de filles.

Mots Clés : Mixité de genre, diversité au sein de l'équipe, résultats créatifs, phase créative de convergence

RESUMEN

Este artículo examina la influencia que ejerce la composición de equipos creativos, en términos de género, en la generación y evaluación de ideas. Un análisis econométrico realizado sobre la evaluación de 100 ideas de nuevos productos desarrolladas por 463 estudiantes muestra que las ideas propuestas por equipos predominantemente compuestos de hombres o mujeres son tan creativas como las ideas propuestas por equipos mixtos cuando éstas son evaluadas por expertos. Cuando se evalúan por parejas, las ideas propuestas por los equipos mixtos son percibidas como menos creativas que las ideas propuestas por equipos compuestos predominantemente por hombres o mujeres.

Palabras Clave: Diversidad de género, diversidad dentro del equipo, resultados creativos, fase creativa de convergencia

Creativity is an individual or group capability that is crucial for organizations that operate in highly competitive environments (Lopez-Cabrales, Pérez-Luño & Cabrera, 2009, Cohendet & Simon, 2015). The literature broadly discusses the influences of group and organizational diversity as a means to promote creative skills and potential. Findings suggest that group diversity is critical to creative idea generation (Guilford, 1950; Milliken & Martins, 1996; Paulus & Huei-Chuan, 2000), but that diversity must be well managed (Foss *et al*., 2013), or else the organization suffers from a lack of motivation and is incapable of developing competitive advantages (Bassett-Jones, 2005). Although most studies examine diversity of functions, recent research broadens the scope of diversity, extending it to individual characteristics such as age, education, type of education, social aspects (Han, Han & Brass, 2014), and gender (Shin *et al*., 2012). Despite recent calls for more research (Woodman & Schoenfeldt, 1990; Foss *et al*., 2013), studies on the influence that team gender diversity has on creative outputs within organizations are missing. This is all the more surprising given that many studies praise the positive role of adding ideas from women for board of companies since they bring ideas for radical innovation and open new strategies of renewal (Galia, Zenou & Ingham, 2015). Other studies with a feminist bent directly show the potential positive impact that ideas generated by women could have on economic growth (Klasen & Lamanna, 2009). Despite all these results, the literature on gender creativity mostly focuses on the ideation process at the individual level, meaning how women generate new ideas and what types of new ideas women generate, and forgets idea generation and idea selection by mixed groups, or groups mostly

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composed either of females or of males. Thus, on one hand, literature on gender about idea generation by group is sparse (Díaz-Garcia *et al*., 2013) and we do not know whether gender diversity in a group influences idea generation. On the other hand, recent research suggests that it is easier to capture men's creative outputs, and that the relationship between creativity and women's ideas is not implemented in organizations to the same degree as men's (Lene, Kristin & Mikko, 2013). Moreover, the literature on team creativity, regardless its gender composition shows that participants themselves face difficulties in selecting the best ideas from an ideation process. Finally, teams often choose what they consider as the worst or merely average ideas, because of the team composition and the difficulties related to judging the intrinsic value of creative ideas (Faure, 2004; Putman & Paulus, 2009). There is therefore a call for a better understanding of the selection process of creative ideas by teams and by organizations (Girotra *et al*., 2010).

Consequently, given this call for a better understanding of how ideas are generated and selected by teams in organizations and why women's ideas are often rejected (despite their creativity), we examine the following research question: What is the impact of team gender composition on idea generation and idea evaluation? Based on econometric analyses of peer and expert evaluations of 100 product ideas proposed and defended by 463 students entering business school, we find that teams mostly composed either of females or of males are as creative as mixed teams when ideas are evaluated by experts. Moreover, we find that ideas supported by mixed teams are perceived as being less creative by peers than ideas supported by teams that are predominantly composed of either males or of females. Despite limitations, this study contributes to literature on gender and creativity in three ways. First, it partly contradicts extant literature that praises benefits of mixed teams as being more creative. Although the literature says that mixed teams are more "efficient" in finding more creative ideas, we find ideas that have been generated by mixed teams are not well perceived during the selection process. Second, it demonstrates that creative processes, more specifically the second phase of these processes (i.e. the convergence phase) are gendered, especially when a team is invited to present and support its own ideas, in other words, ideas are selected based on stereotyped judgments of group composition in terms of gender. Third, based on a sample of students from a business school (who will eventually become managers), our study suggests that there is no glass ceiling effect for ideas that are proposed by female students and, therefore, this re-questions the role of managers and stereotypes in modern organizations, and how these students develop the reflex of gender discrimination.

Literature review and hypotheses

Most attempts to theorize creative processes within groups converge on the fact that these processes are merely iterative and comprised of two intertwined phases (Lubart, 2001). The first is a divergent process to generate new ideas and perspectives to identify a problem, find a solution, and set-up an evaluation criteria (Guilford, 1950). The second is a convergent process whose objective is to evaluate and select outputs of divergent processes (Cropley, 2006; Guilford, 1950). Amabile (1988) argues that primarily individuals, and eventually small groups, conduct both phases, but her model does not consider interactions between the two, or more generally, the evaluation stage conducted by the organization. For more recent authors (Harvey, 2014; Taggar, 2002), the tricky point that requires investigation remains that of the interconnection between individuals who have often been recruited on the basis of their creative capabilities, the group that must be creative, and perhaps the organization in which the groups evolve. Following that call, our objective is to test a series of hypotheses regarding gender within these creative teams and the propensity of these teams to develop ideas that are recognized as creative by team members and by the organization.

The influence of the organization, and more precisely the organization of the workplace on individual creativity, has been well explored. Oldham *et al*. (1996) shed light on the role of the nature of supervision and control modes on individual creativity. Other studies, such as those of Perry-Smith (2006) show that the centrality of the individual and the ties he / she might have developed inside or outside organizations have a strong impact on his / her creativity. However, to date, these authors mostly refer to how individuals succeed in "getting" ideas during the divergent phase of the creative process and not during the convergent phase, when a small group has to select ideas. Within such a process, several variables have been identified as being crucial, such as the explicitness of the selection process of creative ideas (Rietzschel *et al*., 2010), but also the team composition (Somech & Drach-Zahavy, 2013) and similarities and diversity in terms of education, profession, network ties within the team, and… gender. Indeed, we argue that without denying the respective impact of all of these variables within the creative process among teams, gender plays an important role since education and profession are, in a sense, gendered variables (Goldberg *et al*., 1998). For that reason, we primarily explore the role of the gender variable, among others, within the convergent phase of creativity, and how such a role can impact team creativity. Therefore, our hypothesis firstly focuses on the creativity of the male and of the female per se, and secondly, on the role of team composition in terms of gender on the creative output of the team.

Male creativity versus female creativity: is there any difference?

The question of disparities between men and women concerning creative agility has been developed in the literature (Baer, 1997, 1998, 1999, 2008; Kaufman, 2010; Kogan, 1974). Divergent thinking is an essential element of individual creativity (Guilford, 1950), the results of which are measured by the number of ideas generated (i.e., fluency), the number of categories of ideas generated (i.e., flexibility), idea novelty (i.e., originality), and the degree of elaboration of ideas (i.e., elaboration), using the Torrance Test of Creative Thinking (TTCT) (Torrance, 1974). To date, fluency remains the most common criterion for measuring individual creative potential (Runco, 1990). However, the TTCT has some limitations. It measures individual propensity to use a divergent thinking approach, but does not measure the entire creative process. Tests of convergence thinking also exist (Lubart, Besançon & Bardot, 2011), but no study using such a test appears in the literature. A high score on the TTCT does not guarantee output creativity. In a 40-year, longitudinal study

conducted by Torrance, the TTCT explained only 21% of the variance of creative achievement quantity (Runco *et al*., 2010). In the same study, there was a difference between genders, with a canonical predictive validity correlation. Another recent study finds no difference between males and females in the relationship between TTCT scores and creative achievement in the bottom third of respondents in terms of number of public achievements (Cramond *et al*., 2005).

Most research on gender differences refer to the capacities males and females have regarding divergent thinking (Guilford, 1967), and a consensus exists regarding the minor gender difference in divergent thinking. Of 47 articles published between 1974 and 2005 on the topic (most in psychology and creativity journals), 17 studies state no difference across genders, nine conclude that some differences exist, and 17 offer mixed and ambivalent results (Baer & Kaufman, 2008). Although research suggests occasional gender differences regarding creative productivity and achievement (Baer, 2008), much of this can be explained by environmental disparities such as cultural values, social roles, sexist thinking (Helson, 1985), and access to resources (Simonton, 1994). Finally, the difference between female creativity and male creativity appears more prevalent in the convergence phase when ideas are evaluated. In this case, values and social roles in groups and organisations may strongly influence the evaluation of an idea depending on the creator's gender.

Group gender diversity and creativity

In organisations, creativity is rarely the output of a single individual, but is rooted in interactions of individuals in small groups (Woodman, Sawyer & Griffin, 1993). However, literature on group creativity performance offers ambivalent results (Paulus, 2000): Both social (enhanced by heterogeneity among groups) and cognitive stimulation lead to greater individual creativity in interactive groups (i.e., individuals interacting during ideation) than in nominal groups (i.e., individuals working alone during ideation). However, social inhibition and cognitive interference also lead to lower creativity in both interactive and nominal groups. Forcing people to work in groups is not always the most efficient way for generating and evaluating ideas (Putman & Paulus, 2009).

Diversity leads to more cognitive, knowledge and social resources in a group and, therefore, is a factor of creativity. For example, in creative cities, repeated exchanges among groups with a variety of heterogeneous actors fosters the development of new ideas (Cohendet and Zapata, 2009, Simon, 2009). However, although this high diversity positively influences divergence (Watson *et al*., 1993), it negatively affects the convergence process, leading to less creativity (Harvey, 2013). Diversity is a driver for creative fluency (Kurtzberg, 2005; Hoever *et al*., 2012), but it has its limitations: It may damage individual satisfaction of diverse group members, and, in the long run, individual creativity in terms of fluency (Kurtzberg, 2005).

From that vantage point, gender diversity might favour team creativity by fostering fluency and result in more radical innovations (Díaz-Garcia *et al*., 2013). Therefore, we develop hypotheses related to the potential influence of gender on creativity in teams. Literature on the topic is sparse (Díaz-Garcia *et al*., 2013) and the few studies conducted on gender diversity and team creativity within organizations focus mainly on a comparison between male teams and female teams (Rogelberg & Rumery, 1996). However, when gender diversity is high, firms are more likely to innovate (Østergaard *et al*., 2011). In R&D teams, gender diversity favours radical innovations (Díaz-Garcia *et al*. 2013). Gender diversity also affects decision-making (Aspesteguia *et al*., 2012) and generation of new knowledge for innovations (Østergaard *et al*., 2011), favouring a good team dynamic for creation and innovation. Moreover, the team composition – in terms of gender – has an impact on "the team decision quality" (Rogelberg & Rumery, 1996). These authors have developed an interesting mixed team approach with three cases: a predominantly female team, a predominantly male team, and a team with an equal number of men and women. Even if Rogelberg and Rumery's research is not specifically dedicated to the study of creative outputs, we think that this mixed-gender approach is applicable in any situation. Therefore, we propose the following hypotheses:

H1a: Teams comprised predominantly of males are less creative than mixed teams

H1b: Teams comprised predominantly of females are less creative than mixed teams

Female representativity and idea evaluation in creative processes

The first set of hypotheses relates to the creative performance of the team depending on gender distribution. We question the role gender plays during recognition by a group, and more generally by the organization. Here, we focus on the selection by the organization of the creative ideas proposed by the groups depending on the gender composition of these teams.

A creative session spawns many ideas, and the challenge is to select the best ones and then, of those, develop only the most interesting for the company. However, the best ideas are not systematically selected for the company (Girotra *et al*., 2010). While the participants in the creativity sessions must be capable of identifying the most creative ideas, they often have difficulty doing so (Faure, 2004; Putman and Paulus, 2009). The complexity of the evaluation process highlights the importance of finding the right criteria, of organizing the process well, and of involving the right participants.

Based on a review of the literature on the criteria for evaluating ideas, Dean *et al*. (2006) identify the four most important criteria: newness, feasibility, relevance, and idea specificity. The newness of an idea can be estimated from its degree of originality and its paradigm relatedness. The feasibility of an idea can be estimated from its social acceptability and its technical implementability. The relevance of an idea can be estimated from its applicability to a problem and its effectiveness in solving that problem. The specificity of an idea can be estimated from its implicational explicitness and the completeness of its description. Relevant criteria are dependent on the context of creative sessions and strategic aims. Nevertheless, intuitive evaluation by experts can be explained, in part, by using three unconscious criteria: originality, user value and producibility (Magnusson *et al*., 2014). Originality, feasibility and relevance are thus the most used explicit and implicit criteria in creative sessions (Dean *et al*.,

2006; Magnusson *et al*., 2014). Regarding the impact of participant profiles in a creative session, most research highlights the positive impact of diversity on creative performance in the idea generation phase (Ely & Thomas, 2001; Gassman, 2001). Highly diverse groups thus propose not only more ideas than the other groups, but also ideas more useful for the organization (Amabile, 1988). However, idea evaluation is a key phase of the creative process where male-generated ideas and female-generated ideas are potentially assessed differently. Research shows that men and women are not evaluated identically in organizations: Female narcissist leaders are perceived as less effective than male narcissist leaders when male subordinates serve as assessors (De Hoogh, Den Hartog & Nevicka, 2015). Moreover, chairmen are less satisfied with female board members in comparison to male board members (Brunzell & Liljeblom, 2014). Literature on creativity is not prolific on the subject, but we argue that the degree to which a woman has to impose ideas refers to a type of leadership effect and the judgment one may have with regard to her ability to propose creative ideas. We follow assumptions offered by Reuvers *et al.* (2009), according to whom "employees report more innovative behaviour when the transformational leadership is displayed by male in comparison with female managers, confirming (the) gender bias hypothesis" (p. 227). This bias exists during evaluation of new business ideas regarding male-type venture ideas: ideas are scored higher when modern sexism[1] is high among female evaluators (Gupta & Turban, 2012). The more a team is comprised of males, the greater the chances that its ideas are recognized as creative by the organization. Within the organization, creative ideas are trapped and selected differently depending on the context, namely if the creative solution is expected to solve an identified problem or not (Unsworth, 2001). Within a project or creative session when the group has to develop creative ideas to solve a concern, the selection process is mostly done by the project members (Drazin *et al*., 1996), thus by peers. In this context, gender diversity may influence peers' idea evaluation. Therefore, we propose the following hypotheses:

H2a: Peers evaluate ideas proposed by predominantly male teams as being better than ideas proposed by mixed teams.

H2b: Peers evaluate ideas proposed by predominantly female teams as being less good than ideas proposed by mixed teams.

H2c: Peers evaluate ideas proposed by predominantly female teams as being less good than ideas proposed by predominantly male teams.

Research design

According to protocols conducted when considering individual and organizational creativity, the hypotheses were tested on ideas generated by groups of students (Perry-Smith, 2006; Rietzschel, Nijstad & Stroebe, 2010) during an innovation contest.

Data

Our study is carried out on a sample of 463 students (227 males and 246 females) between 19 and 21 years of age, 21% of whom are receiving an academic scholarship. These students entered the Business School via two paths: either after two years in preparatory school (71%) or directly from a university (29%). The data were collected during the first week of the program, meaning that students had never previously worked together and did not yet know each other well. During this week, students participated in an introductory creativity class via an innovation contest. One hundred nine teams of four or five members were randomly formed, and assigned to 16 classrooms to compete with each other. Following protocols previously implemented for work on female representation by teams (Hirschfeld *et al*., 2005), we confirmed that our teams were: predominantly male (with a minority of females), predominantly female (with a minority of males), or mixed (equal male / female representation). For the sake of representativeness, we removed a low number of unisex teams from our sample (4 male and 5 female teams). Our final sample includes 100 teams (36 teams of 4 students and 64 teams of 5 students) whose distribution in terms of gender composition is provided in table 1.

TABLE 1
Team composition

		Number of females			
		1	**2**	**3**	**4**
Number of males	**1**	-	-		
	2	-	15		
	3	10	21	-	-
	4	6	-	-	-

Number of Female Dominant Teams: 48; Number of Equally mixed Teams: 15; Number of Male Dominant Teams: 37

The different exercises given to students were set up in such a way that they could experience and therefore understand what a creative process is. First, each student was asked to participate in a creativity game: "You have three minutes to give as many ideas as you can on what you can do with a sheet of paper" in order to measure individual creative ability. Then, each team was invited to participate in an innovation contest consisting of proposing a new product. Within each team, each student was asked to propose at least one idea to answer a problem statement, and complete a template that briefly explained the idea. Finally, the team selected one idea to promote. The other teams (i.e., peers) in the same classroom evaluated the ideas after a short presentation. Each student had three stickers and used them to individually vote for the best idea, thus peer evaluation was tallied in terms of votes (i.e., stickers) garnered for each promoted idea. In order to enhance the students' motivation and to implicate them in this creative process, we set up a real contest: the "best" ideas of each class were identified and presented to top managers from companies that proposed gifts, and potentially internships. Three innovation experts who were completely unaware of the teams' characteristics assessed the 100 promoted ideas based on three criteria—originality, feasibility, and user value—using a 5-point, Likert-type scale. By experts, we refer to professors and consultants in innovation management who are accustomed to identifying the potential

1. In modern sexism, the sentiments of masculine superiority are enacted in subtle and indirect ways.

TABLE 2
Descriptive statistics

	Experts' evaluations				Peers' evaluations			
	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.
Male dominant teams (N=37)	5.5	11.25	8.61	1.45	2	36	15.97	8.12
Equally mixed teams (N=15)	6.25	11.25	8.65	1.29	3	17	7.66	4.46
Female dominant teams (N=48)	6.75	11.75	8.74	1.08	1	31	14.89	7.52

of innovative ideas. Pearson's correlations were calculated, and inter-rater agreement among the three experts reached an acceptable level (>.7). Thereafter, the expert's evaluation was calculated as the average of scores given by the three experts for each promoted idea.

Variables and measures

Dependent variables. The dependent variables are the measures of creative performance of promoted ideas according to peer (number of votes) and expert (average scores) evaluations.

Explanatory variables. As our hypotheses are related to the teams' gender diversity, two dummy variables were created to account for team composition. The first dummy (male dominant teams) was assigned a value of 1 if the number of males in a team is higher than the number of females, and zero otherwise. The second dummy (female dominant teams) takes a value of 1 if the number of females in a team is higher than the number of males, and zero otherwise. Thus, teams where the number of males is equal to the number of females (equally mixed teams) were considered as the reference category.

Control variables. Our analysis includes several control variables. First, we controlled for the team creative ability, which is simply the average of individual creative ability scores in a team obtained from the creativity game described above. As we have only two different team sizes, we used a dummy variable (team size) equal to 1 if the team had 5 members and 0 otherwise (i.e. 4 members). As there are two ways to enter the Business School, we counted the number of students coming from preparatory schools in the team in order to capture the academic trajectory effect on the creativity performance. In the same logic, we controlled for social background by counting the number of scholarship students in a team.

Research Results

First, the descriptive statistics of the creativity performance of promoted ideas according to the experts' (blind evaluation) and peers' evaluations (non-blind evaluation) are reported in table 2.

To test our hypotheses, we run two multiple linear regressions in order to estimate the effect of team composition on the creativity performance according to peers' and experts' evaluations, considering as baseline category the equally mixed teams. Estimated parameters are given in table 3. On one hand, the expert evaluations of ideas suggest that the team's gender diversity has no effect on idea creativity, meaning that there is no creativity difference comparing female dominant teams or male dominant teams to equally mixed teams. Thus, H1a and H1b are not supported. On the other hand, we find that the creativity performance is influenced positively by team composition when peers assess the ideas, in favour of gender dominant teams (β=6.84, $p<.05$ and β=6.34, $p<.05$). Consequently, peers perceived ideas of male dominant teams and female dominant teams as better than those of equally mixed teams, as expected in hypothesis H2a but not H2b. Regarding control variables, no significant relationship was detected between a team's creative ability and creativity performance in both models, nor in terms of team size, i.e. there is no difference in terms of creativity on average between 4-member and 5-member teams. However, students coming from a preparatory school seem to lower the team's creativity performance as perceived by peers (β=-0.81, $p<.10$), which is not the case with students receiving an academic scholarship (β=1.47, $p<.10$).

TABLE 3
Determinants of creative performance according to experts' and peers' evaluations

	Experts' evaluations	Peers' evaluations
Constant	7.83***	3.33
	(0.73)	(3.58)
Team creative ability	0.04	0.42
	(0.06)	(0.28)
Team size	-0.06	2.50
	(0.30)	(2.08)
Preparatory schools	0.01	-0.81*
	(0.11)	(0.44)
Academic scholarship	0.21	1.47*
	(0.18)	(0.75)
Male dominant teams	0.04	**6.84****
	(0.44)	(2.51)
Female dominant teams	0.26	**6.34*****
	(0.45)	(1.95)
Observations	100	100
R^2	0.03	0.20

Note: Robust standard errors in parentheses; Base category is equally mixed teams

*** p<0.01, ** 0.01<p<0.05, * 0.05<p<0.10

To deepen our analysis, we split the two categories related to team gender dominance into two subcategories depending on the degree of dominance. Consequently, we end up with four categories in addition to the equally mixed team which is still considered as the baseline category. As such, we created a dummy

variable (Pronounced female dominant teams) equals 1 when we have one male and 3 or 4 females per team and 0 otherwise. The second dummy variable (Moderate female dominant teams) takes on 1 when we have 2 males and 3 females per team and 0 otherwise. Likewise, we added two other dummies: Pronounced male dominant teams and Moderate male dominant teams are based on the same logic (descriptive statistics are reported in table 4).

The results in table 5 show that the same conclusion holds for the expert's evaluation, however, it is worthwhile to notice that the significant difference between equally mixed and gender dominant teams is conditional on the degree of gender dominance when it comes to peers' evaluations. In other words, the ideas generated by pronounced male dominant teams as well as pronounced female dominant teams are better perceived by peers than those generated by equally mixed teams (β=7.33 and β=5.90, $p<.05$, respectively), however, this difference is not significant for moderate gender dominant teams, whether male or female.

To test hypothesis H2c, we focused only on ideas generated by pronounced gender dominant teams (41 observations instead of 100) in order to compare the creativity performance of the pronounced male dominant teams and the pronounced female dominant teams which is taken as the reference category. According to peers' evaluations, the results in table 6 do not show any statistical difference between the two team's gender compositions in terms of creativity, which leads to rejecting hypothesis H2c.

One other finding from these analyses is noteworthy. From tables 3 and 5, the reader will note that based on the experts' evaluations, the R^2 values for the creative performance are lower than those based on peer evaluations. These results are consistent with the insignificance of the independent variables, specifically the ones related to team composition.

Discussion

We discuss our results through three main debates. The first debate is linked to the interpretation of these results per se. The second debate centres on the role played by the control variable "Scholarship". The last debate focuses on the place of these results in the broader picture of discrimination against women within the business life.

The first debate around these results deals with the following question: what do these results bring to the understanding of the creative process contingent on team composition in terms of gender? On one hand, our findings show that teams predominantly composed of women and teams predominantly composed of men are as creative as mixed teams, which contradicts the study in Applied Psychology interested in Gender Faultiness and its impact on Team Creativity (Pearsall *et al*., 2008). In this study, Gender Faultiness (the fact that there is the same number of men or women in a team) negatively affects the number and overall creativity of ideas. However, the Pearseall study teams were either mixed or composed of men or women. We can interpret the difference in results by the difference in group composition. Our findings also contradict other study results on gender and its impact on team creativity such as Han *et al*. (2014) who also conducted their analyses on 36 student teams within a business school. We can interpret the difference in results on two main levels. The first level is related to the nature of the sample: Han *et al*. worked with MBA student teams and we worked with Bachelor student teams: work experience, background, etc., might differ across samples. The second level is linked to the object of the study: Han *et al*. refer to diversity of capital (mixing rich team members with poorer team members) among teams and its link to creativity. Without denying these results, our study is specifically focused on gender diversity. Moreover, as discussed in the coming paragraphs, our results also tend to confirm that diversity of capital might have an impact on team creativity.

On other one, our findings show that teams predominantly composed of women and teams predominantly composed of men have greater chances of getting their ideas adopted than do mixed teams, which contradicts the study by Gupta and Turban (2012) about the evaluation of new business ideas. In our study, we did not control for the presence of the male stereotype in our sample. It is possible that the degree of "modern sexism" was low among the students of our sample. We can also explain the difference between previous research and our results by referring to the literature on gender and pedagogy. Most educational research suggests that young female students perform better in school than their male counterparts (Dumais, 2002). However, the presence of a woman in a group can be interpreted as a sign of stereotyped judgement. In this study, the students had just entered a program in management science, not engineering science, and the ideas tested linked most commonly with soft, social, and use innovations. Students might perceive that such innovations are associated with female tastes or competencies. Such interpretations accord with extant research related to gender judgements and higher evaluations for poems written by females (Kaufman, 2010). These results can be explained by the fact that writing poems is perceived to be a female task (Eagly, Makhijani & Klonsky, 1992). In contrast,

TABLE 4
Descriptive statistics

	Experts' evaluations				Peers' evaluations			
	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.
Pronounced female dominant teams (N=25)	6.75	11.75	8.94	1.07	1	31	15.08	8.57
Moderate female dominant teams (N=23)	7.25	11.25	8.52	1.08	6	26	14.69	6.37
Mixed teams (N=15)	6.25	11.25	8.65	1.29	3	17	7.66	4.46
Moderate male dominant teams (N=21)	5.5	11.25	8.32	1.57	5	36	15.66	7.47
Pronounced male dominant teams (N=16)	7	11.25	9.00	1.23	2	35	16.37	9.14

proposing ideas of innovation, and moreover, technical ideas of innovation, might be considered as a male task (Bourdieu, 2002). When teams are comprised predominantly of males, perceptions of male creativity overshadow perceptions of female creativity. Therefore, this study is calling for more research in other contexts, not specifically within a business school, where teams are usually mixed in terms of gender, but within engineering schools, which traditionally welcome more males than females or, conversely, within nursing schools where students are predominantly female. Conducting similar research on creativity in these three types of contexts should either lead to worse results within engineering schools (namely, that female generated ideas should suffer more from a sort of discrimination than in our sample), or confirm that discrimination against creative ideas can vary, regardless the context, depending on the team's composition in terms of gender.

These results can also raise a second debate: How can we explain that "academic scholarship" as control variable impacts results? Without invalidating our main results, our statistics also show that ideas that are proposed by teams including students who benefit from an academic scholarship are better evaluated by peers. Academic scholarships are attributed to students (who submit an application based on financial need) at the age of 18 by the French State which has no relation with the business school. These scholarships take into account students' academic levels and social origins, i.e. parental revenues and resulting taxation. In our case, the great majority of the students receiving a scholarship did not study in preparatory schools. We can assume that these students possess a different profile than students coming from a preparatory school, bring more diversity to the group in terms of experience, social background and knowledge, which might enhance the creativity of their ideas. Therefore, they might have proposed innovation ideas that were perceived as original by the vast majority of students, those who mostly studied economics and mathematics in preparatory schools. Such an interpretation is consistent with some literature about homogeneity of groups and its impact on creativity (Fleming at al., 2007): Team members who had different experiences, and therefore, developed different networks, tend to produce divergent ideas within the team that can be considered as original.

The third debate is especially related to the nature of the sample. The sample was not comprised of firm employees, but instead of young students with little work experience. Therefore, we could discuss generalization of results to situations in firms and, more precisely to the emergence of rejection of ideas that are raised either by women individually, or by predominantly female teams. Our results show there is no significant difference in terms of creativity between teams that are predominantly composed of women and teams that are predominantly composed of men, even if the descriptive statistics (table 2 and table 4) suggest that ideas from predominantly female teams are slightly better according to peer evaluation.

This result partly differs from the findings of Baer and Kaufman (2008), who argue that respective creativity of males and females is equal in terms of intrinsic creativity, but different in terms of extrinsic creativity (i.e., performance). Differences in terms of the respective samples on which the two studies are based might explain divergent results. Our sample was comprised of students in their first year of a three-year Bachelor's degree program, a program that provides general training and education in management. It welcomes students

TABLE 5
Determinants of creative performance according to experts' and peers' evaluations

	Experts' evaluations	Peers' evaluations
Constant	7.77***	3.19
	(0.70)	(3.43)
Team creative ability	0.04	0.41
	(0.06)	(0.27)
Team size	0.51	4.06*
	(0.39)	(1.99)
Preparatory schools	0.05	-0.71
	(0.09)	(0.49)
Academic scholarship	0.19	1.43*
	(0.18)	(0.72)
Pronounced male dominant teams	0.25	**7.33****
	(0.44)	(2.65)
Moderate male dominant teams	-0.87	4.41
	(0.63)	(2.83)
Moderate female dominant teams	-0.49	4.22
	(0.57)	(2.45)
Pronounced female dominant teams	0.09	**5.90****
	(0.49)	(1.99)
Observations	100	100
R^2	0.09	0.21

Note: Robust standard errors in parentheses; Base category is equally mixed teams

*** p<0.01, ** 0.01<p<0.05, * 0.05<p<0.10

TABLE 6
Determinants of creative performance according to peers'evaluations

	Peers' evaluations
Constant	12.78***
	(3.80)
Team creative ability	0.29
	(0.43)
Team size	4.38*
	(2.22)
Preparatory schools	-1.34
	(1.11)
Academic scholarship	1.01
	(0.96)
Pronounced male dominant teams	1.18
	(2.09)
Observations	41
R^2	0.12

Note: Robust standard errors in parentheses; Base category is Pronounced female dominance teams

*** p<0.01, ** 0.01<p<0.05, * 0.05<p<0.10

of both genders, who expect to find a good management job after graduation, and who potentially have no pre-conceived notions about the professional managerial universe. Baer and Kaufman's (2008) sample was comprised of people already in professional positions that might be gendered. In our sample, female students might not face traditional constraints that they could face in companies. That explanation is consistent with Baer and Kaufman's (2008) conclusion—women are less creative than men in terms of performance in companies since they do not have access to the same resources (Baer, 1999). Regarding our sample, we assume this is not the case since students have access to the same resources in college. Recruiting in business schools considers students who are eager to interact with others, are flexible and are risk-takers, qualities that are requested of individual creators (Esfahani *et al*., 2012; Herman & Reiter-Palmon, 2011). According to this logic, business schools recruit creative students, regardless their gender.

Results also point out that to be selected by an organization, creative ideas must be promoted and supported by a mixed-gender team of people with a majority of men or a majority of women, but not by a purely mixed team. This finding is inconsistent with some research mentioned in literature reviews (Reuvers *et al*., 2008) implying companies are to blame for developing gender segregation. Since the students that comprised our sample do not tend to select ideas based on gender biases, gender segregation or stereotyped constructs regarding who should be more creative, it seems that these notions are developed during late stages of education or within companies.

Conclusion: Contribution, limitations and further research

Contributions

Despite its limitations, this study contributes to literature on gender and creativity in two ways. First, it partly contradicts extant literature that praises benefits of mixed groups as being more creative. The literature argues that mixed groups are more "efficient" in finding more innovative ideas, but our results indicate that the creative level of ideas generated by mixed groups is not well perceived during the selection process. It demonstrates that creative processes, and furthermore, the second phase of these processes (i.e. the convergence phase) are gendered, especially when a team is invited to present and support its own ideas, and when ideas may be selected based on stereotyped judgments of group composition in terms of gender. So, this research reopens the debate: It proposes a study about the impact of gender diversity among teams on team creativity by introducing the distinction between the two intertwined phases of the creative process (Lubart, 2001). Most previous research does not follow this distinction and seems to primarily focus on the nature and quality of ideas per se that are proposed by men and women respectively within a team, so, to a certain extent to what each team member, regardless their gender, is capable of creating. Here, we open a new research branch by focusing on how peers and experts judge the creativity of these teams, depending on their composition in terms of gender. As far as we know, and as we previously mentioned in the literature review, few studies focus on how ideas are judged depending on those who present them. This is extremely surprising, since the perception of group efficacy depending on gender representation is established in the literature in psychology (Hirschefeld *et al*., 2005). This is even more surprising since the literature on entrepreneurship, established decades ago that the judgment of any business project by founders is mostly based on a judgment of the potential entrepreneur (see Hall & Hoffer, 1993 for instance). Therefore, this paper contributes to the debate on the topic of gender and entrepreneurship and more precisely to research on entrepreneurial teams. Most studies acknowledge that entrepreneurs hardly create alone, but rather in teams. Previous studies show that the effectiveness of such teams does not change across gender (Chowdhury, 2005). However, here, by showing that the external judgment of team creative output varies according to team composition in terms of gender, our study counterbalances these results: maybe the effectiveness of the entrepreneurial team does not depend on its composition, but the creative outputs of this creative team, as judged by external stakeholders does: Financers can judge the potential of any creative idea that is proposed by an entrepreneurial team depending on the team composition (in terms of different variables such as age or background, but also gender).

Second, due to the sample, based on students from business schools (future managers), the study suggests that there is no glass ceiling effect of ideas that are raised by predominantly female groups, therefore, it re-questions the role of managers and stereotypes within modern organizations and how these students develop the reflex of gender discrimination. Do they develop it during their late stage education process? By organizations? How?

Limitations

As does any research, this study suffers from limitations. The first limitation is the context of the study, and more specially the French context. In order to focus on the gender variable, we selected a French Business School and students who had all been educated in the French system, and more precisely, French "Classes Préparatoires", a specific two-year program that most students attend before entering the 3rd year of a Bachelor's Program within the French "Grandes Ecoles". Therefore, the question we can raise concerns the impact on our results of such an educational program within such a national context. Would we have obtained similar results if the study had been conducted in another national context? Formulating such an assumption would be consistent with the results of recent research on creativity across European countries that show that the creative level of individuals at work is higher in Northern and Eastern Europe than in other places on the continent (Lorenz & Lundvall, 2010). However, these authors also mention that the level of education contributes to the higher creativity of these individuals. Therefore, other studies claim that such results may be more linked to national efforts to promote creativity (Torrance, 1992) than to individual characteristics per se. In this vein, we assume that the context of our sample may have an impact on creative agility, but not necessary on the selection of creative ideas based on the composition of the creative team in terms of gender. The French culture is rather masculine (Bourdieu, 2002), but is not alone in this respect (Hausman *et al*., 2009), and this type of culture could be common in international firms.

A second limitation around this same topic is that the assessment process of the creative ideas was conducted differently

by the experts and by the peers. Indeed, we decided that three experts evaluate the creative ideas the same way they usually do when reviewing and assessing ideas professionally (Dean *et al*., 2006). Because our panel is comprised of students, we should not use the same process with young students since they had to learn first how to assess creative ideas (Lindström, 2006). However, implicitly, by giving a more synthetic score to creative ideas, they evaluated ideas that they unconsciously considered to be original, feasible, and valuable to users, criteria that are usually used to assess any creative idea (Le Loarne & Blanco, 2009; Magnusson *et al*., 2014).

Further research

Beyond these contributions and limitations, we argue that this study opens the door to three different directions on the topic of gender and team creativity. First, it calls for a more comprehensive study on how judgement of creative ideas really operates, and the impact of team composition in terms of gender in this process. We also call for further study that could better examine this same selection process by focusing on the profile of the assessors, and especially their gender. This call would be consistent with similar calls such as that by Gupta *et al*. (2014) who show that the perception of business opportunities differs across gender. Our study is conducted within a business school where women are equally represented. Following the call of Hirschfeld *et al*. (2005) who developed their study within a context where women are under-represented (the military sector), this study calls for similar analysis in different contexts, moreover, in engineering schools where women represent only slightly more than 30% of the total student population.

Second, by showing the impact one control variable might have on our results – academic scholarship and, the social and financial background of students - this study calls for other studies that question the respective role of gender, social origin and other variables of team members in the evaluation process.

Finally, and following what we presented in the "contribution" section, this study can also be implemented on cases of entrepreneurial teams, focusing on how external stakeholders (bankers for instance) judge the quality of creative ideas that are presented by an entrepreneurial team, depending on the gender composition of this team.

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