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SHORT RESEARCH NOTE

School as a Zero-Sum Game between Boys and Girls: Gender Differences in Perceptions

Alyson Sicard and Delphine Martinot

Several studies have reported the existence of a gender gap in academic achievement in favor of girls (Voyer & Voyer, 2014). The present study aims to investigate students' perceptions of the actual pattern of achievement by assessing their zero-sum beliefs (ZsB)—their tendency to perceive school as a zero-sum game between boys and girls. Based on previous studies showing that a threatening intergroup context influences men's perception of gender relations, we hypothesized that boys, but not girls, are more likely to endorse gender ZsB regarding school in a threatening academic context compared to less threatening contexts. The academic context was manipulated using short texts emphasizing either boys' or girls' academic achievement. As expected, the threatening intergroup comparison context led boys (but not girls) to endorse greater ZsB. Implications for achievement-related outcomes and gender relations are discussed.

Keywords: zero-sum beliefs; gender competition; academic context

In the field of education, many studies report the existence of a gender gap in academic achievement. Girls appear to be more successful than boys, at least in primary and secondary education. Girls earn better grades than boys, who are likely to experience school lag (e.g., Voyer & Voyer, 2014). The present study investigates whether students, especially boys, perceive girls' academic success as being related to boys' difficulties in examining their gender zero-sum beliefs in the academic context.

Zero-sum beliefs (ZsB) are beliefs that interpersonal or intergroup relations work as a zero-sum game (e.g., poker), meaning that one's gains imply losses for others. ZsB represent the cognitive underpinnings of perceived competition (Esses, Jackson & Armstrong, 1998). Previous studies on discrimination showed gender differences, with men endorsing greater ZsB than women (e.g., Ruthig, Kehn, Gamblin, Vanderzanden & Jones, 2017). Unlike women, men see decreasing discrimination against women as related to increasing discrimination against men (Kehn & Ruthig, 2013). As a high-status group, men have more to lose from changes in society, so threats to the ingroup's position can lead them to see intergroup relations as a zero-sum game more than women do. Indeed, men endorse greater gender ZsB in a threatening intergroup context; whereas, women's endorsement of gender ZsB is not affected by the intergroup context (Wilkins, Wellman, Babbitt, Toosi & Schad, 2015). Although such results were obtained among men regarding perceived discrimination, we suggest that boys are likely to develop ZsB in other

threatening competitive contexts, such as educational contexts. Indeed, girls are likely to be seen as relevant competitors for boys, especially as they are more academically successful.

According to the instrumental model of group conflict (IMGC) (Esses et al., 1998), the endorsement of ZsB is driven by the salience of a relevant competing outgroup and the perception of limited access to valued resources (resource stress). Although IMGC was developed to understand attitudes toward immigrants, it was later applied to gender relations (Wilkins et al., 2015) and can be extended to less tangible resources (Esses, Dovidio, Danso, Jackson & Semanya, 2005). According to this model, resource stress is influenced by three factors: real or perceived scarcity of resources, their unequal distribution among groups, and the desire for the unequal distribution of resources (Esses et al., 2005). In the academic context, valued resources primarily consist of the indicators of academic achievement (e.g., good grades).

First, good grades are likely to be perceived as scarce resources. Indeed, when many good grades have already been distributed, students predict bad grades for the next students (Meegan, 2010). Students spontaneously react as if the amount of good grades available is limited. Thus, they spontaneously believe that grade distribution follows a zero-sum pattern. The widespread use of normative grading (OECD, 2013) is likely to increase such beliefs. Indeed, research shows that the higher the class average, the lower the evaluation of a student (Dompnier, Pansu & Bressoux, 2006), which could lead students to perceive that good grades are limited and scarce as their attribution depends on other students' performances.

Second, good grades are unequally distributed between boys and girls, with girls generally outperforming boys at school (Voyer & Voyer, 2014).

Third, compared to girls, boys are more oriented to social dominance (Chazal & Guimond, 2003), which is related to the desire for an unequal distribution of resources (Esses et al., 1998; Pratto, Sidanius & Levin, 2006). Consequently, boys might perceive that they have limited access to valued resources in education. Therefore, the educational setting and actual gender gap in achievement, which represents a threatening gender comparison, seem to create favorable conditions for boys to perceive school as a zero-sum gender competition. We hypothesize that when such a threatening comparison context is made salient (i.e., girls outperform boys), boys will endorse more gender ZsB than when less threatening academic contexts are made salient. Based on Wilkins et al.'s (2015) results among women, girls' ZsB should be less influenced by the academic context.

Method

Participants

Our sample comprised 224 students (117 girls, 102 boys, 5 with no indication; $M_{\text{age}} = 12.52$, $SD = 0.67$) in seventh ($N = 138$) or eighth ($N = 85$) grade (one missing information), enrolled in three different French middle schools, including two public schools (representing 16% of participants) and one private school. In France, only private schools charge tuition fees, so their students are less likely to come from disadvantaged socioeconomic backgrounds. All authorizations from school directors and students' parents were provided.

Procedure

The study, described as investigating students' opinions about school and academic achievement, was conducted in classrooms in the presence of an experimenter. As research shows that men tend to be more competition-oriented than women (e.g., Niederle & Vesterlund, 2007), we decided to control for interindividual competition. Therefore, we first assessed students' endorsement of interindividual ZsB. Students were then asked to read a short text and were randomly assigned to one of the following conditions: the threatening comparison condition, low-threatening comparison condition, and no-comparison (control) condition. The comparison context was manipulated by emphasizing the academic success of students' ingroup (low-threatening context) or outgroup (threatening context). In the threatening condition, the outgroup was described as outperforming the ingroup at school (e.g., male [female] participants read about girls [boys] being more successful than boys [girls] at school); whereas, in the low-threatening condition, the ingroup was presented as more successful than the outgroup. In the no-comparison condition, the text presented statistics concerning the choice of a foreign language, which showed that English language was the most frequent choice. Because middle school French students freely make such a choice, this text constituted a relevant (but noncompetitive) topic for them. After answering the manipulation check questions,

the participants completed a gender ZsB scale and were asked to provide demographic information (e.g., gender). Finally, they were carefully debriefed and thanked for their participation.

Measures

Interindividual zero-sum beliefs. Through a six-item scale ($\alpha = .78$) adapted from Rozycka-Tran, Boski, and Wojciszke (2015), the participants rated the extent to which they think that one student's academic achievement is made at the expense of others (e.g., *School is like a tennis game; a student succeeds only when others fail.*).

Intergroup context manipulation checks. To ensure that the experimental manipulations were efficient, two items were created ($\alpha = .65$) to assess the extent to which students think boys and girls have the best results at the baccalauréat (e.g., *At the baccalauréat, the students who have the best results are girls [boys]*).

Gender zero-sum beliefs. Seven items, adapted from Wilkins et al. (2015), assessed the endorsement of gender ZsB toward school (e.g., *When girls are among top students, they take over from boys*) ($\alpha = .77$).

For all measures, response options ranged from 1 (strongly disagree) to 7 (strongly agree).

Results

Interindividual Zero-sum Beliefs

A regression analysis was conducted using a bootstrap approach (based on 5,000 bootstrap replicates) due to the violation of normality assumption. The model included gender (coded -0.5 for boys and 0.5 for girls), school grade (coded -0.5 for seventh grade and 0.5 for eighth grade), school type (coded -0.5 for public school and 0.5 for private school), and their interaction terms as predictors. As private schools generally gather students from higher socioeconomic backgrounds than public schools, we controlled students' socioeconomic status through the type of school in which they are enrolled. The analysis revealed that students endorsed interindividual ZsB more in private schools ($M = 2.32$, $SD = 1.24$) compared to public schools ($M = 2.07$, $SD = 0.79$), $B = 0.32$, $SE = 0.17$, BCa 95% CI $[0, 0.63]$, $p = .05$.

Manipulation Check

The responses to the item referring to boys were subtracted from the item referring to girls to compute a new variable for which the higher the score, the more the participants believed that girls outperform boys at school. Controlling for school grade and school type, the results showed that—consistent with the induction—the participants were less likely to think that girls outperform boys at school when confronted with boys' academic achievement ($M = -0.41$, $SD = 0.22$) compared to exposure to girls' achievement ($M = 0.89$, $SD = 0.25$) or the control condition ($M = 0.32$, $SD = 0.21$), $F(2,196) = 7.95$, $p < .001$, $\eta_p^2 = .07$. There was no interaction between induction and gender, suggesting that the male and female participants did not differ in their perceptions of the context manipulation. Additional analyses comparing how the participants perceived boys' and girls' success within each

condition showed that in the condition of the academic superiority of boys, they perceived no differences between boys ($M = 4.08$, $SD = 1.19$) and girls ($M = 3.84$, $SD = 1.34$), $t(73) = -1.45$, $p > .1$, *ns*. Similar to the result obtained in the condition of the academic superiority of girls ($M_{\text{GIRLS}} = 4.44$, $SD_{\text{GIRLS}} = 1.51$; $M_{\text{BOYS}} = 3.64$, $SD_{\text{BOYS}} = 1.13$; $t(71) = 4.14$, $p < .001$), the participants in the control condition believed that girls ($M = 3.70$, $SD = 1.66$) outperform boys ($M = 3.42$, $SD = 1.47$) at school, $t(76) = 2.45$, $p = .02$. Thus, the participants spontaneously believe in girls' academic superiority.

Gender Zero-sum Beliefs

We conducted a regression analysis with gender, two contrast variables, school grade, school type, and their interaction terms as predictors. Contrast variables were created to compare the different academic contexts. One variable

Table 1: Means and standard deviation (in parentheses) in endorsement of gender ZsB.

	Male students	Female students
Threatening comparison	2.75 (1.18)	2.21 (1.11)
No comparison	2.33 (1.16)	2.44 (1.14)
Low-threatening comparison	1.99 (0.88)	2.38 (1.10)

(C1) contrasts the threatening gender comparison context with the other two contexts; whereas, the other variable (C2) contrasts the low-threatening context with the control context. Due to the violation of the normality assumption, a bootstrap approach was used again. The analysis revealed a significant interaction between gender and the comparison context (C1), $B = -0.32$, $SE = 0.11$, BCa 95% CI $[-0.55, -0.12]$, $p = .003$. As hypothesized, the male students endorsed ZsB more in the threatening context than in the other two contexts ($B = 0.19$, $SE = 0.10$, BCa 95% CI $[0.02, 0.40]$, $p = .04$); whereas, the female students' beliefs did not differ across the comparison contexts $p > .10$, *ns* (see **Table 1**). The difference between the low-threatening context and the control condition (C2) was not significant, $p > .10$, *ns*. Moreover, seventh graders ($M = 2.46$, $SD = 1.20$) endorsed greater gender ZsB than the eighth graders ($M = 2.14$, $SD = 0.93$), $B = -0.61$, $SE = 0.24$, BCa 95% CI $[-1.11, -0.16]$, $p = .006$. As illustrated in **Table 2**, all these effects remained significant when controlling for interindividual ZsB.

Discussion

The present study aimed to investigate the impact of a threatening academic context on students' perception of academic gender relations through their endorsement of ZsB. As expected, the male students, but not the female students, endorsed greater gender ZsB in a threatening

Table 2: Summary of regression analysis predicting gender ZsB, controlling for interindividual ZsB.

Model	B	Standard error	Significance level	Confidence interval	
				Inferior	Superior
C1	0.02	0.07	.72	-0.10	0.19
C2	-0.10	0.11	.31	-0.31	0.11
Gender	0.08	0.22	.68	-.39	.48
School type	-0.18	0.20	.35	-0.61	.19
School grade	-0.59	.23	.005	-1.10	-0.21
Interindividual ZsB	0.51	0.13	.000	0.24	0.75
C1*Genre	-0.34	0.10	.001	-0.55	-0.17
C2*Genre	0.08	0.17	.65	-0.27	0.42
C1*Type	0.16	0.15	.21	-0.19	0.41
C2*Type	0.08	0.22	.72	-0.35	0.51
C1*Grade	-0.09	0.10	.38	-0.31	0.08
C2*Grade	-0.08	0.17	.66	-0.40	0.26
C1*ZsB	0.03	0.04	.44	-0.05	0.10
C2*ZsB	-0.06	0.07	.37	-0.18	0.08
Gender*Type	-0.17	0.44	.67	-0.96	0.77
Gender*Grade	0.25	0.22	.38	-0.27	0.79
Gender*ZsB	0.24	0.12	.03	0.02	0.48
Type*Grade	0.55	0.44	.18	-0.18	1.58
Type*ZsB	-0.27	0.27	.25	-0.78	0.27
Grade*ZsB	-0.09	0.13	.44	-0.35	0.15

academic context compared to less threatening contexts. When threatened with girls' academic success, boys are more likely to consider that this success is made at their expense. Girls' results are similar to those obtained by Wilkins et al. (2015) with two dominated groups, women and Afro-Americans, whose members did not react to discrimination threat. Thus, this result suggests that girls represent a low-status group in the academic context. However, girls might perceive boys' academic success as an irrelevant threat insofar as the participants spontaneously believe in girls' academic superiority. Future studies should examine which explanation best accounts for the present results. They should also focus on less-privileged samples to ensure the generalization of our findings, even though studies dealing with the zero-sum perspective do not generally report any significant effect of level of education or income on the ZsB (e.g., Kehn & Ruthig, 2013). Another potential limit is that the participants reported low scores on the ZsB scales, which could mean that they do not strongly think that school works as a zero-sum game. However, Green (2006) showed that individuals form a less-positive impression of people highly oriented towards competition compared to low competition-oriented people. Therefore, students might perceive that pointing out a zero-sum competition at school, especially between boys and girls, might not be socially desirable.

This research is, to our knowledge, the first to examine students' perceptions of their academic environment through their endorsement of ZsB. Because our operationalization of threat among boys actually reflects the current state of affairs (girls' academic superiority), the potential academic consequences deserve to be mentioned. In line with Latsch and Hannover (2014), who demonstrated that the "failing boys" discourse can impair German boys' reading performances, we argue that a distorted view of gender relations can also have negative consequences. First, in relation to perceived gender competition, ZsB could lead boys to focus on performance rather than learning in order to improve ingroup competitiveness (Lam, Yim, Law & Cheung, 2004). Second, according to IMGIC (Esses et al., 1998), ZsB are associated with anxiety and fear, which are known to be detrimental to academic achievement (e.g., De Castella, Byrne & Covington, 2013; Steinmayr, Crede, McElvany & Wirthwein, 2016). Third, both IMGIC and social interdependence theory (Deutsch, 1949) suggest that ZsB, in reflecting negative interdependence, could impair gender relations with the promotion of negative attitudes and discrimination as a way to decrease outgroup competitiveness. Future research could therefore go a step further and investigate the academic consequences of ZsB.

Competing Interests

The authors have no competing interests to declare.

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