Eliciting classroom motivation : not a piece of cake

Nuland, H.J.C. van

How boys and girls in secondary education differ in their response to motivational information[4]

One strategy emanated from self-determination theory to optimize motivational orientation in the classroom is to provide information about the rationale of a specific task. Three field experiments were conducted in pre-vocational (n = 734 and n = 88) and pre-university (n = 99) secondary education (age 11-17) to replicate the findings from other contexts and school levels. Questionnaires and a sentence revision task were used. Students were randomly assigned to one of three conditions (intrinsic; extrinsic; or no motivational information). Results from three MANOVA analyses showed that motivational information did not affect the girls' motivation and performance. However, boys in pre-vocational secondary education became intrinsically motivated from extrinsic information when they worked on an unfamiliar task (experiment one). This effect was not retrieved when the boys were familiar with the task (experiment two) and for boys within a pre-university context. Consequences of these surprising results are discussed.

Keywords: motivational information; intrinsic motivation; self-determination theory; gender differences

The media and many teachers speak of unmotivated students showing negative classroom behaviour. A lack of classroom motivation has negative consequences such as student dropout (Legault, Green-Demers, & Pelletier, 2006), teacher burnout (Grayson & Alvarez, 2008) and low aspiration level. This internationally acknowledged problem of declined classroom motivation during secondary education (Eccles & Midgley, 1985) particularly manifests in boys (Riordan, 1999). As a result, girls outperform boys in their classroom performance and motivation. Internationally, these differences between the sexes tend to increase (OECD, 2008). Especially at the domain of language skills, girls are more motivated and perform better than boys (e.g., Chiu & McBride-Chang, 2006; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Rosen, 2001). Therefore, at one point, all teachers face the challenge how to optimize their students' motivation and performance, particularly in boys and specifically for linguistic tasks.

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5.1.1. Optimizing motivational orientation from the perspective of self-determination theory

Self-determination theory (SDT), a motivation model introduced by Deci and Ryan (1985), provides strategies to optimize motivational orientation in the classroom. SDT stresses the concept of intrinsic motivation, which refers to the motive to engage in activities for the inherent joy an activity gives (Deci & Ryan, 1985; 2000). Research within the SDT framework emphasizes the importance of creating a favourable learning environment that elicits intrinsic motivation. Increased intrinsic motivation coincides with more autonomous and self-determined behaviour, which has important advantages in education. Deci and Ryan's SDT states that intrinsically motivated students experience higher well-being caused by the satisfaction of their psychological needs (Vansteenkiste, Simons, Lens, Sheldon, and Deci, 2004). Many studies have confirmed that intrinsic motivation elicits behaviour such as persistence, preference for understanding, and curiosity, which in turn result in better performance (Ryan & Deci, 2000).

A relatively new and promising SDT approach to stimulate intrinsic motivation aims at influencing students' motivational beliefs and perceptions about the intrinsic value of a specific task. Emphasizing that students will enjoy a task because of the usefulness of the trained skills in everyday life promotes intrinsic motivation. The effects of the strategy to influence motivational orientation by inducing motivational beliefs and perceptions have already been reported by Martens, De Brabander, Rozendaal, Boekaerts, and Van der Leeden (2010); Schaffner and Schiefele (2007); Simons, Dewitte, and Lens (2003); Vansteenkiste, Lens, and Deci (2006); Vansteenkiste et al. (2004a); Vansteenkiste, Simons, Lens, and Soenens (2004b); Vansteenkiste et al. (2004c); and Vansteenkiste, Timmermans, Lens, Soenens, and Van den Broeck (2008). In these studies students were provided with either written intrinsic or extrinsic motivational information before working on a specific task in a classroom context. The effects on intrinsic motivation, persistence and performance were studied and promising results for intrinsic motivational information were reported.

Students provided with information on the fun and short-term usefulness of the task at hand (i.e., intrinsic motivational information) showed higher self-report scores on intrinsic motivation, persistence scores, and better test score performance. More specifically, an experimental field study by Vansteenkiste et al. (2008) showed that teachers can best promote these intrinsic goals, even when students' original orientation is extrinsic. Compared to intrinsic goal framing, extrinsic goal framing resulted in poorer intrinsic motivation, conceptual learning, and persistence. The negative impact of extrinsic goals is expected to be caused by its competitive and evaluative nature (Vansteenkiste et al., 2004c). Simons et al. (2003) concluded that providing motivational information is a powerful tool that can easily affect the quality of motivation and either strengthens (i.e., intrinsic information) or undermines (i.e., extrinsic information) students' motivational behaviour, performance, and future participation.

5.1.2. Replicating findings in a secondary education context

The present study tries to replicate the promising findings recapitulated in section 1.1. in secondary education. Appealing is that it is relatively easy to incorporate such interventions in normal classroom contexts for no changes need to be made to the learning context. Investigating the generalizability of the positive effects of this relatively simple and straightforward intervention is particularly important for students in pre-vocational secondary education, because motivation problems are considerably higher in this group of students than in any other educational context (e.g., Dijsselbloem, 2008; Van der Veen & Peetsma, 2009). In line with results recapitulated in section 1.1. we expected that students in secondary education who are provided with intrinsic motivational information would show higher intrinsic motivation, more persistence and better performance. Nevertheless, due to the considerably higher motivation problems we expected that the outcomes might be less straightforward at the secondary education level. Therefore, we included observations and interviews in order to question the students about their on-task behaviour after the experiment was finished.

5.1.3. Gender differences in motivation and performance

Gender differences in motivational beliefs and performance in favour of boys have already been studied extensively in the field of mathematics (Vermeer, 1997). Vermeer found that girls reported lower feelings of confidence, especially with regard to complex mathematics tasks (see also Boekaerts & Rozendaal, 2010). The present study tried to extend those results into the field of language learning and with the findings on gender differences in motivational beliefs and performance in mind we anticipated that the effect of motivational information would be different for boys and girls. Boys and girls can pursue multiple goals in and outside the classroom (Ford, 1992). Further, theorists from different motivational perspectives like Boekaerts (2006) and Elliot and Dweck (1988) argued that students have different reasons to engage in learning. Some students engage in learning because they want to impress others (i.e., they have a high preference for superiority goals), whereas other students want to please their peers, their teacher or their parents (i.e., they have a high preference for belongingness goals). Still other students want to really understand the material under study (i.e., they have a high preference for mastery goals). Arguably students with different goal orientations might react differently to motivational information provided in the classroom.

Hijzen, Boekaerts, and Vedder (2006) reported that boys in general have higher preferences for superiority goals than girls and that girls respond more negatively to competitive learning environments (see also Meece, Bower Glienke, & Burg, 2006). By implication, boys might benefit more from extrinsic motivational information than girls because it emphasizes the importance of showing off a good performance, thus creating a competitive context (Vansteenkiste et al., 2004c). In other words, extrinsic motivational information might have a different effect on boys' than on girls' motivation and performance.

On the other hand, intrinsic motivational information might be more beneficial for girls, because they tend to have a more self-determined motivation profile than boys do (Vallerand, Fortier, & Guay, 1997). They tend to be more at the right end of the self-determination theory continuum (Deci & Ryan, 2000), implying that they tend to pursue mastery goals in the classroom (Hijzen et al., 2006). Hijzen et al. (2006) also reported that compared to boys, girls have higher preferences to pursue mastery and social support goals in the classroom.

5.1.4. Research question and hypothesis

Few studies have addressed gender differences in the effect that extrinsic and intrinsic motivational information might have on motivation and performance. We wanted to explore how receptive male and female students in pre-vocational secondary education are to motivational information. More concretely, we wanted to know whether adolescents behave according to the same principles as students at the college level. We will explore the question whether boys and girls differ in their response to the provided intrinsic and extrinsic motivational information with three separate MANOVA analyses and planned contrasts. Our general hypothesis is that boys respond differently to motivational information than girls do with regard to intrinsic motivation, performance and persistence. More specifically, we hypothesize that boys respond more positively to extrinsic information (i.e., score higher on intrinsic motivation, persistence and performance) compared to boys provided with intrinsic or no motivational information. Likewise, we hypothesize that girls respond more positively to intrinsic information (i.e., score higher on intrinsic motivation, persistence and performance) compared to girls provided with no information or extrinsic information. Further, we expect that boys have higher preferences to pursue superiority goals, and girls have higher preferences to pursue mastery and belongingness goals.

5.2. Method

5.2.1. Sample

Six schools with a pre-vocational secondary education track and one school with a pre-university education track volunteered to participate within the present study. In the Netherlands, pre-vocational secondary education is the lowest level of secondary education and is attended for four years by students between 12 and 16 years of age as a preparation to vocational training. Pre-university education is the highest level of secondary education which takes six years to complete. All students were in the first four years of secondary education.

Students from pre-vocational secondary education participated in both experiment one (n = 734, 54% boys, M_{age} = 14.2 SD = 1.0) and in experiment two (n = 88, 50% boys, M_{age} = 14.6 SD = 1.2). In experiment three, 99 pre-university students participated (39% boys, M_{age} = 13.9 SD = 1.2).

Preceding to the experiment, students were randomly assigned to one of the conditions (i.e., receiving intrinsic motivational information; extrinsic

motivational information; no motivational information/control group). The composition of the experimental and control groups with respect to gender was fairly equal in all three experiments. For experiment one the intrinsic information group (n = 244) consisted of 50% male students; the extrinsic information group (n = 223) consisted of 56 % boys; the control group (n = 222) consisted of 53% boys. In experiment two 50% of the participants in the intrinsic information condition (n = 28) was male; 54% of the participants was male in the extrinsic information condition (n = 28); and 45% was male in the control group (n = 31). The intrinsic information condition in experiment three (n = 33) consisted of 36% boys; the extrinsic information condition (n = 33) consisted of 41% boys; and the control condition (n = 33) consisted of 41% boys.

5.2.2. Manipulations: Motivational information

The experimental instructions were based on research reported by Simons et al., (2003) and Vansteenkiste et al., (2004). After reading the instruction of the specific assignment (see section 5.2.3.2.) students in the intrinsic motivational information condition read information emphasizing both the fun-aspect and the short-term usefulness of the task. In the extrinsic motivational information condition, the importance of showing off a good performance was emphasized. Students in the control condition read a neutral text that lacked motivational information. See Table 1 for the essential parts of the manipulation texts. The texts in Table 1 were translated from Dutch and therefore differ in word length. The original texts were of equal length.

Table 1.
Motivational information

	Written instruction
Intrinsic motivational information	This assignment will help you to understand how sentences are constructed. This will be **fun** to do and your understanding of the Dutch language will improve. Practicing these skills will improve your language skills and you will **enjoy** performing those tasks. The acquired skill will be **useful** when you work on other school assignments and when you read leisure texts. Practicing these skills and doing this assignment is **handy** because you can frequently use these skills in school, in daily life, and soon in your job or further education.
Extrinsic motivational information	This assignment will not only help you to get a good **grade** for your Dutch class, it will also improve your grades in other classes. You need to perform this assignment seriously, because it will test your skills. The test will **check** whether you have learned something. After the test you will get a grade, which will be send to your teacher. With the grade on the **test** you will be able to show the teacher how well you have already mastered this skill. Practicing these skills and doing this assignment is necessary to perform well on the test.
Control condition text	This assignment was developed by researchers working at the university. Other teachers in other classes also use assignments developed by researchers. For example Math and Geography. Sometimes computers are used during those assignments. Teachers often like the assignments developed by others, because they can use them in their lessons. Often, teachers use assignments, books and learning materials developed by special publishers who are specialized in education and the development of learning materials. Practicing these skills is also done at other schools.

5.2.3. Instruments

5.2.3.1. Manipulation check

To check the effectiveness of the manipulation and to test the implication of the motivational information, we used two subscales (one for the intrinsic and one for the extrinsic information condition). Both subscales consisted of four items with a 7-point Likert scale ('is very unlike me' versus 'is very like me'). A principal component analysis (PCA) on the intrinsic motivation manipulation check ('I believe this task will be useful when I work on other school assignments and when reading leisure texts': α = .81) for the data in experiment one showed a good fit for a one-component solution (R^2 = 63.56; r = .70/.85). The PCA on the extrinsic motivation manipulation check ('I believe this assignment will help me to get better grades in other classes': α = .75) for the data in experiment one showed an acceptable one-component solution fit (R^2 = 57.90; r = .57/.87). The assumption of normality for both subscales was satisfied. Comparable results were found for the data in experiment two and three. We checked whether students in the experimental conditions differed significantly from each other on the manipulation checks, with two one-way ANOVAS for the data in all three experiments separately. In all three experiments, students in the intrinsic condition did not score significantly higher on the intrinsic manipulation check subscale than did students in the extrinsic or control condition. The results of our planned contrasts within the one-way ANOVA on the extrinsic manipulation check showed that students in the extrinsic condition in experiment one scored significantly higher (M = 4.76) than students in the control (M = 4.51; p < .03), or intrinsic condition (M = 4.33; p < .001). The latter two groups did not significantly differ on the extrinsic manipulation subscale (p = .12). Pre-vocational secondary education students within the extrinsic condition in experiment two scored significantly higher (M = 3.97) than students in the intrinsic condition (M = 3.50; p < .05). Students in the extrinsic condition in the pre-university experiment scored significantly higher (M = 4.45) than students in the intrinsic condition (M = 3.66; p < .05).

5.2.3.2. Performance

We developed comparable language tasks for each grade together with experienced secondary school teachers. These tasks measured revision skills based on the writing revision problem tasks developed by Zimmerman and Kitsantas (1999). Students had to revise two or three short sentences into a single, inclusive, but non-redundant sentence (see Figure 1 for an example of the task in 11th grade). The sentences were scored on technical writing aspects (e.g., spelling; grammar) and content (i.e., primary and secondary main words) according to a correction procedure designed for Dutch speaking students by Boekaerts, Cascallar, Costigan, and Rozendaal (2008). The sum of the scores on technical and content aspects was calculated to obtain the performance score. The performance scores on the different tasks were only comparable within the same grade. Therefore, performance scores were z-standardized within grade group before analysing the data. Although we

made sure that the assignment was in line with the curriculum and comparable to other tasks used in the participating schools, the task was unfamiliar to the students when they participated in experiment one and three. Before participating in experiment two, students were told that the task was comparable to the task in experiment one.

To measure the reliability of the scoring system, a second coder scored 10 assignments of each task at each grade level. Agreement was assessed by computing coherence (*r*) between the two coders. The average coherence in the sample was 88%. Disagreements were solved through discussion and this resulted in minor revisions of the scoring system. All normality assumptions of the revision tasks were satisfied.

They tried to examine parts of their body which they normally cannot see.

The elephants moved their trunk to look into their mouth. (*23 words*)

Revision:

The elephants moved their trunk to examine the inside of their mouth. (*12 words*).

Figure 1. Example of the revision task.

5.2.3.3. Motivation

Information on task specific intrinsic motivation was collected with four 7-point Likert scale items ('is very unlike me' versus 'is very like me'), derived from Ryan and Deci's interest/enjoyment subscale of the Intrinsic Motivation Inventory. A sample item is 'This assignment will be fun to do'. Cronbach's alpha of this subscale was .83 in experiment one, .81 in experiment two, and .90 in experiment three.

Goals (mastery, belongingness and superiority goals) were assessed with eleven general items (same 7-point Likert scale) from the Goal Importance and Facilitation Inventory, reported by Boekaerts and Hijzen (2007). Cronbach's alpha of the superiority goals subscale (four items; e.g., 'To me it is important that I impress others') was .75 in experiment 1, .79 in experiment 2, and .70 in experiment 3. The mastery goals subscale (four items; e.g., 'To me it is important that I learn new things') had also good internal consistency. In experiment one, Cronbach's alpha was .81, in experiments two and three .78. Finally, the belongingness subscale (three items; e.g., 'To me it is important that my classmates like me') had alphas in experiment one of .70, .77 in experiment two and .81 in experiment three.

With the same 7-point Likert scale, 13 items assessed persistence after the task (e.g., 'I want to know whether I can apply the skills we practised'). Cronbach's alpha of this subscale was .86 in experiment one, .87 in experiment two, and .86 in experiment three.

5.2.3.4. Interviews and observations

After experiment one, 61 students were interviewed. The interviews were semi-structured with several open-ended questions. The students were asked upon their experience with the whole experiment and how they believed they could become motivated in general and for language tasks in particular. The first author was present during all data collection sessions and observed. During these sessions, everything that could be noteworthy was noted.

5.2.4. Procedure

The design and procedure of our study was the same for all three field experiments. All participants were presented with the language assignment and were unaware of the different conditions and neither were the teachers. All students who participated had informed consent of their parents. Data collection took place during one lesson (maximum 45 minutes) of a native language class in the normal classroom context with both the teacher and researcher present. The task was introduced by the teacher as part of the normal curriculum. Students had to revise two or three short Dutch sentences into a single inclusive, but non-redundant sentence. After the teacher read out loud the standardized instruction, participants autonomously read the instruction for the sentence revision tasks (including the experimental manipulation). The motivation questionnaires on motivation variables were administered before (i.e., intrinsic motivation and goals) and after working (i.e., persistence) on the sentence revision tasks. The students in pre-vocational secondary education participated in both experiment one and two, which took place with an intervening period of a couple of months.

5.3. Results

Three separate MANOVA analyses with planned simple contrasts were conducted on the data from the three field experiments. We will present the results of the analyses separately for each field experiment. First, we will present the results of students in pre-vocational secondary education working on the unfamiliar task. Second, the results of the same students working on a similar task (by now a familiar task) will be presented. Finally, we present the results of students in pre-university education working on an unfamiliar task. For clarity reasons all statistically significant results are presented together in Table 2.

5.3.1. Pre-vocational secondary education students working on an unfamiliar task

A MANOVA analysis with planned contrasts on data from the first field experiment revealed only significant effects for the outcome variable intrinsic motivation. First of all, we retrieved a significant main gender effect (multivariate: Wilks' $\lambda = .953$, $F(5,679) = 6.694$, $p < .001$, $\eta^2 = .047$) on intrinsic motivation (univariate: ($F(1,683) = 8.699$, $p < .01$, $\eta^2 = .013$), with boys in general ($M = 3.16$) scoring lower on intrinsic motivation than girls ($M = 3.47$). See the mean values marked with [b] at the second and fourth column of Table 2 for the statistically

significant different mean values based on observed scores. The analysis also revealed a significant gender by motivational information interaction effect (multivariate: Wilks' $\lambda = .970$, $F(10,1358) = 2.077$, $p < .05$, $\eta^2 = .015$) on intrinsic motivation (univariate: $F(2,683) = 3.366$, $p < .05$, $\eta^2 = .010$). See the mean values marked with [a] at the second column of Table 2 for the statistically significant differences. Planned contrasts show that girls generally score higher than boys on intrinsic motivation. Further, when we compared boys within the extrinsic information group ($M = 3.40$) with the boys in the control group ($M = 3.02$), we observed that boys became more intrinsically motivated after reading extrinsic motivational information (multivariate: Wilks' $\lambda = .982$, $F(5,679) = 2.501$, $p < .05$, $\eta^2 = .018$; univariate: $F(1,683) = 4.732$, $p < .05$, $\eta^2 = .007$). This implies that boys benefit from motivational information that emphasizes showing off a good performance, compared to receiving no motivational information (see Figure 2).

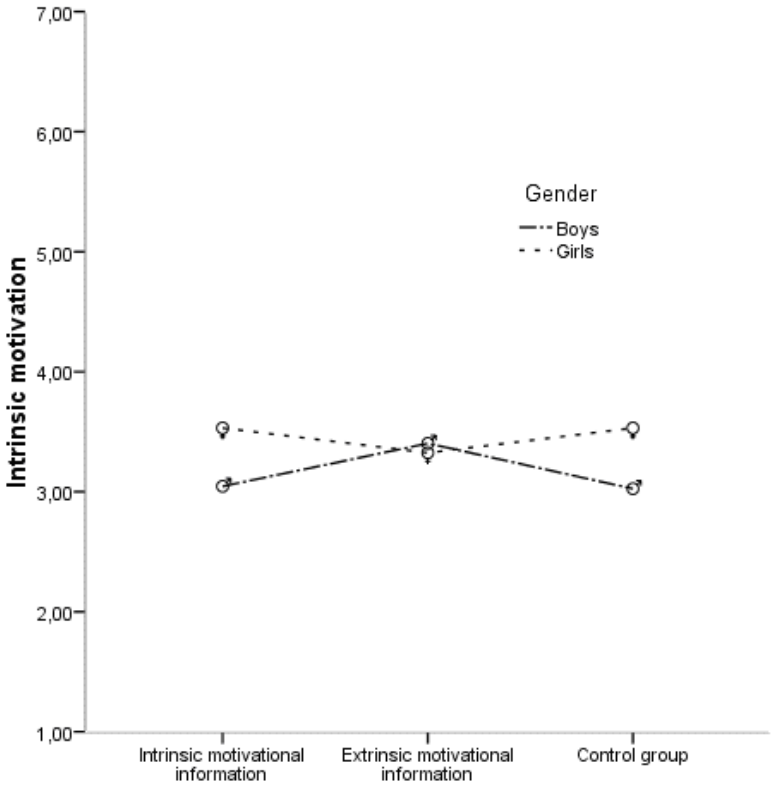

Figure 2. Extrinsic motivational information enhances boys' intrinsic motivation.

On the other hand, girls are more intrinsically motivated than boys and are not affected by receiving extrinsic motivational information. These results are in line with our expectations that boys would become intrinsically motivated by extrinsic motivational information, because they pursue superiority goals more than girls do. An ANOVA analysis tested whether boys score higher on superiority

goals than girls in pre-vocational secondary education. Boys (M = 3.75) pursued significantly more superiority goals ($p < .01$) than girls (M = 3.48). Contrary to our expectations, girls did not report more mastery and belongingness goals than boys did. However, their preference for these goals became apparent during observations in the classroom. Students who finished the assignment, were free to continue working on the computer in silence and could choose to do whatever they wanted to do. Observing the girls showed that most of them checked their email or visited websites where they could chat. They tended to socialize with others during their free time. By contrast, boys tended to go to websites where they could play (often violent) games. They sometimes got loud in sharing their high scores with others, which is a good illustration of their superiority goals.

In our interviews with some of the students, we asked how teachers should alter their classes in order to motivate their students. Six boys responded that teachers should use more games during class. Not a single girl came up with this answer; girls indicated that they would prefer more discussion with both peers and the teacher during class and would welcome the opportunity to express their own opinion. Not a single boy came up with this type of answer.

Table 2.
Statistically significant gender differences in motivation and performance in secondary education

	Boys		Girls	
	Unfamiliar task motivation[1/2]	Familiar task performance[1]	Unfamiliar task motivation[1/2]	Familiar task performance[1]
Intrinsic motivational information *M* (*SD*)	3.05 / 3.54 (1.34) / (.94)	-.64 (1.27)	3.53 / 4.13 (1.27) / (1.05)	.74 (.81)
Extrinsic motivational information *M* (*SD*)	3.40[a] / 3.77 (1.34) / (1.38)	-.39 (1.35)	3.32 / 4.46 (1.39) / (1.31)	.03 (.91)
Control group *M* (*SD*)	3.02[a] / 3.33 (1.36) / (1.25)	-.72 (1.38)	3.53 / 4.29 (1.40) / (1.36)	.03 (1.18)
Total *M* (*SD*)	3.16[b] / 3.55[c] (1.36) / (1.99)	-.58[d] (1.31)	3.47[b] / 4.29[c] (1.35) / (1.23)	.25[d] (1.03)

[1/2] =… /… results in pre-vocational secondary education / results in pre-university education
[a,b,c,d] Mean difference with the same letters are statistically significant at 5% level

5.3.2. Pre-vocational secondary education students working on a familiar task

A MANOVA analysis on data from the second field experiment revealed a significant main gender effect (multivariate: Wilks' λ = .818, $F(5,77) = 3.423$, $p < .01$, $\eta^2 = .182$) on performance (univariate: ($F(1,81) = 11.186$, $p < .01$, $\eta^2 = .121$), with boys in general (M = -.58) scoring lower than girls (M = .25). See the mean

values marked with [d] at the third and fifth column of Table 2 for the statistically significant different z-scores. There were no significant effects for the other outcome variables. These results imply that girls in pre-vocational secondary education perform better on a familiar linguistic task than boys, but are not more intrinsically motivated than boys are.

5.3.3. Pre-university students working on an unfamiliar task

Similar to what we found in pre-vocational secondary education, a MANOVA analysis yielded a significant main gender effect (multivariate: Wilks' $\lambda = .857$, $F(5,89) = 2.958$, $p < .05$, $\eta^2 = .143$) on intrinsic motivation (univariate: ($F(1,93) = 8.701$, $p < .01$, $\eta^2 = .086$), with boys in general ($M = 3.55$) scoring lower than girls ($M = 4.29$). See the mean values marked with [c] at the second and fourth column of Table 2 for the statistically significant different mean values. There were no significant effects for the other outcome variables. These results imply that girls in pre-university education have higher intrinsic motivation for an unfamiliar task than boys do. Those results align with the results on an unfamiliar task in pre-vocational secondary education. Note that mean scores in the pre-university context are in general higher than the mean scores in the pre-vocational secondary education context. Remarkable is that both boys ($M = 4.21$) and girls ($M = 4.46$) in the pre-university track report the pursuit of superiority goals.

5.4. Discussion

With the present research we tried to test the generalizability of the positive effect of providing intrinsic motivational information on reported intrinsic motivation, persistence and task performance. We found no main effects of the experimental conditions. Students in this age group are not as receptive to motivational information as students in higher education and as students who voluntarily participated in physical education classes in secondary education.

5.4.1. Explaining our findings

As predicted, we did find main gender effects. Experiment one and three showed a main gender effect on intrinsic motivation for language tasks, with girls enjoying the unfamiliar task more than boys. Field experiment two showed that girls outperformed boys when working on a familiar language task. This aligns with findings reported by other researchers that girls in general enjoy language tasks more than boys and that girls perform better on these tasks (e.g., Chiu & McBride-Chang, 2006; Riordan, 1999; Rosen, 2001).

In contrast to the findings reported by other researchers, this study clearly showed that providing extrinsic motivational information can have positive effects on intrinsic motivation. In accordance with our hypothesis, we found that boys and girls differ with respect to their response to motivational information. In pre-vocational education, boys who were provided with extrinsic motivational information, enjoyed the unfamiliar task more than boys who were not provided

with motivational information. Although the increased intrinsic motivation was still below the scale average, this suggests that emphasizing social comparisons and showing off a good performance may increase the challenge and fun in doing unfamiliar tasks for boys.

Other researchers already questioned the alleged negative effect of incentives, emphasizing that incentives may even increase intrinsic motivation (Konheim-Kalkstein & Van den Broek, 2008). We believe that in general, boys have a higher preference to engage in competitive play (e.g., computer games) than girls do (Colley & Comber, 2003). Former research in a vocational training context revealed that boys have a higher preference for superiority goals than girls and that girls score higher on mastery and belongingness goals (Boekaerts & Hijzen, 2006). The present study confirmed that boys in a pre-vocational secondary education context score higher on superiority goals than girls, but did not confirm the results with regard to mastery goals. However, gender differences in goal preferences were apparent during observations in the classroom.

We did not retrieve the interaction effect of motivational information with gender on intrinsic motivation within the familiar task context. During experiment two, we used a similar language task so students knew what kind of task they had to work on. This may have influenced their motivation, and probably indicates that boys have a preference for engaging in *new* and *competitive* tasks. Together with the novelty of the task, intrinsic motivation might disappear. Boys might benefit from extrinsic information on the short-term, but the effect on the long-term (i.e., within familiar tasks) might disappear or even become negative. Hence, influencing motivational orientation in the classroom is not that straightforward. The conclusion that teachers can best promote intrinsic goals, even when students' original orientation is extrinsic (Vansteenkiste et al., 2008), might have to be reconsidered in light of our findings.

Where Simons et al. (2003) and Vansteenkiste et al. (2004; 2006; 2008) found positive effects in a similar educational context with students participating voluntarily during gym classes and with students in higher education performing a language assignment, participating in our study was not voluntarily and the fact that we included a control group might partly explain the different findings. Although we did find some main gender effects and an interaction effect, we did also not retrieve the positive effect on persistence; neither on the self-report scale nor on the behavioural outcomes (extra exercises). This also contrasts with the effects found in former research.

The interaction effect that we found was small, but significant and we believe it to be meaningful. If an intervention that is easy to implement in actual classrooms has an effect when introducing an unfamiliar task, teachers might try to increase their male students' intrinsic motivation by providing extrinsic information. Nevertheless, the third field experiment consisted of only a small group of students, which might explain why we did not retrieve the interaction effect we retrieved in pre-vocational secondary education. Future research should investigate how pre-university students respond to motivational information, when

they are working on a familiar task.

5.4.2. Study limitations

The present study has some limitations. The motivational information was phrased as if an adult told the students why the assignment was important or fun to do. The motivational information might therefore have been interpreted differently by the students than we intended, and was maybe not powerful enough to make any difference (i.e., in the case of intrinsic information). Furthermore, a mismatch between student and environment could explain our results. In general, adolescent students are more extrinsically oriented and might have doubted the intrinsic information. Also, we did not find significant differences between the groups on the intrinsic information manipulation check. This implies that the written statements that supplied intrinsic motivational information were not perceived as such and might not have had the impact that was intended. This might explain why the results for students in the intrinsic groups were not statistically different from students in the control groups. So, a challenge for motivation researchers is to design their interventions in such a way that students understand the interventions the way they are intended.

5.4.3. Theoretical implications

From a theoretical perspective, our results imply that optimising motivation and performance in an educational context is not that straightforward. The positive influence of motivational information as shown by other researchers at the college level and when adolescents voluntary participated, can not simply be generalised to other contexts. What we learned from this study is that extrinsic motivational information does not always have negative effects (i.e., not for boys during familiar tasks). Future research should focus on and distinguish between short- and long-term effects, between unfamiliar and familiar tasks, and study the different impact of motivational information on boys and girls. From a theoretical perspective, it might be important to look for other differences between the sexes. Boys and girls might also respond differently when confronted with other motivational interventions and interventions beyond motivation.

5.4.4. Practical implications

The present study provided valuable information for educational practice. It addressed relevant issues of increased motivational problems in education, especially amongst boys. Contrary to what is often assumed, Dutch students in pre-university are not that different from students in pre-vocational secondary education with regard to their motivation and in their response to motivational information. Future research comparing students in traditional schools with students in more innovative schools where the focus is on stimulating intrinsic motivation, could provide more information as to why students score below average on intrinsic motivation. In the meantime, we suggest that providing motivational information might increase intrinsic motivation on the short-term for

boys in a traditional school environment in pre-vocational secondary education. The extrinsic motivational information from the present study could be used in the classroom to elicit intrinsic motivation, bearing in mind that the effect accounts only for boys on the short-term. Thus, schools might differentiate between the instructions given to boys and girls, in order to elicit intrinsic motivation. Future research should aim at how to approach girls in order to establish higher intrinsic motivation on the short and long-term, and for boys on the long-term.

The mean intrinsic motivation of the students in this study proved to be below the average on a 7-point Likert scale, both in a pre-vocational and pre-university context. This finding raises the question as to whether it is possible to raise intrinsic motivation in secondary education classrooms. We must conclude that inducing motivation is not as straightforward as expected. Nevertheless, our results indicate that influencing adolescents' motivation is feasible. Especially if we compare it to intelligence and social economic status, two variables that affect motivation and performance but are not under the teacher's control at all.

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