



Effects of classroom goal structures on student emotions at school



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ABSTRACT

The aim of the current study was to improve our understanding of classroom environment effect on student's discrete emotions at school. Nine hundred and ten adolescents from 55 classrooms completed a self-reported questionnaire about five emotions (anger, boredom, anxiety, shame, and enjoyment) and their perceptions of classroom goal structures. Multilevel analyses showed that anger is negatively associated with mastery goal structure and positively associated with performance goal structure, boredom is negatively associated with mastery goal structure, and anxiety and shame are both positively associated with performance goal structure. Both individual perceptions and classroom-level indicators of goals structures were associated with emotions, but these effects varied according to the discrete emotion taken into account and to the level of analysis.

1. Introduction

During the countless hours spent at school, each student may experience a large range of emotions, including anxiety, enjoyment, hopelessness, pride or anger. In addition to playing a part in motivational and learning processes, positive or negative emotions experienced at school have implications for general well-being (Boekaerts, 1993). This is why many researchers now agree on the importance of giving further consideration to the emotional aspects of schooling (Eccles & Roeser, 2011; Matthews, Kilgour, Christian, Mori, & Hill, 2015). A better understanding of how school and classroom environments shape emotions would help in designing interventions aimed at improving both youth achievement and psychological health. However, there is a gap between this consensus in the scientific community and the limited number of studies published on this subject. In this article, we want to assess within a multilevel framework the effect of goal structures at the classroom level on students' discrete emotions at school.

2. Research on emotions at school

There are numerous studies regarding test anxiety (see Zeidner, 1998), but other negative and positive emotions at school have been considered less widely and only more recently (Pekrun, Goetz, Titz, & Perry, 2002). Moreover, previous research has mainly been devoted to the individual antecedents and consequences of emotions at school, such as competence and value beliefs (Ahmed, van der Werf, Minnaert, & Kuyper, 2010), victimization and prosocial experiences (Martin & Huebner, 2007), behavioral commitment (Reschly, Huebner, Appleton, & Antaramian, 2008), learning (Hascher, 2010), self-regulatory strategies (Ahmed, van der Werf, Kuyper, & Minnaert, 2013) or achievement (Pekrun et al., 2002). Few studies have attempted to identify the antecedents related to the school environment even though the learning environment could be a relevant leverage point in improving emotional well-being of young people (Kaplan & Maehr, 1999; McLaughlin, 2008). Among the few studies about the relationships between learning

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environment and student emotional outcomes, most investigated more specifically the effects of goal structures.

3. Goal structure and emotional outcomes

The goal structure approach derived from a well-known theory of individual motivational processes, goal achievement theory. Achievement goals are purposes that lead students to engage in achievement behavior and different types of achievement goals can be endorsed by students (Ames, 1992). Three types of goals are most frequently distinguished in the literature (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010): mastery goals, (to understand, to improve one's competences and to develop new skills); performance-approach goals (to demonstrate his/her ability and to surpass other students) and performance-avoidance goals (to avoid appearing less competent than others). Beyond the extended investigation of individual goals, some researchers have addressed the issue of goals at a contextual level. Indeed, goal-related messages can be made salient by some elements of the learning environment, like for instance instructional practices, teacher discourse or organisational features (Meece, Anderman, & Anderman, 2006). The concept of goal structure refers to the kind of goals emphasized in a learning environment (Ames, 1992; Ames & Archer, 1988; Midgley, 2002). Most studies distinguish two goal structures. A mastery (or task) goal structure, where learning, improvement and intellectual development are salient in the learning environment. And a performance (or ego) goal structure where social comparison, competition and elitism are emphasized. According to goal theory, it is expected that mastery goal structure is predictive of positive affect while performance goal structure is predictive of negative affect, and these relationships are hypothesised to be mediated by individual goals (Kaplan & Maehr, 1999; Roeser et al., 1996). Indeed when teachers emphasize understanding and personal progress in their classrooms (mastery goal structure), they lead students to endorse mastery goals. In this case, students work on a task for itself and each improvement is evaluated as a success, which can thus foster to positive affect. On the other hand, if students are in a classroom where teachers compare them and push them to be better than the others (performance goal structure), it is likely that they will pursue performance goals. In this learning climate, only being the best is considered as a success. Learning activities can become threatening for self-esteem and be evaluated as a failure by students, which can elicit negative affect (Covington & Omelich, 1984; Kaplan & Maehr, 1999).

Globally speaking, empirical research supported these hypotheses. Kaplan and Midgley (1999) studied the link between student perceptions of classroom goal structures and affect experienced at school. Results of structural equation modelling showed a positive association between individual perception of classroom mastery goal structure and positive affect in school and a positive link between individual perception of classroom performance goal structure and negative affect in school. Roeser et al. (1996) also found a significant relationship between positive affect and both perceived school mastery (positive) and performance (negative) goal structures. However associations between perceived school goal structures and positive affect were no longer significant when the quality of teacher-student relationship was included in the analyses. Roeser, Eccles, and Sameroff (1998) also investigated the negative side of the student emotional experience assessing anger and depressive symptoms. They found a significant association with perception of school performance goal structure together with a significant association with perception of positive teacher regard, a dimension of teacher-student relationships. No link was found with perceived school mastery goal structure. However, regarding emotional engagement in math classes (i.e. interest and enjoyment), Shim, Cho, and Wang (2012) found a positive association with perceived classroom mastery goal structure and no association with perceived classroom performance goal structure. So, these studies confirmed that perceived mastery goal structure is linked to positive affect and that perceived performance goal structure is linked to negative affect. But it is not clear whether perceived mastery goal structure is associated with negative affect or if perceived performance goal structure is associated with positive affect, what is not explicitly foreseen by goal theory.

Some studies also used a global measure of affect including both positive emotions and reversed negative emotions. Kaplan and Maehr (1999) found a relationship between a global measure of student affective experience in school and both mastery (positively) and performance (negatively) goal structures perceptions. However, Gonida, Voulala, and Kiosseoglou (2009) found that emotional engagement (i.e. positive emotions and negative emotions reversed) was positively related to perception of school mastery goal structure but unrelated to perception of school performance goal structure. Unfortunately, given the aggregation of positive and negative affects, it is difficult to compare these results with those presented above.

It should also be noted that reviewed studies are not completely comparable. Their affective measures differ according to the main approach of authors. Some more recent studies (Gonida et al., 2009; Shim et al., 2012) are more geared towards the understanding of the role of emotions in motivational and learning processes. Measures of affect refer therefore more to academic tasks (for instance, "When my teacher first explains new material, I feel great" or "When we work on something in class, I feel interested"). On the other hand, in many earlier studies (Kaplan & Maehr, 1999; Kaplan & Midgley, 1999; Roeser et al., 1996; Roeser et al., 1998), the focus was more on understanding how learning environments (classroom or school) can be linked to affect experienced by students at school. Researchers therefore used more general measures of affects (for instance, "I like being at school" or "Most of the time, being in school puts me in a good mood"). The purpose of these researchers is to contribute to a better understanding of students' well-being. In this perspective, it's relevant to consider students' emotional experience at school in a general way and not specifically task-related. The present study is in line with this last approach.

4. Individual or contextual effect?

However, all these studies face a common limitation. They highlighted a link between individual perceptions of contextual features (goal structures) and emotional outcomes. However, student emotional experience could color his/her perception of the learning context. For instance, student feeling anxiety could be more sensitive to teacher feedback, or student feeling enjoyment

could interpret teacher practices as more supportive (Forgas, 1995). Moreover, individual perceptions could also reflect other personal characteristics or bias (Tapola & Niemivirta, 2008; Wolters, 2004). Consequently even if individual perceptions are an important component of the complex process underlying student experience in school, those perceptions do not provide a strong basis to draw conclusions about contextual effect and hence to issue practical recommendations regarding the organization of the learning environment (Lüdtke, Robitzsch, Trautwein, & Kunter, 2009; Roeser et al., 1996). To draw more valid conclusions about environmental effects, the use of multilevel analyses is recommended (Marsh et al., 2012; Miller & Murdock, 2007). Within this approach, it is common to aggregate the perceptions of people from a same environment (e.g. classroom or school) to create a measure of the “shared perception” of this environment (Lüdtke et al., 2009). Students are then regarded as multiple observers of their classroom or school environment. Multilevel models allow to analyse the effect of this aggregated score at the environment level on individual outcome, taking into account hierarchical structure of the data (Raudenbush & Bryk, 2002). A few studies have already used multilevel analyses to investigate the effect of goal structures on various student outcomes, such as avoidance strategies (Lau & Nie, 2008; Turner et al., 2002; Urdan, 2004), help-seeking (Karabenick, 2004), disruptive behaviors (Galand, Philippot, Frenay, 2006; Kaplan, Gheen, & Midgley, 2002), behavioral engagement (Lau & Nie, 2008), intrinsic motivation (Lau & Nie, 2008; Murayama & Elliot, 2009) and achievement (Lau & Nie, 2008; Urdan, 2004). But none of these studies explored the effects of goals structures on emotional outcomes. As already underlined by Roeser et al. (1998), conclusions based on individual perceptions only are not sufficient to assert the relevance of recommendations about features of the learning environment. Multilevel analysis would allow to disentangle individual and contextual effects and to draw more valid conclusions about learning environment effects on emotional outcomes.

5. Goal structure and discrete emotions

Most studies on the link between goal structures and affective outcomes have a second common limitation. They used composite scores aggregating different emotions into global variables as measures of affective outcomes. Usually, positive emotions are aggregated into a positive affect score and negative emotions into a negative affect score. However, when discrete emotions were investigated separately, results sometimes vary depending on the emotion considered. Regarding individual characteristics, for example, some discrete emotions were linked to gender or cognitive ability while others do not (Mouratidis, Vansteenkiste, Lens, & Auweele, 2009; Pekrun, Elliot, & Maier, 2009; Pekrun, Lichtenfeld, Marsh, Murayama, & Goetz, 2017; Shim, Wang, & Cassady, 2013). Moreover, relationships between discrete emotions experienced at school and individual achievement goals were investigated and studies highlighted different underlying process according to the emotion taken into account (Huang, 2011; Linnenbrink-Garcia & Barger, 2014; Pekrun, Elliot, & Maier, 2006). So, as already suggested by Kaplan and Midgley (1999), an investigation of the effects of goal structure on each discrete emotion appears relevant rather than only on positive or negative affects.

Based on the fact that a dichotomous conception of emotional dimension disregards considerable qualitative differences between discrete emotions, Pekrun et al. (2006) propose instead a theoretical classification along two dimensions: the classical dimension of valence (positive vs. negative) but also the dimensions of objet focus (activity vs. outcome). In their view, some emotions are related to the activity itself, such as enjoyment, boredom or anger, while other emotions are related to the outcomes expected or achieved, such as hope, anxiety or shame. This 2×2 taxonomy leads to four groups of emotions: positive activity-related emotions (e.g., enjoyment), negative activity-related emotions (e.g. boredom or anger), positive outcome-related emotions (e.g. hope or pride) and negative outcome-related emotions (e.g. anxiety or shame). This taxonomy is not used to combine emotions into new constructs but to make theoretical predictions. According to the control-value theory (Pekrun, 2006), discrete emotions at school are influenced by two main appraisals: the perceived controllability of activities or outcomes and the subjective value of these activities or outcomes. These appraisals are the proximal determinants of student emotions, mediating the impact of situational factors. Pekrun and colleagues did not explore the effect of goal structure on discrete emotion but they investigated the effect of individual achievement goals. They suggest that the type of achievement goal pursued by students (mastery goal, performance-approach goal or performance-avoidance goal) facilitates some appraisals and consequently impacts emotions. More precisely, according to Pekrun et al. (2006), activity-related emotions (enjoyment, boredom and anger) are influenced by personal mastery goals, positive outcome-related emotions (hope and pride) by performance-approach goals, and negative outcome-related emotions (anxiety and shame) by performance-avoidance goals. These hypotheses were empirically supported in several studies (Pekrun et al., 2006, 2009). As goal structures encourage the endorsement of these different personal achievement goals (Midgley, 2002), different effects of goal structures according to the discrete emotion taken into account can be expected.

To our knowledge, only one study has empirically explored the effect of goal structure on discrete emotions. Its findings actually showed different effects of perceived goal structure according to the discrete emotion taken into account (Galand & Philippot, 2005). Results showed a positive association between perceived classroom performance goal structure and anxiety, shame or anger while boredom was mainly linked to perceived teacher-student relationship. However, this study faces the same limitation outlined above: it relied on individual perception of learning environment and hence does not allow to draw valid conclusions about contextual effect.

6. Purpose of the current study

The general goal of this paper is to clarify the effects of learning environment on emotions experienced at school by students. The goal structure framework seems to be highly relevant to investigate this question by providing both available theoretical predictions and empirical results. But existing evidence has two main limitations.

First, the analytical strategy used in previous studies does not make it possible to disentangle individual effects from contextual

effects. So the aim of this paper is to use a multilevel framework to investigate the effects of the learning environment on student school-related emotions. Learning environment will be conceptualized through the lens of goal structures. These variables will be introduced at the classroom-level because previous studies showed that classroom context matters more than school context (Baudoin, Hospel, & Galand, 2014; Vezeau et al., 2010).

Second, previous researches investigated effect of learning environment on composite measures (positive and negative affects) while other studies highlighted different significant predictors according to the discrete emotion taken into account (Mouratidis et al., 2009; Pekrun et al., 2006). In this study, the effects of goal structures will be investigated on five discrete emotions experienced at school (boredom, anger, anxiety, shame and enjoyment). The original approach of goal structure made predictions based only on a dichotomous conception of emotional outcomes. However, following the work of Pekrun et al. (2006) on individual achievement goals, more specific assumptions are allowed. In this study, it is expected that mastery goal structure has an effect on activity-related emotions: (positively) enjoyment and (negatively) boredom and anger. Performance goal structure is expected to have an effect on outcome-related emotions: (positively) anxiety and shame. As mentioned above, these hypotheses are based on the assumption that contextual goal structures encourage the adoption of personal achievement goals (Midgley, 2002) which could facilitate different appraisals of the situation (Pekrun, 2006) and, consequently, emotions.

7. Method

7.1. Participants and procedure

Data from 910 Belgian French-speaking adolescents who had participated in a larger study about student academic adjustment were used (Galand et al., 2006). These students (47 seventh graders, 307 eighth graders, 227 ninth graders, 148 tenth graders, 141 eleventh graders, and 40 twelfth graders) were from 55 classrooms in 6 secondary schools in an urban area. The mean number of student respondents per classroom was 16. Among the sample, 53.5% were girls and 37.1% repeated a year at least once. This figure is consistent with the widespread practice of grade retention in the Belgian education system. The majority of students were in a comprehensive track (72.9%) and the others in a vocational track. Parental occupations and material belongings reported by participants indicated that these adolescents came from a large variety of sociocultural background. Both parents are Belgian citizen for 72.6%, one of the parents for 14% and both parents are non-native for 13.4% of the sample. An anonymous self-reported questionnaire was administered in classroom during regular school time and a researcher informed students about the aims of the study and gave instructions. Students also received information about freedom of participation and data confidentiality.

7.2. Measures

Learning environment was assessed in this study by two scales: mastery goal structure and performance goal structure. These measures included a French version of items from the PALS and some other existing scales (Ames & Archer, 1988; Midgley, Feldlaufer, & Eccles, 1989; Anderman & Young, 1994; Midgley et al., 2000; Roeser et al., 1996; and Wentzel, 1997). Original items referring to the same construct were grouped together, duplicates were deleted, and priority was given to items assessing perceived teacher behavior rather than perceived teacher intentions (that require more inference from the students). As the aim of this research was to study school-related emotions (and not task-related emotions), measures of learning environment variables were general rather than subject- or task-specific. These scales had been validated in a previous study (Galand & Philippot, 2005) and results of factorial analysis support the a priori grouping of items. All items used a 7-point Likert type scale, ranging from 0 (*not at all true*) to 6 (*totally true*). **Mastery goal structure** was measured with 5 items assessing teacher behaviors that emphasize understanding, improvement and intellectual development in the classroom (e.g., Teachers pay attention to students' progresses). Cronbach's alpha in this study was 0.70. **Performance goal structure** was assessed with 4 items assessing teacher behaviors that emphasize social comparison, competition and promotion of the best students in the classroom (e.g., When teachers ask questions, they mainly ask good students to answer.) Cronbach's alpha in this sample was 0.66.

School-related emotions items asked students to rate the frequency with which they experienced several discrete emotions at school during the last week using a 7-point scale (from 0 "never" to 6 "all the time"). Anger ($\alpha = 0.67$), anxiety ($\alpha = 0.76$), shame ($\alpha = 0.72$) and enjoyment ($\alpha = 0.71$) were each assessed by 2 items adapted from the Differential Emotion Scale (Izard, Dougherty, Bloxom, & Kotsh, 1974). One item was added to assess boredom: "I get bored". This item is similar to that used by Pekrun and colleagues to assess class-related boredom (Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011).

Control variables. At the individual level, we controlled for gender (0 = *girl*, 1 = *boy*) that was shown to be linked to some emotions (Mouratidis et al., 2009; Pekrun et al., 2017; Shim et al., 2013). In addition, past performance and ability may impact emotions (Pekrun et al., 2009; Pekrun et al., 2017), so we take grade retention into account (0 = *no repetition*, 1 = *grade repetition once*, 2 = *grade repetition at least twice*). Some studies also found that socioeconomic status (SES) was weakly related to some emotional variables (Pekrun et al., 2017; Roeser et al., 1998). Therefore we controlled for SES assessing parents' occupational status (0 = *both parents are unemployed*, 1 = *one of the parents has a job*, 2 = *both parents have a job*). At classroom-level, previous multilevel studies showed no relationship between emotional outcomes and compositional variables (Peetsma, van der Veen, Koopman, & van Schooten, 2006; Verkuyten & Thijs, 2002). So we controlled only for two variables at classroom-level: grade (0 = *7th*, 1 = *8th*, and so forth) and track (0 = *comprehensive*, 1 = *vocational*) which were found to be associated with student well-being in the Belgian context (Galand et al., 2006; Engels, Aelterman, Van Petegem, & Schepens, 2004).

Table 1

Means, standard deviations and correlations among variables.

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Gender	0.47	0.50									
2. SES	1.61	0.58	0.05								
3. Grade retention	0.50	0.71	0.04	−0.25***							
4. Anger	1.36	1.32	0.12***	−0.09 [†]	0.09**						
5. Boredom	2.19	1.93	0.19***	0.01	0.02	0.37***					
6. Anxiety	1.45	1.22	−0.05	0.01	−0.02	0.44***	0.19***				
7. Shame	0.83	1.02	0.03	0.05	0.01	0.40***	0.23***	0.49***			
8. Enjoyment	3.57	1.53	−0.03	0.08 [†]	−0.01	−0.24***	−0.26***	−0.24***	−0.24***		
9. Perceived mastery goal structure	3.53	1.27	−0.14***	−0.02	0.05	−0.28***	−0.26***	−0.11**	−0.09**	0.20***	
10. Perceived performance goal structure	2.10	1.39	0.07 [†]	−0.04	0.01	0.37***	0.25***	0.24***	0.26***	−0.14***	−0.44***

Note: N = 891. Gender was coded 0 = female, 1 = male.

[†] p < 0.05.

** p < 0.01.

*** p < 0.001.

7.3. Data analysis strategy

Multilevel analyses were performed with the HLM7 software. Due to missing data at individual level, 19 subjects (2% of the total sample) were removed from the analyses using listwise deletion. Multilevel analyses were therefore based on a sample of 891 students from 55 classrooms. Null-models without any explanatory variables were first fitted for each dependent variable. In model 1 control variables and environment perceptions were introduced at the individual level. Individual perception of learning environment were centered at the group mean to allow disentanglement of contextual effect from idiosyncratic effect (Lüdtke et al., 2009). Next, model 2, including control variables at classroom level was run. Following the recommendation of Raudenbush and Bryk (2002), only variables with significant effect were kept at classroom-level. Finally, in model 3, learning environment variables were introduced at classroom level. As mentioned earlier, non-significant variables at classroom level were again removed to obtain the final model. The same steps were followed with each emotional outcome as dependant variable.

8. Results

8.1. Preliminary analyses

Means, standard deviations and correlations among variables are shown in Table 1. Before running multilevel models, it's necessary to check if students of a same class really share a common perception of classroom environment. So null models with learning environment variables as dependant variables were run to obtain an estimate of the proportions of within- and between-classroom variance. The IntraClass Correlation (ICC) coefficient indicated that the amount of variance related to between-classroom differences was 29% for mastery goal structure and 18% for performance goal structure. Therefore it is relevant to analyse goal structure variables at the classroom level.

Null-models were then run for each discrete emotion. Between-classroom variance was significantly different from zero for each emotion. Results showed that the proportion of variance lying between classrooms was 15.6%, 7.2%, 4.7%, 4.5%, and 5.3% for anger, boredom, anxiety, shame, and enjoyment, respectively.

8.2. Effects of control variables and perceptions of goal structures (individual-level)

In the first step, control variables (gender, SES and grade retention) and individual perceptions of the classroom goal structure were introduced at level 1. Goal structures perceptions were centered on the mean of each classroom (group-mean centering). Control variables and individual perceptions accounted for some part of within-classroom variances: 11% for anger, 9% for boredom, 4% for anxiety, and 5% for shame and enjoyment. The between-classroom variances were not affected by the introduction of these variables in the model. Results presented in Table 2 indicated that boys report being more often angry and bored while gender was not associated with anxiety, shame or enjoyment. There are no relationships between discrete emotions and SES or grade retention, with the exception of shame that is marginally related to SES. Regarding individual goal structures perceptions, the results showed a positive and significant association between perceived performance goal structure and all negative emotions and no link with enjoyment. Students who perceived a higher level of performance goal structure than their classmates (classroom mean) reported being more often angry, bored, anxious and ashamed. Perceived mastery goal structure was significantly and positively related to enjoyment while negatively related to two negative emotions: anger and boredom. Students who perceived a higher level of mastery goal structure than their classmates reported feeling more frequently enjoyed and less frequently angry or bored.

Table 2

Unstandardized coefficients for final multilevel models for anger, boredom, anxiety, shame and enjoyment at school.

	Negative emotions				Positive emotion
	Anger	Boredom	Anxiety	Shame	Enjoyment
ICC	0.156	0.072	0.047	0.045	0.053
Intercept	1.51[*]	2.64^{***}	0.81^{***}	0.14	3.72^{***}
Student level					
Individual characteristic					
Gender	0.26^{**}	0.58^{***}	−0.13	0.02	−0.12
SES	−0.05	0.07	0.05	0.13 [†]	0.15
Grade retention	−0.01	−0.02	−0.06	−0.03	0.07
Individual goal structures perception (group-centered)					
Mastery goal perception	−0.12 ^{**}	−0.21 ^{**}	0.02	0.03	0.27^{***}
Performance goal perception	0.25^{***}	0.27^{***}	0.2^{***}	0.18^{***}	−0.06
Classroom-level (fixed effects)					
Classroom characteristics					
Grade		0.22^{***}			−0.16 ^{**}
Track	0.53^{***}			0.19 [†]	
Classroom goal structures (mean-centered)					
Mastery goal structure	−0.28 ^{**}	−0.37 ^{**}			
Performance goal structure	0.29[*]		0.29^{***}	0.2^{**}	
Explained between-class variance	73%	66%	44%	33%	32%
Explained total variance	21%	13%	6%	6%	6%

Note: N_{students} = 891; N_{classrooms} = 55. Gender was coded 0 = female, 1 = male.

[†] p < 0.1.

^{*} p < 0.05.

^{**} p < 0.01.

^{***} p < 0.001.

8.3. Effects of grade and track (classroom level)

Grade and track were then introduced at classroom level as control variables. Between-classrooms variances were reduced by 24% for anger, 39% for boredom, 0% for anxiety, 4% for shame, and 32% for enjoyment.

The results indicated that grade was significantly related to boredom and enjoyment. Students from a higher grade reported feeling more often bored and less often enjoyed. Educational track was significantly linked to anger and marginally linked to shame. In vocational tracks, students reported more frequent feeling of anger and shame.

8.4. Effects of goal structures (classroom-level)

In a third and last step, goal structures variables were introduced at level 2. Between-classrooms variances were reduced by 50% for anger, 26% for boredom, 44% for anxiety, 29% for shame, and 0% for enjoyment. Between-classrooms variance was still significant for each outcome. Results showed a positive association between performance goal structure and feelings of anger, anxiety and shame whereas mastery goal structure was negatively related to anger and boredom. For enjoyment, no associations with goal structures were found. So a higher level of performance goal structure in the classroom is related to more frequent feelings of anger, anxiety and shame among students. And a lower level of mastery goal structure in the classroom is related to more frequent feelings of anger or boredom. The final model for each emotion can be seen in Table 2.

9. Discussion

The aim of this study was to analyse with multilevel models the effects of goal structures on discrete emotions considered separately. By extension of Pekrun's approach (Pekrun et al., 2006), it was expected that mastery goal structure should impact enjoyment positively and boredom and anger negatively (the activity-related emotions), while performance goal structure was expected to affect anxiety and shame positively (the outcome-related emotion). These analyses first confirmed that students' emotions vary significantly from one class to another. The proportions of variance at the classroom level, ranging from 4.7% to 14.6% depending on the emotion considered, are comparable to those identified in the literature about achievement emotions (Frenzel, Pekrun, & Goetz, 2007). Regarding this classroom effect, our results show that a large proportion of the between-classroom variance, from 35% to 55%, can be accounted for by goal structures for most emotions, except for enjoyment. As predicted, learning environment effects are different depending on the discrete emotion taken into account. Results indicate that between-classroom variations in anger are linked to both mastery and performance goal structures, between-classroom variations in boredom are linked to mastery goal structure, and between-classroom variations in anxiety and shame are both linked to performance goal structure.

The use of multilevel models made it possible to highlight the effects of classroom goal structure as contextual effects. Previous

studies analyzed only the effect of individual perception of goal structure on emotional outcomes and recommendations regarding optimal learning environment were based on these individual perceptions. But when multilevel analyses distinguish, on the one hand, individual perception of goal structure and, on the other, goal structure as a classroom contextual characteristic, the results show that the effects are not comparable (see Bressoux, 2008). This difference in findings between the classroom-level goal structure and the individual-level perception of goal structure is particularly obvious for boredom and joy. Our analyses showed that students reporting more boredom also perceive higher performance goal structure and lower mastery goal structure compared to other students in their class. But when we look at the differences between classes, we can observe that it is only mastery goal structure that appears to be strongly associated with boredom. Students reporting more enjoyment are also those who report a higher level of mastery goal structure compared to their classmates while mastery goal structure is not associated to the variations between classrooms. Even if our results about individual perceptions of goal structure seem similar to the existing literature (Kaplan & Midgley, 1999; Roeser et al., 1998), it should be emphasized that our measure is not equivalent. In contrast to previous studies that confounded classroom effect and individual effect in the same analyse, multilevel analyses distinguish these two effects. Previous studies showed that students who feel more often enjoyment are those who perceived a higher level of mastery goal structure than all the other students in the sample. Our results, however, indicate that those who report a higher level of mastery goal structure relative to the average level of their own class report more enjoyment (as in this study, individual perceptions have been centered on the classroom mean). By distinguishing the classroom effect, multi-level analyses make it possible to isolate this student-effect. But how should we interpret these deviations from classroom averages perceptions and, most importantly, its relationships with the emotions? These deviations may be due to individual differences but may also reflect potential differences from a student to another in terms of teacher treatment (Wolters, 2004). These results reinforce the need to take into account the correct level of analysis (Lüdtke et al., 2009; Marsh et al., 2012). Theoretical and practical implications about the contextual effects of goal structure should be based on findings from multilevel analyses, or (quasi)-experimental studies. Of course, this does not mean that studying the effects of individual perception is not relevant. Indeed our results also showed a large effect of individual perception beyond classroom effects. But this means that these effects should not be directly considered as a reflection of the learning environment. The results of the present study underscore that implications regarding learning environment and teaching practices should not be drawn from findings based only on individual perceptions (see also Hospel & Galand, 2016).

Finally, our study also aimed to investigate the results of multilevel analyses on each discrete emotion usually combined in composite measures such as negative or positive affects. Following goal-achievement theory (Kaplan & Maehr, 1999), mastery goal structure promotes positive emotions and performance goal structure increases negative emotions. However, this research showed that results vary from one discrete emotion to another. Anxiety and shame are, for example, mainly associated with an environment oriented towards social comparison and performance demonstration, which is in line with the theory, while boredom, another negative emotion, appears more related (negatively) to a classroom environment oriented towards learning and progression. Employing a composite measure of negative emotions, as is usually the case in the literature, thus probably confounds these different effects. Others factors have also differential effects according to emotion taken into account. Our results showed that frequency of anger or boredom at school increases during adolescence while frequency of anxiety or shame appears to be stable. Combining different variables while their predictors are different reduces the validity of the findings based on this composite measure. Although the use of an aggregate variable, such as negative or positive affect, is still relevant in many situations (Pekrun et al., 2017), it might be interesting, as already suggested by Mouratidis et al. (2009), to avoid them when the aim of the study is to identify the antecedents of emotions at school. Beyond the theoretical issue, this has also practical implications. Indeed, rather than to react to an overall problem of negative affect, teachers often have to deal with the boredom of some specific students, the anxiety of other ones, and still the anger of others.

From a theoretical point of view, these results confirm that it is hazardous to make predictions about goal structures effects on emotions based only on the positive or negative valence of these emotions. The taxonomy of emotions including “object focus” in addition to “valence” proposed by Pekrun et al. (2006) seems more relevant. As expected, performance goal structure was linked to outcome-related emotions such as anxiety and shame. Regarding activity-related emotion, such as enjoyment, anger and boredom, an association was expected with mastery goal structure. Our study confirms this hypothesis for boredom and anger but not for enjoyment. Indeed this study finds no significant relationships between enjoyment and classroom goal structures. It should be noted that, in a recent study among different achievement emotions, enjoyment is the only one not influenced by an experimental manipulation of feedback instructions (Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014). So the degree to which enjoyment is influenced by learning environment is not clear and deserves further studies.

Regarding anger, an effect inconsistent with our theoretical framework was also found. This emotion is indeed associated with performance goal structure. Concerning this result, one might wonder whether anger is not also an outcome-related emotion and not only an activity-related emotion. Indeed, even if anger is usually considered as an activity-related emotion in empirical studies (Pekrun et al., 2006; Pekrun et al., 2009), this emotion appears both as an activity-related emotion and an outcome-related emotion in Pekrun theoretical approach (2006). Students can feel anger about an activity but also about outcome such as bad marks or disciplinary decision. Items assessing anger in Pekrun et al.’ studies about achievement emotions (2006, 2009) are more focused on activity (e.g., “I get angry when I have to study”) while our items are more general (e.g., “I feel anger”). It is therefore possible that some students answered this items with anger about an outcome in mind. This may explain why our result differs from our initial assumption.

10. Limits and perspectives

Our study has several limitations. First, given its cross-sectional design, this research does not allow us to draw conclusions in terms of causality. Second, since our sample consist of students from only six different schools, it was not possible to control for a potential school effect beyond the classroom effect. Regarding the classroom effect on emotions, between-classroom variance of the final model is still significant for all outcomes. Future studies will have to explore which other classroom-level variables, in addition to variables taken into account in this research, can explain the differences between classrooms regarding students' emotions. Previous studies showed that compositional variables had no impact on student well-being (Peetsma et al., 2006; Verkuyten & Thijs, 2002); only some associations between compositional variables and achievement emotions in mathematics were found (Frenzel et al., 2007). Another trail to explore would be the potential impact of social relationships among peers within the classroom (Modin & Ostberg, 2009; Oberle, Schonert-Reichl, Zumbo, 2011; Ryan, 2011). Then, only five emotions contained in the database were investigated. It could be appropriate to replicate this study with a wider range of emotion, mainly with positive outcome-related emotions such as pride and hope.

Finally, it would also be interesting to explore empirically the processes explaining the relations between goal structure and emotions. For instance, it would be relevant to replicate this kind of multilevel study by adding individual achievement goals to test if the effects of classroom goal structures on students' emotions are mediated by individual achievement goals, as hypothesised by achievement goal theory (Roeser et al., 1996).

In conclusion, students feel more or less anger, boredom, anxiety, shame or enjoyment at school according to their classroom goal structure, which is related to teachers' practices (Midgley, 2002). Our results suggest to promote practices oriented towards mastery and improvement to reduce the frequency of anger and boredom. It is also preferable to avoid to promote elitism and competition in order to reduce student anger, anxiety and shame and increase enjoyment. It would be pertinent to raise awareness of the importance of these practices among teachers. Indeed it is not simply a matter of learning, but also of adolescents' psychological health. The role of teachers is important given that adolescence is a critical period during which an increase of anger and boredom and a decrease of enjoyment are observed.

Regarding future studies, the results of this study call for being careful in the use of composite measures such as positive or negative affects when the purpose is to identify antecedents and underlying processes. Discrete emotions are related to different factors and analyses of composite measures confound these different effects, which affects the validity of the conclusions drawn. In addition, the use of multilevel models leads to nuance conclusions usually drawn about the effects of goal structures. The findings show that the effect of goal structures can be very different at the classroom level and at the individual level. Like other studies using multilevel models (Murayama & Elliot, 2009), our study thus opens up new perspectives for refining the goal structure approach, whose potential has not yet been fully exploited to promote positive youth development.

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