



Unpacking classroom goal structures based on students' own words

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Abstract

Achievement goal theory research, which investigates students' perceptions of the classroom climate, has mainly focused on teacher practices from a deductive perspective. However, this appears to hinder a fuller understanding of all the factors that influence students' perceptions of the classroom goal structures (CGS). Therefore, using a combination of inductive and deductive approaches, a series of three studies was conducted to identify new elements in students' perceptions of CGS in relation to mathematics. In Study 1 ($N=340$, 5th–7th graders), a self-reporting Hungarian-language questionnaire was developed to measure CGS. In Study 2 ($N=250$, 7th graders), the same questionnaire was supplemented with open-ended questions about the classroom climate. Based on a qualitative analysis of these open-ended questions, new scales, one each for the factors of helping peers, recognition by peers, and image of the classroom community, were created in Study 3 ($N=438$, 6th–8th graders) to explore their relationship to classroom goal structures. Factor analysis confirmed the expected structure, except for recognition by peers, which had to be divided into two factors with the new construct known as teasing peers. Findings confirm the relevance of a combined, inductive–deductive approach in examining CGS.

Keywords Motivation · Achievement goal theory · Classroom perceptions · Goal structure · Social context · Mixed-methods

1 Introduction

The way in which students perceive the classroom environment plays a crucial role in their motivation, engagement, and achievement at school. Achievement goal theory provides a key approach to explore the link between the classroom environment

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and motivation to learn. Achievement goal theory research has identified a number of environmental factors that can help to create a positive climate in terms of motivation (for reviews, see Anderman & Patrick, 2012; Lüftenegger et al., 2014; Patrick & Kaplan, 2022; Urdan, 2010). However, previous studies have typically used a deductive approach, leaving little room for students' own experiences. Despite criticism of this approach as regards the characteristics of students' motivation (e.g., Brophy, 2005; Dowson & McInerney, 2003; Lee & Bong, 2016; Lüftenegger et al., 2019; Urdan & Mestas, 2006), little attention has been paid to understanding the features of the learning environment. The deductive approach would appear to limit our understanding of the factors of the classroom climate affecting motivation. However, other data collection methods that focus more on students' own experiences may make it easier to identify new causes and, at the same time, provide more information on the role of previously established factors. This research relies on achievement goal theory and aims to examine the classroom motivational climate by allowing more scope for students' voices than before in order to identify new environmental factors that may affect their learning motivation.

Within the framework of achievement goal theory, the motivational climate in the classroom is usually explained by goal structures. Achievement goal theory assumes that learning, engagement, and achievement can be influenced through goal structures (Anderman & Patrick, 2012; Patrick & Kaplan, 2022; Urdan & Kaplan, 2020). This research uses a combination of inductive and deductive approaches to better understand those characteristics of the classroom that are behind students' perceptions of goal structures, and determines their significance in the domain of mathematics.

1.1 Achievement goal theory

In achievement goal theory, individual differences in students' motivation are explained by their *goal orientations* and their fundamental opinions regarding their own capability. There are two types of goal orientations that may explain students' desires in situations involving achievement. *Mastery goals* describe the desire to develop new skills and competences, and to understand new ideas, while *performance goals* relate to the desire to demonstrate individual skills and abilities. Mastery goals are usually evaluated using internal norms, and performance goals tend to be assessed with the help of interpersonal norms (for a review, see Senko, 2016; Urdan & Kaplan, 2020). Goal theorists distinguish between approach and avoidance forms of goal orientations. The former means that the individual's behavior is influenced by desirable potential outcomes, with the latter signifying that it is motivated by undesirable ones. Although this distinction was first applied to performance goals alone, it was later extended to mastery goals as well, resulting in a 2×2 framework of goal orientations (Elliot, 2005). Based on the *approach–avoidance* dimensions, a new 3×2 model of achievement goals has recently come into use that distinguishes between *task-based*, *self-based*, and *other-based* goals (Elliot et al., 2011).

These goal types and their various combinations are linked to different cognitive, motivational, behavioral, and social outcomes. For example, the mastery-approach

goal is generally associated with favorable consequences, while the performance-avoidance goal usually relates to unfavorable ones. Results of previous studies are ambiguous in terms of both mastery-avoidance and performance-approach goals (Anderman & Patrick, 2012; Baranik et al., 2010; Huang, 2011, 2016; Payne et al., 2007; Senko & Dawson, 2017; Urdan & Kaplan, 2020). Studies focusing on a combination of goals suggest that mastery orientation is consistently positive for students, whereas following both mastery and performance goals at the same time offers positive outcomes only in certain contexts (Niemi-virta et al., 2019; Wormington & Linnenbrink-Garcia, 2017).

Achievement goal theory assumes that learning motivation is influenced by both the environment and students' individual characteristics. In research on the topic, the motivational effect of the learning environment is usually characterized by goal structures. These convey students' subjective perceptions and experiences of the messages relating to the learning environment that influence their goal orientation. As with goal orientations, there are also two types of goal structures. A mastery goal structure drives students to thoroughly understand the learning material, to outperform their previous achievements, and to follow mastery goals. On the other hand, a performance goal structure encourages them to compare their performance with that of others, to compete, and to follow performance goals (Ames, 1992). Studies relying on student questionnaires usually show a positive relationship between goal structures and the respective orientations. In addition to the impact goals have, goal structures may have a direct influence on learning, engagement, and achievement. In general, a mastery goal structure is associated with positive outcomes, while a performance goal structure is linked to negative ones (for reviews, see Anderman & Patrick, 2012; Baudoin & Galand, 2017; Patrick & Kaplan, 2022; Urdan & Kaplan, 2020). A mastery goal structure seems to have a stronger relationship to student outcomes than a performance goal structure. This is most probably explained by the fact that while facilitating self-improvement creates a favorable motivational environment for all students, encouraging comparison with others may have different effects depending on the student. It is advantageous for high achievers but can be harmful for low achievers (Middleton et al., 2004). There is broad consensus in the literature that strengthening structures related to mastery goals and eliminating those connected to performance goals creates a positive motivational classroom environment (e.g., Anderman & Patrick, 2012; Maehr & Midgley, 1996). As a rule, goal structures are seen as potential intervention points that can influence students' motivation, engagement, and achievement. Furthermore, a growing body of research highlights that students' socioemotional outcomes, including social goals, relationships, and well-being at school, are shaped by goal structures (e.g., Bardach et al., 2019; Baudoin & Galand, 2022; Madjar et al., 2019; Polychroni et al., 2012). Quasi-experimental research and intervention programs have provided empirical evidence that the perception of goal structures can be manipulated through the behavior and practice of teachers (e.g., Gertsakis et al., 2020; Maehr & Midgley, 1996; O'Keefe et al., 2013). In order to examine this idea, Ames (1992) used Epstein's (1983) conceptual framework in relation to achievement goal theory. This framework describes the teaching principles and strategies that may influence students' perceptions of goal structures. Six categories were established using the acronym TARGET (task,

authority, recognition, grouping, evaluation, and time). These theoretically separate TARGET dimensions are overlapping and interacting with each other in the classroom, that is, the TARGET framework is considered as a coherent group of teacher practices representing mastery goal structure (Patrick & Kaplan, 2022).

A growing number of studies draw attention to the role of classroom relational factors in students' motivation in general (for a review, see Wentzel, 2022), and, more specifically, in the perception of the classroom goal structures (for a review, see Patrick & Kaplan, 2022). In line with this, some goal theorists add a seventh—Social—dimension to TARGET (thus changing the acronym to TARGETS) (e.g. Kaplan & Maehr, 2007; Patrick, 2004). The social features of mastery-structured classrooms are the supportive, warm and caring interactions between the teacher and the students, the open communication of the teacher, and the encouraging peer interactions as well as the mutual respect among students (Kaplan & Maehr, 2007; Patrick & Kaplan, 2022). Lüftenegger et al. (2017) opted for another solution to represent the role of the social environment within the TARGET framework. Their instrument includes items in the category of grouping which are closely related to classroom relational factors (e.g., “In this subject it is important to the teacher that we learn how to work together with others.”).

1.2 Assessing goal structures using student questionnaires

There are a number of measures available to explore goal structures (for reviews, see Bardach et al., 2020; Urdan, 2010). However, the Likert-type student questionnaire, *Patterns of Adaptive Learning Survey* (PALS), developed by Midgley et al. (1996, 2000), as well as adapted and revised versions, are the most widely used instruments. Specific scales related to the teacher, the classroom, or the school may be used depending on the aims of the research. In the first version of PALS (Midgley et al., 1996), items relating to goal structures pertained to teachers' activities, behavior, and assumed intentions. “My teacher...” was used as a sentence beginning in these items. However, these scales were criticized for offering a narrow interpretation of the classroom environment, one which only provided information relating to teacher practice and not to other important aspects such as the norms and values shared by students (Urdan, 2004a). Therefore, the revised version of PALS uses twice as many scales for goal structures as the original. Separate scales have been developed to measure teacher-related and classroom-related goal structures, the latter using “In our class...” as a sentence beginning (Midgley et al., 2000).

Until recently, approach–avoidance dimensions have not been considered in relation to goal structures. When the latest version of PALS (Midgley et al., 2000) was developed, these two dimensions had not yet been accepted in terms of mastery goals; hence, they were not considered as part of the mastery goal structure. The two dimensions were part of PALS for the performance goal structure, but as no significant difference was found among classrooms for this variable in some studies (e.g., Kaplan et al., 2002; Murayama & Elliot, 2009), the differentiation between the approach–avoidance dimensions was not considered to be significant for this goal structure. Studies focusing on performance goal structure either used only the

PALS performance-approach scale, or a modified version was created containing items linked to both dimensions (e.g., Patrick et al., 2011; Urdan, 2004a). Recently, some researchers have argued that the approach-avoidance dimensions should be considered in relation to goal structures as well. Current studies provide support for this view in the case of performance goal structure, while investigation into the approach-avoidance distinction of mastery goal structure has only recently started (Bardach et al., 2020; Gertsakis et al., 2020; Peng et al., 2018; Schwinger & Stiensmeier-Pelster, 2011).

Student questionnaires are sometimes combined with classroom observations (e.g., Patrick et al., 2001) or teacher questionnaires (e.g., Kaplan et al., 2002). Available results show that students' motivation, behavior and achievement have a weaker relationship with goal structures in teacher questionnaires than in student questionnaires or that this relationship may even be non-significant in the former (Schiefele & Schaffner, 2015; Urdan, 2010). Additionally, the convergence of student-teacher agreement on goal structures ranges from non-existent to moderate (e.g., Bardach et al., 2018). Furthermore, evidence was also found of differences in perception and interpretation between researchers and students (e.g., Urdan, 2004b).

Analyses using a multilevel modeling approach indicate that even students in the same class or school may perceive the climate differently. These differences in students' opinions are usually greater within a class than among different classes (e.g., Bardach et al., 2019; Miller & Murdock, 2007). This may be explained by the fact that students' own motivational characteristics, their personal history and current social positioning all influence the way they perceive and interpret their environment (Patrick & Kaplan, 2022; Tapola & Niemivirta, 2008). In addition, messages received from the social environment, especially teacher behavior, may indeed be different for each student (e.g., Bardach et al., 2018; Patrick et al., 2011).

Studies using a person-oriented approach to explore students' goals have extended our knowledge about the links between students' own motivational characteristics and their perceptions of the learning environment. These studies have found considerable consistency in students' achievement goal orientation profiles across ages and various academic contexts, as well as in the perceptions and preferences of students with certain profiles (Niemivirta et al., 2019; Tuominen-Soini et al., 2011). Learners with predominantly mastery or combined mastery-performance goal profiles have given more positive evaluations of different features of their learning environment. Among others, they saw their learning environment as cooperative, meaningful, and more learning focused (Koul et al., 2012; Tapola & Niemivirta, 2008), and tended to evaluate teaching, assessment, goal clarity, and workload more positively when compared to groups with different profiles (Cano & Berben, 2009; Pulkka & Niemivirta, 2013, 2015). Performance-oriented students showed more preference for public evaluation practices, while avoidance-oriented students showed less preference for challenges and task focus in class (Tapola & Niemivirta, 2008). These results suggest that the perceived match between student's own needs and the environment influences their experiences of the learning environment (Niemivirta et al., 2019).

In sum, it seems that—in accordance with the social-cognitive approach in which achievement goal theory is embodied (Kaplan & Patrick, 2016)—the perception of goal structures is associated with ones' subjective meaning-making processes,

however, a certain degree of agreement usually exists among individuals. Although some facets of students' perceptions about the classroom are shared, as Patrick and Kaplan (2022) point out, goal structures are not "objective" characteristics of the learning environment.

1.3 The relationship of goal structures to other characteristics of the classroom

When reviewing previous research in the field, this study focused on investigations providing information on the relationship between goal structures and other characteristics of the learning environment, and on those at least partially relying on students' own perceptions. The relevant studies can be divided into two groups based on the method used: (1) studies that rely on a combination of student questionnaires and observations and (2) studies that rely solely on student questionnaires and which also collect information regarding goal structures and other characteristics of the classroom environment.

1.3.1 Combining student questionnaires and observations

One approach to examining the factors that influence the perception of goal structures is to first categorize school classes according to goal structures using student questionnaires, and then to use qualitative methods, primarily classroom observation or analysis of teacher communication, to shed light on the reasons behind differences in students' perceptions. Usually, the Observing Patterns of Adaptive Learning (OPAL) coding protocol is used for observations. It includes the six TARGET categories plus three additional ones: social interactions, help-seeking, and general teacher messages (Patrick et al., 1997).

Teachers' messages regarding academic tasks, authority, and recognition were found to be linked to the classroom mastery goal structure. Differences were found between high and low mastery-oriented classes in terms of social and affective aspects such as teacher–student relationships and teachers' messages regarding how students should relate to each other. In contrast to low mastery-oriented classes, teacher support, respect, positive affect and teacher enthusiasm were noticeable in high mastery-oriented classes (Patrick et al., 2001, 2003). According to results from Anderman et al. (2002), the most striking difference between high and low mastery-oriented classes was in relation to teacher support for student autonomy. The most significant difference between high and low performance-focused teachers was in the level of importance they attached to formal evaluation. No differences were found in the majority of the TARGET categories. High mastery-focused teachers typically had a warm relationship with their students, and showed them respect. With regard to social comparison, in classes where students reported high mastery and high performance goal structures at the same time, teachers used positive comparison, that is, they emphasized excellent achievement. In high performance-oriented classes, the use of negative comparison was more frequent. In classes characterized by high mastery and low performance goal structures, social comparison was less common.

Turner et al. (2002) found that teacher messages that strengthen the mastery goal structure are partly communicated in an explicit way. That is, teachers explicitly tell students not to feel ashamed or incompetent if they do not understand something. Mastery-focused teachers send more motivationally supportive messages. They also model their own thinking processes to demonstrate that feelings of insecurity, learning from one's mistakes, and asking questions are natural and necessary elements of the learning process. They use humor more often, and create learning situations where the responsibility for tasks is transferred to students, taking into account individual capabilities. In addition, there are also important social and emotional aspects to teacher–student interactions.

1.3.2 Student questionnaires that assess goal structures and other characteristics of the classroom

Another approach that can shed light on underlying factors is the use of student questionnaires that contain scales related to both goal structure and other characteristics of the classroom. Results of student questionnaires confirm the significance of the TARGET dimensions in the perception of the mastery goal structure (Lüftenecker et al., 2014, 2017; Tapola & Niemivirta, 2008), and suggest that a mastery goal structure scale has a positive relationship with academic and emotional support, student–student interactions, students' task-related interactions, classroom mutual respect, peer climate, and student autonomy (Bardach et al., 2019; Butler, 2012; Ciani et al., 2010; Makara & Madjar, 2015; Ohtani et al., 2013; Patrick et al., 2011; Polychroni et al., 2012; Roeser et al., 1996; Shim et al., 2013; Skaalvik & Skaalvik, 2013; Turner et al., 2013). A mastery goal structure may be interpreted as an overarching construct consisting of different dimensions of the classroom social climate (Butler, 2012; Patrick et al., 2011; Turner et al., 2013). Studies on the relationship of a performance goal structure with other classroom characteristics are rare, and the correlations are generally weaker. The performance goal structure shows negative correlations with teacher support for student–student interactions and mutual respect of peers, the classroom climate, as well as with teacher–student and student–student relationships (Makara & Madjar, 2015; Ohtani et al., 2013; Patrick et al., 2011; Polychroni et al., 2012; Roeser et al., 1996; Ryan & Patrick, 2001; Shim et al., 2013; Skaalvik & Skaalvik, 2013).

Patrick and Ryan (2008) added open-ended questions to the Likert-type items on the PALS Perception of Teacher Mastery Goals scale. First, students were asked to rate each item, and then they were asked to describe in their own words what the teacher did or said which had led them to choose that specific rating for each item. Responses were coded thematically, and four more categories were added to the TARGET categories (pedagogical interaction, affective interaction, teacher says, and cannot tell). Pedagogical and affective social interactions elicited the most responses. Recognition, time, evaluation, and task also generated a large number of responses, while teacher says, authority, teacher cannot tell, and group work produced relatively few responses. No difference was found between high and low mastery-oriented classes with regard to the characteristics of teacher practice as perceived by students.

2 Overview of research questions and studies

The most widely used measures of the motivational characteristics of the learning environment within the framework of achievement goal theory are goal structures. Since goal structures describe the classroom's motivational effect in a holistic way, goal structure questionnaires usually involve general statements, thus making it difficult to draw practical conclusions from them. Therefore, exploring the factors that affect students' perceptions of goal structures is of vital importance. However, despite the extensive research on achievement goal theory, studies focusing on relevant factors have a number of limitations. One of the reasons for this is the one-sidedness of the methodology. Although one of the central assumptions of achievement goal theory suggests that the foundation of learning motivation is the individual's own, subjective meaning-making process (Kaplan & Patrick, 2016), little attention has been devoted to exploring students' views on their learning environment. Deductive studies, which are more frequent in the field, typically use psychometric techniques to examine factors in the classroom environment that the researchers themselves assume are important. This leaves limited room for a clear grasp of what students actually think, and instead, simply asks them to rate the scales researchers have predefined (see Patrick & Ryan, 2008, as an exception). Students' interpretations are not represented in observation research either. The deductive approach appears to significantly hinder an understanding of the factors that influence the perception of goal structures.

Research which uses student questionnaires to examine goal structures and other characteristics of the classroom primarily focuses on teacher practice, behavior, and communication; thus, little is known about the characteristics of the learning environment that are not directly linked to teachers and their perception of goal structures. Furthermore, we have even less information about the factors that are connected to the perception of a performance goal structure (Anderman & Patrick, 2012).

In order to help teachers promote a positive motivational classroom climate, as many factors that are linked to the perception of the classroom goal structures need to be identified as possible. This research aims to expand our knowledge about those classroom factors which can be linked to students' self-perceived goal structures. It combines inductive and deductive approaches to explore new, unknown characteristics of the classroom. It attempts to identify new motivational factors of the classroom environment based on open-ended questions. The decision to use open-ended questions was guided by the criticism that Likert-type questionnaires may limit the range of options and present a distorted picture of reality (Brophy, 2005; Dowson & McInerney, 2003; Lee & Bong, 2016; Lüftenegger et al., 2019; Urdan & Mestas, 2006).

A series of three studies was conducted to explore and determine the significance of classroom motivational characteristics. The first study aimed to develop the Hungarian-language version of the classroom goal structure questionnaire. The second study, based on the instrument developed, collected information on students' experiences with regard to goal structures relying on a qualitative

approach, without special focus on the role of teachers. The third study relied on a quantitative approach, and examined the relationship of goal structures to the new scales that had been created based on students' responses in Study 2.

The research questions that this work is intended to shed light upon are the following:

- (1) Can the developed scales for measuring classroom goal structures be applied among Hungarian late elementary students? (Study 1)
- (2) Which factors can be identified behind students' perceptions of the classroom goal structures if more scope is allowed for students to share their own experiences by using open-ended questions? (Study 2)
- (3) Can the significance of social factors which were identified by means of qualitative data collection as influential in the perception of classroom goal structures statistically confirmed? (Study 3) The research used the field of mathematics, primarily because the majority of relationships identified in previous research had also focused on this subject. Moreover, different schools may use different names for the same subject area in Hungary, but mathematics is usually known as mathematics, which made it practical in the wording of items. The research project was approved by the United Ethical Review Committee for Research in Psychology in Hungary.

3 Study 1

Study 1 was carried out to develop a Hungarian instrument which measures mastery and performance goal structures in the classroom. Although the meanings of both mastery and performance goal structure are widely accepted, there are no definitions for these terms in use in the literature (Urdu, 2010). Therefore, in the development of this Hungarian-language instrument, this research relied on existing questionnaires. Bearing in mind one of the goals of the present research, namely, revealing new factors based on students' perceptions of classroom goal structures (Study 2 and Study 3), representing both dimensions of approach and avoidance seemed important in the case of the performance goal structure. As for the mastery goal structure, these dimensions have hardly been used so far, and only with the teacher-related scale (for a review, see Bardach et al., 2020).

In the current study, two scales were developed for the Hungarian-language version of the Classroom Goal Structure Questionnaire. This was abbreviated to MOCK after the acronym for the questionnaire in Hungarian. The mastery goal structure scale was based on PALS (Midgley et al., 2000), while the performance goal structure scale was based on Urdu's (2004a) scale. PALS (Midgley et al., 2000) is the most widely used instrument to explore goal structures from the perspective of students. It contains scales related to both teacher and classroom goal structures. In terms of this research, PALS scales that are related to classroom goal structures are more relevant. In the latest version of PALS, one scale is dedicated to the classroom mastery goal structure and two (approach and avoidance dimensions) are devoted to the classroom performance goal structure. As previously mentioned,

instead of making a distinction between the approach and avoidance dimensions of performance goal structure in empirical research, goal theorists mostly used to rely on a single measure of performance (-approach) goal structure. In the limited number of studies where both performance goal structure scales of PALS were used, the authors typically did not subject the avoidance scale to further analysis because of its low internal consistency or non-significant variance among classrooms (see Schwinger & Stiensmeier-Pelster, 2011). Hence, the seven-item scale of classroom performance goal structure developed by Urdan (2004a) was chosen for the present study. This measure was created to avoid the moderate interrelation between the mastery and the performance goal structure found several times in previous studies. Both approach- and avoidance-oriented items are included in the scale. Moreover, the scale emphasizes those features of the classroom climate that are driven by student attitudes and behaviors and that are independent of the teacher. In Urdan's (2004a) study, confirmatory factor analysis was conducted with the classroom mastery goal structure of PALS and the new classroom performance goal structure items. The correlations with personal goal items as well as the reliability analysis confirmed the applicability of the scale.

3.1 Participants and data collection

The participants were 340 fifth- to seventh-grade students from 12 classes in three Hungarian elementary schools. Four classes per grade level were sampled (mean age: 12.8 years). At each grade level, two classes had a disproportionate amount of children whose parents had a low educational attainment while the others had an unfair share of children whose parents' educational attainment was high. The proportion of boys and girls was approximately equal (48% girls, 52% boys). Table 1 displays the main characteristics of this sample.

School principals and parents of participants signed an informed consent form. Questionnaires were completed during regular class hours, and administered by the

Table 1 Main characteristics of the sample in Study 1 (n = 340)

Variable	<i>n</i>	%
<i>Grade</i>		
5	112	33
6	110	32
7	118	35
<i>Mother's educational level</i>		
Primary school	67	20
Vocational school	96	28
High school	102	30
College/university	75	22
<i>Gender</i>		
Boy	177	52
Girl	163	48

homeroom teacher for each group. Teachers were provided with an explanatory note on how to complete the questionnaires. They were required to inform students of the general aims of the research, and they were told to ask the students to provide honest answers. Teachers also informed students that participation in the research was voluntary and anonymous.

3.2 Instrument

The mastery goal structure scale in MOCK was based on PALS (Midgley et al., 2000), while the performance goal structure scale was based on Urdan's (2004a) scale. The original scales were translated into Hungarian using back-translation techniques (Brislin, 1986; International Test Commission, 2017; McKay et al., 1996). Translations from English into Hungarian were prepared by two independent translators and a researcher. Discrepancies among the three translated versions were then discussed to develop the initial Hungarian scales. The translated items were back-translated into English by a third translator who had not seen the original English version of the scales, and the back-translated scales were compared with the original scales. Discrepancies, errors, and biases were highlighted and discussed. The translation process was repeated until the back-translated items were equivalent to the items of the original English scales. The final version of the Hungarian scales was independently reviewed by a translator to confirm that each item had kept its original meaning. As regards their content, items were the same as those in the original scales; however, all items appeared twice with different wording, which offered an additional opportunity to choose optimal translations for each item on the basis of statistical analysis. The classroom mastery goal structure scale of PALS (Midgley et al., 2000) consists of six items; Urdan's (2004a) classroom performance goal structure scale consists of seven items, hence 12 items related to the mastery and 14 to the performance goal structure in the preliminary version of MOCK.

The instrument which was used to validate the goal structure questionnaire had been developed in a previous study (Fejes & Víg, 2012). It was based on PALS (Midgley et al., 2000) to measure Hungarian adolescents' goal orientations, however, it consisted of four scales, each of which contained four items: a mastery-approach goal (e.g., "I'm aiming to fully understand the material in math"); a mastery-avoidance goal (e.g., "I want to avoid not understanding every bit of the material in math"); a performance-approach goal (e.g., "My aim in math is to be considered better than my classmates"); and a performance-avoidance goal (e.g., "I want to avoid being considered weak in math"). The items were presented using a 5-point Likert scale (1 = *not true at all*; 5 = *very true*) and were randomly arranged in the questionnaire rather than grouped by scale.

3.3 Data analysis

To analyze the structural validity of MOCK, the sample was randomly divided into two subsamples ($n=170$, respectively) for exploratory (EFA) and confirmatory factor analyses (CFA). The size of the subsamples, including the ratio of participants

to factors, was adequate for factor analyses (see Kline, 2016; Thompson, 2004). With the first split sample, to explore the scale's underlying factor structure, a series of *EFAs* was used in SPSS 20. *EFAs* were run with principal axis factoring and oblimin rotation, which allows correlation between factors. The selection of items for the final version of scales was based on both convergent (high factor loadings on the relevant scale) and divergent (low factor loadings on the other scale) scale validity keeping in mind to cover the content of the original scales. With the second split sample, to test the goodness-of-fit of the revealed factor structures, a *CFA* with maximum likelihood estimation using Mplus 7.0 software (Muthén & Muthén, 1998–2003) was carried out. Independent *t*-tests revealed no significant differences between the two subsamples. One-factor and two-factor models were also compared using *CFA*. The internal consistency of the scales of goals and goal structures was measured by Cronbach's α , and the strength of the correlations was determined by Pearson's correlation. Items for the goal structure scales were examined from the perspective of content, and compared with those for the original scales. To deal with missing data (which ranged between 0 and 0.4% on the item level regarding all variables), full information maximum likelihood estimation was used.

3.4 Results

In an iterative process of *EFA*, a number of items were excluded due to either cross-loadings or low factor loadings. The final version of the questionnaire contained 11 items out of the original 26, which explained 54.3% of the variance. As expected, a two-factor structure emerged. Table 2 shows the factor structure of the instrument. Five items related to the mastery goal structure, and six to the performance goal structure. All items adequately represent their corresponding factor, and are linked to the corresponding scale.

The structural validity of the final version was also studied by *CFA*. The fit of the hypothetical model and the actual data is characterized by the following indicators: χ^2 test, *CFI* (Bentler comparative fit index), *TLI* (Tucker-Lewis fit index), and *RMSEA* (Root Mean Square Error of Approximation). The criterion of model fit was set according to Hu and Bentler (1999) ($RMSEA \leq 0.06$; $CFI \geq 0.95$; $TLI \geq 0.95$). As per the results of the *CFA*, the fit indices were satisfactory: $\chi^2(43) = 63.32$; $p < .05$; $RMSEA = 0.053$; $CFI = 0.98$; $TLI = 0.97$. A one-factor solution with all of the items was also tested. Fit indices were poorer than in the case of a two-factor solution: $\chi^2(35) = 141.15$; $p < .05$; $RMSEA = 0.134$; $CFI = 0.88$; $TLI = 0.84$.

The final scales were examined for content as well. The mastery goal structure scale was compared to the corresponding PALS scale, which contains six items in the following domains: persistence, development, comprehension, comprehension versus memorization, learning new content, and attitudes to making mistakes (see Midgley et al., 2000). The Hungarian-language scale does not measure attitudes to making mistakes, but the other five items correspond to the respective items on the original scale.

Urdan's (2004a) original performance goal structure scale contains seven items linked to: demonstrating competence (three items), avoiding the demonstration

Table 2 Rotated component matrix for MOCK in Study 1

Factors and items	Factor loading	
	1	2
<i>Factor 1: Mastery goal structure</i>		
1. In our class, understanding the material in math is an important goal	.51	.18
2. In our class, it is very important to improve in math	.72	.09
3. In our class, working hard in math is very important	.68	.17
4. In our class, it is important to actually understand the material in math, not just memorize it	.78	.11
5. In our class, understanding new ideas and concepts in math is very important	.86	.02
<i>Factor 2: Performance goal structure</i>		
1. In our class, it is important not to make mistakes in math in front of the others	.09	.49
2. In our class, it is an important goal to get better grades in math than the others	-.02	.78
3. In our class, it is important to avoid looking dumb in math	.25	.51
4. In our class, students try to show that they are better in math than the others	-.12	.92
5. In our class, it is important to show that you are not worse than the others	.01	.85
6. In our class, it is important to avoid looking as if math tasks are difficult	.12	.64
Eigenvalues	4.84	1.99
% of variance	27.03	26.95

Factor loadings > .40 are in boldface

Table 3 Descriptive statistics, alphas, and zero-order correlations for all scales in Study 1

Scale	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6
1. Mastery-approach goal	3.91	0.83	.87	–					
2. Mastery-avoidance goal	3.30	1.01	.71	.41**	–				
3. Performance-approach goal	2.87	1.20	.91	.36**	.14**	–			
4. Performance-avoidance goal	3.72	1.04	.80	.37**	.28**	.40**	–		
5. Mastery goal structure	3.98	0.86	.88	.52**	.34**	.12*	.14*	–	
6. Performance goal structure	3.46	0.92	.87	.50**	.19*	.40**	.37**	.66**	–

* $p < .05$ ** $p < .01$

of lack of competence (three items), and frequency of competition (one item). Although the Hungarian scale consists of items related to demonstrating competence and avoiding the demonstration of lack of competence, it works with a different number of items to the original scale. There is also no item linked to the frequency of competition.

Table 3 shows the descriptive statistics, reliability values, and correlations of the scales. The new scales showed adequate internal consistency (Cronbach's $\alpha = 0.88$ and 0.87). Correlations between the scales of goals and goal structures follow a logical path, except for the relatively strong correlation between the mastery-approach goal and performance goal structure ($r = .50$); however, this is not

unprecedented in the literature (e.g., Bong, 2008). The correlation between the scales of the two goal structures is moderate ($r = .66$).

3.5 Discussion

This study describes the developmental process for MOCK, a Hungarian-language questionnaire, to assess classroom goal structures in relation to mathematics. The structural validity of the instrument was statistically confirmed. The majority of the items corresponded to the original scale items with regard to their content. In the final version of the Hungarian-language instrument, one domain in each of the original scales had to be excluded. Furthermore, the newly developed performance scale contained more items related to avoiding the demonstration of lack of competence than the original one. The new scales showed adequate internal consistency. The means of the scales were not significantly different from previous results (see Midgley et al., 2000; Urdan, 2004a). The convergent validity of MOCK was confirmed by the correlations between the scales for goals and goal structures.

The strength of the correlation between the goal structure scales was higher than previously reported; however, this does not imply that the instrument is not adequate. The two scales are orthogonal (e.g., Anderman & Patrick, 2012; Urdan, 2010). In previous studies, the two scales did not usually correlate, or their relationship was weak and negative (e.g., Makara & Madjar, 2015; Skaalvik & Skaalvik, 2013). However, there are some examples where the correlation ranged from moderately negative to moderately positive (see Bong, 2008; Madjar, 2017; Ohtani et al., 2013; Shim et al., 2013). It is important to note that, while all studies referenced here relied on the PALS classroom goal structure scales or adapted versions, there are significant differences in the number and content of items these studies used. Some studies did not use all the scale items. In addition, not all of them used items related to either the approach or the avoidance dimension of the performance goal structure. In contrast, some studies carried out separate explorations of the two dimensions.

4 Study 2

Study 2 aimed to explore the specific experiences of students that may be associated with their perceptions of classroom goal structures. Previous research has mostly relied on a deductive approach, which does not leave much room for the voices of students, and primarily focuses on teacher practices, behavior, and communication. This study used open-ended questions to shed light on students' own experiences with regard to their perception of classroom goal structures. The study followed the methodology developed by Patrick and Ryan (2008); however, slight differences were introduced in the research design. First of all, this study examined students' experiences as regards both the mastery and the performance goal structure. Furthermore, questionnaire items focused on the classroom as a whole and not on

Table 4 Main characteristics of the sample in Study 2 ($n=250$)

Variable	<i>n</i>	%
<i>Mother's educational level</i>		
Primary school	22	9
Vocational school	63	25
High school	88	35
College/university	77	31
<i>Gender</i>		
Boy	120	48
Girl	130	52

teacher practices. This methodology was expected to explore new characteristics of the learning environment that are important in the perception of goal structures.

4.1 Participants and data collection

A total of 250 seventh-grade students from 11 classes in five different elementary schools participated in the study (mean age: 14.1 years). Special attention was paid to include a range of schools where parents had low, average, or high educational attainment. The proportion of boys and girls was approximately equal (52% girls, 48% boys). Table 4 shows the main characteristics of this sample. In all other respects, the data collection in Study 2 was the same as in Study 1.

4.2 Instrument

Following Patrick and Ryan (2008), each MOCK item, which was developed in Study 1, was supplemented with an open-ended question. Once students had rated their level of agreement (1 = *not true at all*; 5 = *very true*) for a MOCK item, they were asked to explain what specifically happened in the classroom that made them choose that rating. They were then asked to provide an example ("Why did you choose this rating? Please explain what exactly happens in the classroom that makes you think this way? Please give an example").

The large-scale data collection was preceded by a smaller one in just two classes. Results from this small-scale data collection showed that the open-ended questions of similarly worded items were answered only once (see, for example, items 1 and 4 on the mastery goal structure scale and items 4 and 5 on the performance goal structure scale in Table 2). Learning from this experience, the 11 MOCK items were distributed in three different questionnaire versions. Two of the versions contained four items each, while the third one consisted of three items. All versions contained items from both goal structure scales (see Table 2, items of version 1: PGS 3, MGS 3, MGS 4, PGS 6; items of version 2: PGS 5, MGS 2, PGS 2, MGS 1; items of version 3: PGS 1, MGS 5, PGS 4).

4.3 Data analysis

During data analysis, on the one hand, (a) the focus was on the factors that showed up based on students' responses in order to confirm the already identified environmental characteristics that play a role in students' perceptions of the classroom goal structures as well as to add new ones; and, on the other hand, (b) for each item, the distribution of students' responses with regard to the newly identified factors was examined to shed light on the significance of these factors from the perspective of students.

A total of 866 responses were obtained for the open-ended questions using the three versions of the questionnaire. The average word length of relevant (coded) student responses was 22 words (min. = 8; max. = 64). 25.6% of the responses consisted of 1 sentence, 52.7% consisted of 2 sentences, 14.0% consisted of 3 sentences, 6.4% consisted of 4 sentences, and 1.2% of them consisted of 5 sentences.

All of the students' responses were transcribed verbatim and classified according to MOCK items. For the analysis of students' responses, a hybrid approach, a combined technique of inductive and deductive content analysis was used. Coding relied on categories established by Patrick and Ryan (2008), with new categories also defined. Thus, *priori* coding (Weber, 1990) as well as emergent coding (Haney et al., 1998) were combined in Study 2. In the decision about coding units, Merriam's (1998) guidelines were followed according to which the unit of data is the idea represented in each response.

Since previous qualitative and quantitative studies have both confirmed the significance of the TARGET dimensions in students' perceptions of goal structures (for a review, see Patrick & Kaplan, 2022), these categories were assumed to be relevant for this research, too. Therefore, it seemed favorable to rely on Patrick and Ryan's (2008) categories for coding students' responses, which were set up in a research which used the same research design as ours. Although, it worked with different items than our scales, but theirs also included the TARGET dimensions as well as other items that focused on the social characteristics of the classroom, and it was based on the OPAL coding protocol (Patrick et al., 1997). It was assumed that this would make results easier to interpret, and also help distinguish new factors from already existing ones. Students' responses that matched the categories established by Patrick and Ryan (2008) were treated with *priori* coding, that is, categories were established prior to the analysis (see Weber, 1990).

New categories were established with the help of emergent coding. Categories were established following some preliminary examination of the data, in line with the four-phase coding process suggested by Haney et al. (1998). Coding was performed by three encoders. In the first phase of the data analysis, the author of this study reviewed 20% of the student responses to check if they fit into the categories established by Patrick and Ryan (2008), and suggested new categories with definitions and examples. Merriam (1998) makes the following recommendations concerning categories: they should be exhaustive to cover the whole range of the data under investigation; they should be mutually exclusive so that each data point can only be included in one category; category names should be sensitive to and representative of the data; and categories should be in conceptual agreement and at the

same level of abstraction. Having these criteria in mind, a list of keywords was created that represented the main ideas of students' responses. 6 keywords were generated which provided bases for the new categories. After re-reading the students' responses that were listed under certain categories, each new category was given a distinctive name. In the second phase of the data analysis, two independent encoders verified the coding protocol used with the 20% of the student responses from the first phase. Based on the results, the coding protocol was updated. In the third phase, another 20% of student responses were reviewed by all three independent encoders. As a result, new categories were defined and existing ones were revised. Finally, all three independent encoders reviewed and coded all of the responses as per the coding protocol. The inter-rater reliability was measured by Fleiss' kappa ($\kappa=0.72$; $p < .001$), which represents substantial agreement (Landis & Koch, 1977). If two out of the three codes were the same for a response, it was awarded the code. If there was no agreement to a response, the author of this study decided on the category for the response. Seven percent of the responses fit into two categories simultaneously. A second code was assigned to a response if at least two of the three encoders assigned the same second code to it.

4.4 Results

4.4.1 Categories defined based on student responses

Patrick and Ryan (2008) added four additional categories (pedagogical aspects of student–teacher interaction, affective aspects of student–teacher interaction, teacher says, and cannot tell) to the TARGET dimensions (task, authority, recognition, grouping, evaluation, and time) in their analysis, which was used as a model in this study. The analysis was based on these categories, with new ones added. No responses were obtained for grouping and teacher cannot tell; therefore, there is no further discussion of these elements in this study. The categories and their descriptions are shown in Table 5.

Six new categories were created: (1) helping peers, (2) recognition by peers, (3) image of the classroom community, (4) competition, (5) responses related to the heterogeneity of the classroom, and (6) situation-dependent responses. In order to make it easier to differentiate between the category related to recognition by teacher and the one related to recognition by peers, the original category, recognition, is further used to apply to recognition by teacher.

Responses linked to the heterogeneity of the classroom and situation-dependent responses were those in which students explained why they chose a particular item rating. They said that it was difficult to provide a clear answer as regards rating a specific classroom experience, as the community in a classroom is not consistent in certain aspects, or they experienced particular situations differently.

For ease of review, the following category groups were defined: (1) TARGET categories; (2) social categories (pedagogical interaction with the teacher, affective interaction with the teacher, teacher says, helping peers, recognition by peers, image of the classroom community, and competition); and (3) contextual categories, which

Table 5 Description of categories and examples of student responses

Category	Description	Examples of student responses
Task	Refers to the types, variety, amount, level of challenge, or difficulty of tasks and activities	I gave this rating because the teacher always gives us practice problems, and so I feel that I'm better because I can do those problems Instead of just giving a lecture, our teacher proves the learning material with some problems, and this helps us understand the new ideas
Authority	Refers to rules, power, discipline, and decisions, including student choice and input	It is important because if we are persistent, we can achieve more. For example, we get less math homework Because they usually [some of the classmates] don't pay attention during class, and we get bad grades because of them, as the teacher punishes us as well
Recognition	Refers to whether teachers respond to students, type of response (feedback, praise, rewards, or social comparison) and what they respond to (effort, insight, test scores, or behavior)	The teacher despises those who are a bit weaker in math It is important because our teacher likes hard-working students and cares about them more
Evaluation	Refers to the nature of formal or informal student evaluation and assessment, including tests, assignments, homework, grading policies, what is evaluated (completion or correctness), and opportunities for extra or partial credit	We can do extra problems for extra credit, which add up to an A, there are extra problems in every class to be able to earn good grades more easily True! Because we take a practice test, which is not graded, at the beginning of each class so that the teacher can check who has learned and who hasn't
Time	Teacher's reference to or use of time to complete assignments or manage classroom activity	It is important that we understand the material and to progress with it quickly, but, of course, we practice something until everybody understands it If, following a test, for example, our math teacher thinks that we still don't understand something, we practice it before moving on with the new material

Table 5 (continued)

Category	Description	Examples of student responses
Pedagogical interaction with teacher	Teacher–student interactions, including teaching content, explanation, demonstration, revision, giving examples, re-teaching, and teaching specific learning strategies	The teacher tries to make math classes exciting and enjoyable. If we have questions or need help, she tries to explain the material in a really nice way. E.g., she uses games and more exciting problems in math class. If we have any questions, she is happy to answer them A lot of us don't understand the problem, and that's mostly because of the teacher as he/she is difficult to follow, and we are not allowed to ask questions
Affective interaction with teacher	Teacher–student interactions that involve affect, including references to teacher support, caring, respect, conflict, mood, humor, and whether students feel noticed as individuals and connected to the teacher	Because she encourages us to try. If someone starts to do a problem, but doesn't understand it, they still finish it The whole class hates the teacher, who focuses more on making some students laugh at his/her jokes than on making sure we understand the material
Teacher says	Refers to statements made by the teacher	The teacher always says that we should pay attention in class because if we pay attention and understand the material, we will be successful in life! When the teacher says that no one is born a mathematician, but anyone can be good at math if they work hard But not always because if someone doesn't know something, we try to help them Working hard is important in our class because if someone is lagging behind in math or in any other subject, the rest will give them their notes
Helping peers	Student–student interactions which are aimed at helping a classmate to achieve something	It is important because math helps us to figure out the world, and it's embarrassing to look silly in our class We don't humiliate another human being because they are not good at a subject! We accept them as they are!
Recognition by peers	Situations which involve or lack recognition or despising of peers	

Table 5 (continued)

Category	Description	Examples of student responses
Image of the classroom community	Refers to the fact that the views of a third party about a particular school or class may be influenced by the achievement and behavior of the class (e.g., compared to other classes or schools)	Only high achievers go to our school, and we don't want to ruin the reputation of our school It is important because it's a relatively good school, and everybody rates the classes based on students' intellect
Competition	Refers to competition among students within a class, competitive spirit, and academic competitions (the focus is not on recognition by peers or the teacher)	If we enter a competition, we want to get the best possible results Maybe five of my classmates and I try hard together to get better grades. We are pretty competitive in class
Heterogeneity of the classroom community	Refers to the diversity of the classroom community from a certain perspective (e.g., behavior, attention, knowledge, and motivation), so it is difficult to provide unambiguous responses or to generalize; or, in contrast, the community is homogeneous from some perspective	That's my opinion because some of my classmates are lazy and don't do their homework, but there are others who pay attention in class and do their homework as well Some classmates are not interested in this subject and they disturb the rest to hold the class back so that we can't do so many problems
Situation-dependent responses	Refers to situations where it is difficult to generalize and provide clear responses as students' behavior (attention and motivation) depends on the circumstances (e.g., mood, fatigue, and topic)	If we want the class to end earlier, we persist, but usually we don't because math is one of the last lessons Sometimes true, sometimes not because sometimes we don't pay attention to the teacher. But sometimes we join forces and work hard to reach an aim, and we are often successful

The following categories are taken from Patrick and Ryan (2008, 108–110): task, authority, recognition, evaluation, time, pedagogical interaction with the teacher, affective interaction with the teacher, and teacher says

consisted of responses related to the heterogeneity of the classroom community and situation-dependent responses.

The proportion of responses without codes was relatively high (it ranged between 23.8 and 46.6%). The most common reasons for this were as follows: no response was provided to a particular question, the questionnaire item was rephrased, or an irrelevant response was provided. One pattern could be established among irrelevant responses: instead of the learning environment, some of the students' responses related to students' own learning goals (e.g., achieving better grades than previously, passing a high school entrance examination in the future).

4.4.2 Factors related to the perception of the classroom mastery goal structure

Table 6 shows the distribution of responses to the classroom mastery goal structure items. Evaluation is prominent among the TARGET categories, as students noted it most often (6.0–12.7%, $M = 10.6\%$). Other TARGET categories produced relatively few responses. Task (0.0–2.6%, $M = 1.3\%$) and time (0.0–2.5%, $M = 1.3\%$) are also

Table 6 Percentage of student responses by category for classroom mastery goal structure items

Category	Item					Mean
	1	2	3	4	5	
Number of responses*	76 (3)	77 (7)	74 (2)	63 (1)	82 (3)	
<i>TARGET categories</i>						
Task	1.3	1.2	2.6	0.0	1.2	1.3
Authority	0.0	0.0	0.0	0.0	0.0	0.0
Recognition	0.0	1.2	0.0	0.0	0.0	0.3
Evaluation	12.7	6.0	10.5	12.5	11.8	10.6
Time	2.5	1.2	0.0	0.0	2.4	1.3
<i>Social interaction</i>						
Pedagogical	15.2	14.3	2.6	10.9	9.4	10.6
Affective	2.5	4.8	5.3	4.7	1.2	3.6
Teacher says	0.0	0.0	1.3	0.0	3.5	1.0
Image of the classroom community	1.3	3.6	1.3	0.0	3.5	2.1
Helping peers	0.0	0.0	1.3	1.6	4.7	1.5
Recognition by peers	0.0	1.2	1.3	0.0	2.4	1.0
Competition	0.0	4.8	1.3	0.0	0.0	1.3
<i>Contextual categories</i>						
Heterogeneity of the classroom community	19.0	17.9	27.6	34.4	15.3	22.2
Situation-dependent responses	3.8	6.0	15.8	6.3	1.2	6.5
No code	41.8	38.1	28.9	29.7	43.5	36.8

1=In our class, understanding the material in math is an important goal. 2=In our class, it is very important to improve in math. 3=In our class, working hard in math is very important. 4=In our class, it is important to actually understand the material in math, not just memorize it. 5=In our class, understanding new concepts and ideas in math is very important

*The numbers in brackets show the number of items that fit into two categories

worth noting. However, authority was not mentioned in any of the responses, while recognition was only noted once.

From the social categories, pedagogical interaction with the teacher figures prominently (2.6–15.2%, $M=10.6\%$), and affective interaction with the teacher follows behind (1.2–5.3%, $M=3.6\%$). The number of responses relating to other categories in this group (teacher says, image of the classroom community, helping peers, recognition by peers, and competition) was low (1.0–2.1%).

Taking all categories into consideration, or just the contextual categories, heterogeneity of the classroom generated most of the responses (15.3–34.4%, $M=22.2\%$). The proportion of situation-dependent responses was also relatively high (1.2–15.8%, $M=6.5\%$).

4.4.3 Factors related the perception of the classroom performance goal structure

Table 7 shows the distribution of responses to classroom performance goal structure items. From among the TARGET categories, evaluation yielded the most responses

Table 7 Percentage of student responses by category for classroom performance goal structure items

Category	Item						Mean
	1	2	3	4	5	6	
Number of responses*	83 (8)	73 (0)	72 (8)	80 (4)	76 (4)	72 (3)	
<i>TARGET categories</i>							
Task	0.0	1.4	0.0	1.2	2.5	1.3	1.0
Authority	1.1	0.0	0.0	0.0	1.3	0.0	0.4
Recognition	0.0	0.0	0.0	0.0	0.0	1.3	0.2
Evaluation	0.0	9.6	1.3	0.0	1.3	4.0	2.5
Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Social interaction</i>							
Pedagogical	17.6	0.0	6.3	0.0	3.8	30.7	9.6
Affective	1.1	1.4	1.3	0.0	1.3	0.0	0.8
Teacher says	2.2	1.4	0.0	0.0	2.5	1.3	1.2
Image of the classroom community	2.2	2.7	7.5	2.4	8.8	1.3	4.2
Helping peers	9.9	0.0	2.5	14.3	1.3	2.7	5.3
Recognition by peers	29.7	8.2	17.5	7.1	25.0	2.7	15.3
Competition	0.0	11.0	0.0	9.5	5.0	0.0	4.2
<i>Contextual categories</i>							
Heterogeneity of the classroom community	6.6	12.3	33.8	36.9	7.5	24.0	20.2
Situation-dependent responses	5.5	5.5	6.3	4.8	2.5	5.3	5.0
No code	24.2	46.6	23.8	23.8	37.5	25.3	29.8

1=In our class, it is important not to make mistakes in math in front of the others. 2=In our class, it is an important goal to get better grades in math than the others. 3=In our class, it is important to avoid looking dumb in math. 4=In our class, students try to show that they are better in math than the others. 5=In our class, it is important to show that you are not worse than the others. 6=In our class, it is important to avoid looking as if math tasks are difficult

*The numbers in brackets indicate the number of responses that fit into two categories

(0.0–9.6%, $M=2.5\%$); however, their proportion was generally low, except for one item, “In our class, it is an important goal to get better grades in math than the rest.” Time was not referred to in any of the students’ responses, and the remaining categories (task, authority, and recognition) were only mentioned a few times (0.2–1.0%).

Recognition by peers was cited the most among the social categories (2.7–29.7, $M=15.3\%$), with an especially high proportion for two items (29.7%: “In our class, it is important not to make mistakes in math in front of the others” and 25.0%: “In our class, it is important to show that you are not worse than the others”). Pedagogical interaction with the teacher is also worth noting (0.0–30.7%, $M=9.6\%$). For one of the items, it generated almost one-third of the responses, although no response was obtained in this category for two items. In this group, helping peers (0.0–14.3%, $M=5.3\%$), image of the community (1.3–8.8%, $M=4.2\%$), and competition (0.0–11.0%, $M=4.2\%$) were also popular, although the latter was not mentioned in three items out of the six. The other two categories in this group (affective aspects of student–teacher interaction and teacher says) were only noted rarely (0.8–1.2%).

From the contextual categories, heterogeneity of the classroom produced most of the responses, and this category proved to be the most important among all of the categories (6.6–36.9%, $M=20.2\%$). The proportion of situation-dependent responses was also high; its significance was about the same for all items (2.5–6.3%, $M=5.0\%$).

4.5 Discussion

This study has identified some new characteristics of the classroom environment that are linked to the perception of classroom goal structures in relation to mathematics. The qualitative analysis of student responses has prompted the addition of six more categories to those defined by Patrick and Ryan (2008). The category of *helping peers* concerns the student–student interactions which are aimed at helping classmates to achieve something. *Recognition by peers* focuses on situations which involve or lack recognition or despising of peers. *Image of the classroom community* refers to the fact that the views of a third party about a particular school or class may be influenced by the achievement and behavior of the class. The *competition* category involves the competition among students within a class, competitive spirit, and academic competitions (when the focus is not on recognition by peers or the teacher). *Heterogeneity of the classroom community* refers to the diversity of the classroom community from a certain perspective (e.g., behavior, attention, knowledge, and motivation). From students’ perspective it means that it is difficult to provide unambiguous responses or to generalize; or, in contrast, the community is homogeneous from some perspective. *Situation-dependent responses* refer to situations where it is difficult to generalize and provide clear responses as students’ behavior (attention and motivation) depends on the circumstances (e.g., mood, fatigue, and topic). Four of the new categories refer to social characteristics of the classroom: helping peers, recognition by peers, image of the classroom community, and competition. The other two categories, heterogeneity of the classroom community and situation-dependent responses are about the contextual aspect of classroom.

Among the new categories, the role of competition is recognized in the perception of goal structures. Competition may be interpreted as a form of social comparison, which is considered to be a general characteristic of the performance goal structure (Ames, 1992). Although there are several scales similar to *helping peers* in the literature on goal structures, for example, *promoting task-related interaction* (Patrick & Ryan, 2005) and *promoting interaction* (Ohtani et al., 2013), these are all related to the teacher. Moreover, the grouping dimension of TARGET also seems closely related to the new category, *helping peers*. The grouping category is defined as the use of heterogeneous cooperative groups and peer interaction to encourage working with others (Ames, 1992). The main difference between the grouping category and the new category, helping peers, is that the latter is not exclusively related to teacher-guided or teacher-encouraged activities. In addition, it is important to note that while the data collected focused on students' experiences in the classroom ("Please explain what exactly happens in the classroom that makes you think this way?"), very often, students referred to their experiences outside of the classroom as well (for examples, see Table 5). Koskey et al. (2010) also noted this in their study in which they used cognitive interviews to explore students' perceptions of the classroom mastery goal structure.

Shim et al. (2013) used the classroom peer climate scale which showed low but positive correlation with the classroom mastery goal structure and low but negative correlation with the classroom performance goal structure. Their scale contains items that measure positive and negative peer interactions, and it is not related to the teacher. Based on the item examples in the work of Shim et al. (2013), there is an overlap between the classroom peer climate scale and the recognition by peers category (reverse coded sample item: "Students are often teased or picked on in this class"). However, the classroom peer climate scale includes items that are not related to the recognition by peers category. Moreover, items of the classroom peer climate scale are more general, they are not related to specific school subjects.

As mentioned before, the factors that are connected to the perception of a performance goal structure are under-researched in the literature (Anderman & Patrick, 2012). The distribution of student responses suggests that the new categories are chiefly linked to the perception of the performance goal structure; however, this needs to be empirically confirmed, which was one of the aims of Study 3.

The results of this study confirm the important role of students' pedagogical interaction in the motivational climate of the classroom in mathematics. The categories of recognition by peers and image of the classroom community that were identified by this research add new factors to the examination of the perception of goal structures. The role of recognition is well-known in this process. Recognition by peers is a similar factor, and highlights the importance of others, not just the teacher, in the perception of the motivational climate. Image of the classroom community may be interpreted as a manifestation of social comparison. Achievement goal theory has mostly examined social comparison within a learning community, but other learning motivation theories have already established the influence of social comparison of different communities on learning motivation (e.g., Ireson & Hallam, 2001).

Study 2 also drew attention to the fact that students are aware of the contextual aspect of classroom proceedings, which is indicated by the high proportion of

responses related to the heterogeneity of the classroom community as well as to situation-dependent responses. These two categories could be relevant to research methodology used in the future. They raise the prospect of using written assessments to gather information from students on certain aspects of in-context attributes. For instance, further research could look at how different students perceive the views and behaviors of their classmates, and whether these views and behaviors are perceived as situation-dependent.

TARGET dimensions were not significantly represented in students' responses, except for evaluation. Grouping and teacher cannot tell were even excluded from the analysis, as they had generated no responses. These results suggest that students' perceptions of the classroom goal structures are primarily linked to the social characteristics of the classroom.

Differences in the proportions of mentioning particular aspects of the TARGET dimensions suggest that the importance of TARGET categories in students' perceptions may differ considerably. In other words, it seems some aspects of the classroom environment are more important in conveying messages that influence students' perceptions about the classroom motivational climate. The dimension of grouping, which did not yield responses from students, deserves special attention. This result is consistent with the findings of Patrick and Ryan (2008). The category of grouping yielded the lowest proportion of responses in their research, too. In addition, in the research of Lüftenegger et al. (2014), which looked at the relationship of the TARGET dimensions with the classroom mastery goal structure, grouping demonstrated the lowest correlation with the mastery goal structure. However, the result concerning the grouping category needs to be interpreted with some caution, given that a single-item scale was used ("In this class, we can work together on tasks if we like.").

In the study by Patrick and Ryan (2008) in which items with a teacher-related frame were used ("My math teacher...") in a similar age group, students' responses without codes ranged between 10.2 and 22.3 percentage points in the case of the teacher mastery goal structure scale. In this research, the proportion of responses without codes was remarkably higher (23.8–46.6%). A possible reason for this might be the different frame of the items. According to the study by Koskey et al. (2010), students interpret teacher-related and classroom-related items differently. It was found that students were more likely to reflect on their own goal orientations or even additional classroom contexts rather than goal structure when the item was classroom-related. In this study, classroom-related items such as "In our class..." were used, thus providing a possible explanation for the high proportion of responses which were not coded.

5 Study 3

Study 3 aimed to confirm the generalizability of some factors of the social environment identified in Study 2 as well as the importance of these factors with a quantitative approach. More specifically, Study 3 focused on the factors of helping peers, recognition by peers, and image of the classroom community. Based on the results

of Study 2, these factors may play a role in students' perceptions about the classroom goal structures, however, these constructs have not been established in previous research. In order to assess the importance of these social factors, the teacher emotional support scale, which was found to be closely linked to the scale of the mastery goal structure in previous studies (e.g., Butler, 2012; Patrick et al., 2011; Turner et al., 2013), was added to the instrument.

The research aimed to answer the following questions: (1) Can the social factors identified by qualitative methods be transformed into constructs that can be measured on a Likert scale? (2) What is the relative importance of these constructs as regards their relationship to goal structures? (3) What is the importance of these constructs in relation to teacher emotional support?

5.1 Participants and data collection

Participants were 438 students from 24 classes in ten different elementary schools. They attended Grades 6–8 (mean age: 13.6 years; 46% girls, 54% boys). The main characteristics of this sample are presented in Table 8. In all other respects, the data collection in Study 3 was the same as that in Study 1.

5.2 Instrument

The instrument included the MOCK scales that were developed in Study 1, the new scales regarding the social characteristics of the classroom that were created based on the results of Study 2 (image of the classroom community, helping peers, and recognition by peers), and the teacher emotional support scale.

The development of the new scales relating to the social characteristics of the classroom comprised several steps. First, 12–15 items were created for each category. Second, to ensure content validity, these items were revised using expert judgments from three researchers with expertise in the field of learning motivation (two

Table 8 Main characteristics of the sample in Study 3 (n=438)

Variable	<i>n</i>	%
<i>Grade</i>		
6	155	35
7	147	34
8	136	31
<i>Mother's educational level</i>		
Primary school	66	66
Vocational school	87	87
High school	152	157
College/university	128	128
<i>Gender</i>		
Boy	238	54
Girl	200	46

additional besides the author of this study). In the next step, 6–11 items that most closely reflected their respective categories were selected. The criteria of semantic redundancy were also considered. These items were used as the preliminary version of the new scales in the present study. The teacher emotional support scale was developed by Patrick et al. (2011). Its validity and reliability were confirmed by several studies of young adolescents (e.g., Turner et al., 2013). The translation process of this scale was the same as that presented in Study 1. Items for the original teacher emotional support scale were slightly modified in the Hungarian-language version to match the structure of the rest of the items. That is, instead of questions (e.g., “Does your teacher respect your opinion?”), statements were used (e.g., “Your teacher respects your opinion”).

The instrument included 38 five-point items on the Likert scale. The five-point Likert-type scale was used for all instruments (1 = *not true at all*; 5 = *very true*) in order to comply with the Hungarian grading system which also uses five grades to represent students' achievement (1 = *failed*; 5 = *outstanding achievement*). Due to the easy identification of response options, the five-point analogy is widely used in Hungarian data collection settings. All items were related to mathematics. Items on the six scales were randomly arranged. All the items are illustrated in Table 9.

5.3 Data analysis

The total sample was randomly divided into two subsamples ($n = 219$, respectively) for the split-half validation technique. The size of the subsamples, including the ratio of participants to factors, was adequate for *EFA* and *CFA* (see Kline, 2016; Thompson, 2004). Independent *t*-tests revealed no significant differences between the two subsamples. In order to develop the final version of the instrument, with the first split sample, a series of *EFA*, principal axis factoring, and oblimin rotation was used in SPSS 20. With the second split sample, the structural validity was then examined by *CFA* with maximum likelihood estimation using Mplus 7.0 software (Muthén & Muthén, 1998–2003). Items of the final scales were selected according to convergent validity (high factor loadings on the relevant scale) and divergent validity (low factor loadings on other scales). 6–9 items per scales were selected according to these criteria. The internal consistency of the scales was assessed by Cronbach's α , and the strength of the correlations was measured by Pearson's correlation. To deal with missing data (which ranged between 0 and 0.5% on the item level regarding all variables), full information maximum likelihood estimation was used.

5.4 Results

The 38-item questionnaire was reduced to 32 items based on the results of the *EFA*. They explain 57.1% of the variance of the system of variables. Three items were excluded due to their low factor loadings, and another three because of cross-loadings. The item of recognition by peers loaded into two separate factors.

Table 9 Rotated component matrix for MOCK and new scales in Study 3

Factors and Items	Factor loading						
	1	2	3	4	5	6	7
<i>Factor 1: Mastery goal structure</i>							
1. In our class, understanding new ideas and concepts in math is very important	-.06	.15	.70	.10	.21	.14	.07
2. In our class, understanding the material in math is an important goal	-.07	.22	.76	.24	.15	.08	.07
3. In our class, it is important to actually understand the material in math, not just memorize it	-.05	.13	.62	.23	.21	.03	.08
4. In our class, working hard in math is very important	-.06	.29	.69	.20	.10	.11	.18
5. In our class, it is very important to improve in math	.02	.25	.62	.20	.19	.21	.17
<i>Factor 2: Performance goal structure</i>							
1. In our class, it is important not to make mistakes in math in front of the others	.09	.63	.14	.04	-.01	.28	.11
2. In our class, it is an important goal to get better grades in math than the others	.25	.62	.23	.09	-.01	-.01	.08
3. In our class, it is important to avoid looking dumb in math	.09	.62	.38	.04	-.01	.16	.14
4. In our class, students try to show that they are better in math than the others	.32	.57	.06	.08	-.05	.12	.13
5. In our class, it is important to show that you are not worse than the others	.20	.85	.13	.05	.01	.14	.10
6. In our class, it is important to avoid looking as if math tasks are difficult	.23	.60	.24	.23	.08	.01	.12
<i>Factor 3: Helping peers</i>							
1. In our class, students often explain math to each other	-.01	.04	.14	.66	.02	-.04	.07
2. In our class, students often seek help from each other in math	.08	.11	.15	.71	.07	.01	.08
3. If someone is lagging behind in math in our class, the others try to explain it to them	-.18	.10	.28	.55	.08	.21	.16
4. Students usually discuss the solutions to math problems with each other	.09	.03	.04	.60	.08	.11	-.08
5. Students usually share their ideas on the solutions to math problems with each other	.06	.11	.21	.63	.15	.10	.14
<i>Factor 4: Image of the classroom community</i>							
1. It is important for our class to have a good reputation in math	.19	.22	.18	.04	.15	.29	.59
2. The image our class has with regard to math is important	.11	.37	.23	.16	.17	.20	.58
3. We strive to be good at math because our class's reputation is important	.24	.27	.25	.24	.12	.12	.58

Table 9 (continued)

Factors and Items	Factor loading						
	1	2	3	4	5	6	7
<i>Factor 5: Recognition by peers</i>							
1. In our class, we look up to those who are good at math	.21	.14	.03	.00	-.01	.67	.12
2. In our class, we are proud of our classmates who are good at math	-.06	.19	.23	.14	.15	.63	.22
3. In our class, classmates recognize those who are good at math	-.01	.16	.21	.19	.14	.71	.05
<i>Factor 6: Teasing peers</i>							
1. In our class, those who are not good at math are despised	.79	.07	-.06	-.09	-.09	.22	.06
2. If someone struggles with math in our class, the others laugh at them	.80	.14	-.03	.06	-.07	-.01	.07
3. If someone struggles with math in our class, the others tease them	.78	.11	-.08	-.03	-.05	-.06	-.01
4. The others get angry with those who slow down the class	.58	.23	.08	.09	-.02	-.02	.05
5. In our class, those who are good at math show off	.58	.22	-.03	.01	-.14	.11	.04
6. In our class, students who are weak in math are mocked	.80	.11	-.06	.08	-.05	.00	.13
<i>Factor 7: Teacher emotional support</i>							
1. Your teacher respects your opinion	-.15	.00	.14	.10	.71	.12	-.02
2. Your teacher tries to help you when you are sad or angry	-.05	-.08	.10	-.02	.70	.06	.14
3. You can count on your teacher's support when you need it	-.13	.10	.23	.20	.70	.02	.07
4. Your teacher understands your feelings about certain things	-.05	.00	.15	.12	.71	.02	.07
Eigenvalues	8.34	4.85	2.13	1.99	1.63	1.19	1.03
% of variance	11.68	10.37	9.86	7.87	7.29	5.77	4.25

Factor loadings > .40 are in boldface

In addition to the expected factor, another meaningful factor was identified. The new factor was labeled “teasing peers.” Each factor consisted of 3–6 items.

The structural validity of the final version of the seven-scale instrument was also examined by *CFA*. The fit of the hypothetical model and the actual data was characterized by the following indicators: χ^2 test, *CFI*, *TLI*, and *RMSEA*. The criterion of model fit was set according to Hu and Bentler (1999) (*RMSEA* \leq 0.06; *CFI* \geq 0.95; *TLI* \geq 0.95). As per the results of the *CFA*, the fit indices were satisfactory, $\chi^2(292) = 486.22$; $p < 0.001$; *RMSEA* = 0.059; *CFI* = 0.93; *TLI* = 0.98; thus, the structural validity of the scales was confirmed.

Table 10 shows the descriptive statistics, reliability values, and correlations of the scales. According to standard deviation, the biggest difference in students’ opinion was in relation to the image of the classroom community (*SD* = 1.21). The reliability of the scales was good, as Cronbach’s α values varied between 0.76 and 0.88.

Among the new variables, only teasing peers was easy to interpret from the perspective of classroom practice as it only correlated with a performance goal structure ($r = .40$). From this perspective, helping peers is important to note since it showed a stronger correlation with the mastery goal structure ($r = .47$) than with the performance goal structure ($r = .28$). Recognition by peers and image of the classroom community showed similar correlations with both the mastery and the performance goal structure.

Teacher emotional support, the benchmark scale, only correlated with the mastery goal structure. However, this relationship was not striking; much stronger correlations were observed between goal structures and other variables as regards the classroom social environment. This suggests that the new variables identified in this research play a significant role in the perception of the classroom environment.

The low correlation ($r = .14$) between recognizing and teasing peers is also an interesting finding. Their different relationship with goal structures confirms their separate roles in the perception of the classroom environment. Just like in Study 1, Study 3 also found higher correlations between the scales of the two goal structures than previous studies ($r = .48$).

Table 10 Descriptive statistics, alphas, and zero-order correlations for all scales in Study 3

Scale	M	SD	α	1	2	3	4	5	6	7
1. Mastery goal structure	3.85	0.88	.88	–						
2. Performance goal structure	3.40	0.95	.87	.48**	–					
3. Helping peers	3.82	0.86	.80	.47**	.28**	–				
4. Teasing peers	2.89	0.87	.88	-.03	.40**	.04	–			
5. Recognition by peers	3.46	0.89	.76	.38**	.37**	.28**	.14*	–		
6. Image of the classroom community	3.02	1.21	.80	.49**	.55**	.36**	.30**	.47**	–	
7. Teacher emotional support	3.65	0.98	.82	.39**	.06	.25**	-.17*	.20**	.27**	–

* $p < .05$, ** $p < .01$

5.5 Discussion

The structural validity of the scales developed during Study 2 is substantial, with generally high internal consistencies. Contrary to expectations, the scale of recognition by peers loaded into two factors. The existence of the new factor, further referred to as teasing peers, was both theoretically and empirically established. This new scale is actually the inverse of mutual respect, a previously identified scale related to teacher practices (Ryan & Patrick, 2001), from the perspective of students. The link between the mastery goal structure and scales similar to helping peers is well-known (Ohtani et al., 2013; Patrick & Ryan, 2005); however, these scales have always worked with items that also refer to the role of the teacher. The results of this study confirm the role of teacher support in mutual respect among students and helping peers. The results also highlight that students do not link these classroom characteristics to teacher practices, suggesting that relying on scales related to teacher behavior may not be a sufficient way to represent the teasing and facilitating behavior in student–student interactions. However, the teacher emotional support scale is significantly correlated with the scale of helping peers, teasing peers, recognition by peers and image of the classroom community. This may indicate that the teacher is perceived as somewhat responsible for how these peer relationships play out.

Variables that are only linked to one of the goal structures are especially valuable from the perspective of classroom practices. Although correlations do not show cause and effect, they may suggest that students' perceptions of the classroom goal structures can be influenced through an identified variable. This is only valid for teasing peers according to the new scales, which does not correlate with the mastery goal structure but has a moderate correlation with the performance goal structure. Since helping peers correlates with both goal structures, its role is ambiguous. It shows a stronger correlation with the mastery goal structure, possibly suggesting it has a positive impact on the motivational climate of the classroom. Recognition by peers and image of the classroom community both show a similar strength of correlation with the two goal structures. This correlation pattern, which is difficult to interpret, and the relatively high correlations of the two goal structures may be linked.

Correlations between teacher emotional support and the scales of mastery goal structure have been of central importance in previous studies (e.g., Butler, 2012; Patrick et al., 2011; Turner et al., 2013). Teacher emotional support also shows a relatively high correlation with the mastery goal structure in this study, while it has no relationship with the performance goal structure. Newly identified variables show similar or higher correlations with goal structures than teacher emotional support, possibly indicating the importance of these factors in the perception of the classroom's motivational climate in mathematics, at least among Hungarian students.

The relationship between goal structures and social factors in the classroom is well-known; however, previous research has mainly focused on the role of the teacher and has paid little attention to peers. Their role has been measured through scales describing teacher practices, except for some studies which used specific scales to measure the relationship between students (e.g., Makara & Madjar, 2015; Polychroni et al., 2012). The scales developed in this study emphasize the

fundamental role of peers in the perception of goal structures. This aspect deserves more attention in future research.

6 General discussion

This study examines the perception of the classroom goal structures from the perspective of students. It expands on previous studies by using a combination of inductive and deductive approaches, and by concentrating on the classroom as a whole instead of just the teacher's role.

This paper describes the findings of three empirical studies. The research was conducted among Hungarian students in Grades 6 to 8 in relation to the field of mathematics. The first study aimed to develop a Hungarian instrument to measure classroom goal structures. The psychometric properties of the instrument were found to be satisfactory. Slight content-related differences can be identified when compared to the original scales.

The second study combined this new instrument with open-ended questions to shed light on other characteristics of the classroom in terms of students' perceptions of goal structures. Results confirmed the importance of previously established factors, and identified some new ones. Following the methodology developed by Patrick and Ryan (2008), and with a focus on the classroom, six additional categories were added to their system. Four of these new categories, helping peers, recognition by peers, image of the classroom community, and competition, refer to the social characteristics of the classroom. Various aspects have already been discussed in previous studies such as (a) the link between peer relations and the perception of goal structures (e.g., Ciani et al., 2010; Polychroni et al., 2012), and (b) the relationship between the teacher's role in supporting student–student interactions and mutual respect and goal structures (Patrick & Ryan, 2008). Nevertheless, examining the importance of peers as regards the perception of goal structures is a neglected area (see, as exceptions, Madjar et al., 2019; Warburton, 2017). However, the results of this study confirm the need to pay more attention to the role of peers, and to examine this area independently of the role of teachers.

The third study focused on creating new scales from some of the categories identified in Study 2. *EFA* showed that one of these new scales loaded into two factors. The independence of these factors was confirmed both theoretically and empirically. One of them was recognition by peers, and the other was teasing peers. The validity and reliability values of all the new scales created in this study (helping peers, teasing peers, recognition by peers, and image of the classroom community) were satisfactory. Correlations of the new scales with goal structures were similar or higher than the correlation between teacher emotional support, the benchmark variable of the study, and the mastery goal structure, thus reinforcing the relevance of the new scales. The majority of the new scales correlate with both goal structures. The only exception is teasing peers, which is only related to the performance goal structure. This means that the performance goal structure may be linked to positive as well as negative outcomes. This may be linked to the fact that a stronger relationship was found between the two goal structures among Hungarian students in both Study 1

and Study 3 than in previous research, which may be explained by the peculiarities of the Hungarian education system. Presumably, social comparison is especially widespread in that context. Achievement-based selection is strong and starts early (Csapó et al., 2019), and competition in school, e.g., Fülöp et al., 2007) is very common, even when making comparisons at an international level.

The benefit of the questionnaires widely used to measure goal structures is that they provide a comprehensive picture of the motivational climate with the help of only a few Likert-type items. However, due to their holistic nature, it may be difficult to make conclusions on how to encourage a positive classroom motivational climate or how to tone down a negative one. In order to better understand the interaction between students' own motivational characteristics and the learning environment, as well as to effectively support the classroom practice, as many factors that influence the perception of the classroom goal structures should be identified as possible. Previous studies have mainly focused on teachers' messages, behaviours, and practices. Little attention has been paid to those factors that teachers may influence in an indirect manner. This study expanded our knowledge on this specific area by identifying some environmental factors that are associated with students' perceptions of the classroom goal structures, but are not closely related to teachers. Findings of this research confirm the role of relational factors in the perception of the classroom goal structures and the new constructs identified may contribute to a more elaborate representation of the interpersonal features of the classroom in order to understand the interaction between students' academic motivation and the learning environment on a deeper level.

It is noteworthy that the findings related to the environmental factors this study has identified have previously been observed in one form or another in relation to students' goals. As mentioned earlier, teasing peers can be seen as the inverse of the mutual respect scale (Ryan & Patrick, 2001) from the perspective of students. An expansive literature has documented that besides achievement goals, students also have social goals, and goals of these two areas work together and impact school adjustment (for review, see Liem & Senko, 2022; Wentzel, 2022). Besides teasing peers, factors identified by this study may be interpreted as representations of students' perceptions of the social goals of the classroom. For instance, in Dowson and McInerney's (2003) system of social goals that inspire academic effort, recognition by peers may be considered as a possible representation of a social goal called social approval in the classroom. Contribution to the image of the classroom community may be translated as the experience of one of the social goals named social status in this system, while helping peers may be interpreted as social responsibility in the classroom. In the goal content perspective, in which social goals are viewed as broad socially valued interpersonal qualities, this latter factor may be translated as the perception of the prosocial goal in the classroom environment (e.g., Wentzel, 1996). It seems logical to assume that if social goals and achievement goals are associated, then messages of the environment relevant to social goals may be considered part of the perceived motivational climate. This also calls attention to previously identified social goals to be used as the starting point for identifying further factors of the motivational climate.

Findings confirm the benefits of a combined inductive-deductive approach to investigate the characteristics of the classroom climate. Further research should involve samples with diverse characteristics to identify additional factors that play a role in the perception of goal structures as well as to explore the role of cultural differences. In addition, the methodology developed by Patrick and Ryan (2008) could also be used with teachers, and with the help of it, teachers' experiences in relation to goal structures may aid in identifying even more factors that affect the perception of goal structures.

The results presented in this study must be considered in light of several limitations. Although the performance goal structure scale of MOCK contains items related to the dimensions of both approach and avoidance, this distinction was not represented as two different scales as the most current goal theory research suggests (e.g., Bardach et al., 2020). This would be a possible explanation for the difficulties in interpreting the correlational pattern in Study 3. Hence, future research should examine the interaction between the two performance goal structure scales and the additional scales created as part of the present research. According to previous research, students from the same class report only small to moderate levels of shared perceptions in the case of goal structures (e.g., Khajavy et al., 2018). The small sample size in studies 1 and 3 hampers the investigation of the multilevel structure of the data. Revealing students' shared perceptions of goal structures as well as the new scales created in this work will also be valuable in the future. For instance, in Study 3, no correlation could be established between teasing peers and mastery goal structure. However, Bardach et al. (2019) have demonstrated that higher levels of within-class consensus on some mastery goal structures dimensions (task, autonomy, and recognition/evaluation) lowered the error climate (the negative classmate reactions to errors, which is a construct similar to teasing peers) perceived by students.

Achievement goal theory attempts to consider the role of cultural differences, although previous research has mainly focused on the relationship between students' individual goals and their learning-related behavior and views (e.g. Litalien et al., 2017; Zusho & Clayton, 2011). The majority of assessments that aim to examine the relationship between goal structures and the characteristics of the classroom environment have taken place in the United States, and little is known about the generalizability of the results, the importance of cultural differences, or the peculiarities of various education systems (see, as an exception, Khajavy et al., 2018). One of the limitations of this study, that is, the generalizability of the results, also stems from this.

The use of cross-sectional data is an additional limitation. The conclusions of this study are based on the assumption that the environmental factors associated with goal structures are ideal intervention points to influence them; however, it is important to note that correlations do not show cause and effect. That is, the perception of goal structures may not be a consequence but an influencing factor that shapes students' views on other characteristics of the classroom environment (see Butler, 2012; Patrick et al., 2011; Turner et al., 2013). A longitudinal design that addresses reciprocal effects would add valuable information to our understanding of how goal structures and additional factors of the classroom environment mutually influence each other over time.

Previous studies have shown that students with different goal orientation profiles perceived the key aspects of the learning environment in different ways (e.g., Tapola & Niemivirta, 2008). The present work did not examine the relationships found by this approach. It is possible that the relationships of the constructs differ significantly among student groups with various goal profiles. Future studies may find it profitable to use open-ended questions to explore the classroom climate together with students' personal goals. This would allow a deeper insight into how students' goals affect their perceptions of the classroom goal structures.

Lastly, it needs to be emphasized that the results of this research may not be generalizable to different age groups or other academic subjects. Rather, the findings may be interpreted only in the subject area of mathematics, and further research is needed to address developmental differences.

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Declarations

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