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**THE RELATIONSHIP BETWEEN GOAL ORIENTATIONS
AND THE CLASSROOM ENVIRONMENT IN
MATHEMATICS IN GRADES 5 TO 8**

Theses of the PhD Dissertation

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INTRODUCTION

Intervention programs of the past two decades clearly indicate that the empirical way of improving learning motivation is attainable (e.g. *D. Molnár*, 2012; *Guthrie, Wigfield and Vonsecker*, 2000; *Miller and Meece*, 1997). However, in Hungary, the areas of intervention have still not been explored and there is not enough empirical data available with regard to the process of learning motivation in the classroom (*Józsa and Fejes*, 2012). Moreover, both the international (e.g. *Artelt, Baumert, Julius-Mc-Elvany and Peschar*, 2003; *OECD*, 2004) and the national studies (e.g. *Csapó*, 2000; *Józsa*, 2007) indicate problems with the learning motivation of Hungarian students.

Today, *goal orientation theory* is the most prominent theoretical perspective for examining students' motivation at school (*Kaplan and Maehr*, 2007). Since one of the quite significant objectives of goal theory research is to map the interaction between students' motivational characteristics and their learning environments, this perspective can serve as a solid empirical basis for the manipulation of learning motivation (*Fejes*, 2010, 2011).

The dissertation, utilizing the framework of goal theory, explores the motivational characteristics of students and identifies some environmental factors that influence these characteristics in Mathematics among senior elementary school students. The aim of this study is to identify the main elements of the teacher practices as well as of the social environment of the classroom that shape learning motivation. This may only be attained by a system of instruments capable of describing the individual differences of the students as well as the distinctive features of the learning environment. Therefore, the dissertation also aims at developing two questionnaires that meet these criteria.

THEORETICAL BACKGROUND

Within the framework of goal orientation theory motivational characteristics of students are described by the goal orientations (or goals) they adopt. Goal orientation refers to the purpose that students strive to achieve in achievement contexts. There are two basic types of goals: *mastery goal* refers to the intention of developing competence, whereas *performance goal* refers to the intention of demonstrating competence relative to others (*Ames*, 1992). Both types are further divided into *approach* and *avoidance* dimensions depending on whether students focus on the aim of achieving success or on avoiding failure. The approach-avoidance distinction had first emerged in relation to performance goal and later it was accepted for mastery goal as well, which resulted in the 2x2 goal framework (*Linnebrink and Pintrich*, 2001). Some researchers use another goal, the work-avoidance goal to identify students who are not interested in achievement situations at school and desire to overcome these situations by investing as little effort and time as possible (e.g. *Tapola and Niemivirta*, 2008).

Adopting different types of goals or patterns of goals is associated with different cognitive, emotional, motivational and behavioural processes. In general, research underlines the adaptive consequences of the mastery approach goal and the maladaptive consequences of the performance avoidance goal. The effects of mastery avoidance and performance approach goals are diverse. It depends on the measured constructs and the circumstances whether the impacts are favourable or unfavourable. While investigations have found positive correlation between the mastery approach goal and performance in cognitive areas, grades tend to correlate with the performance approach goal instead. Moreover, students may set more than one goal in different classroom situations, which makes it even more complicated to draw conclusions on the impacts of goals (*Urduan*, 2004). In summary, the adaptation of either the mastery approach goal or the combination of the mastery approach goal and the performance approach goal is considered beneficial for students (*Fejes*, 2011).

In studies based on goal theory, researchers use goal structures to describe the motivational climate of the learning environment. Goal structures refer to the messages of the environment that influence student goals, that is, they represent the motivational effects of the context (Ames, 1992). Just like with goal orientations, the literature identifies two types of goal structures. *Mastery goal structure* emphasizes understanding, improvement and overcoming one's own previous achievement, whereas *performance goal structure* inspires competition and the comparison of students' abilities (Ames, 1992).

Besides using goal structures as the global indicators of the motivational impacts of the learning environment, some concrete teacher practices are also connected to students' goal adaptation. These practices were collected by Ames (1992), who identified six categories which contribute to students' perceptions of goal structures. These categories represented in the TARGET acronym are the following: Task, Authority, Recognition, Grouping, Evaluation, Time. TARGET categories serve as a guide to reveal the effects of the learning environment and to plan interventions based on goal theory.

Table 1. Aspects of the Setting that Influence Goal Orientations (TARGET) (Extract from the original table from Kaplan and Maehr, 2007, 159.)

<i>Domain of environment</i>	<i>Issue</i>
Task	What is the person asked to do? What is the product, the participation structure, and the demands of the task? How meaningful is the task to the person?
Authority	Does the person have the authority to decide how and when to perform the task? Can regulations and rules be changed? Who participate in decision-making and in what way?
Recognition	What outcomes and behaviors are attended to and recognized?
Grouping	What are the criteria by which people are grouped? What are the norms and regulations of group-members' interaction?
Evaluation	What does the task assessment imply about the task objectives? How is evaluation done?
Time	How is time managed? How flexible is the schedule? What message is sent with time limits?

There are two ways to explore the motivational characteristics of the learning environment: (1) finding correspondence between student surveys on goals and student surveys on perceptions of the environment (goal structures or TARGET categories); or (2) using qualitative methods, for example classroom observation to identify the differences in the teacher practices in the different classrooms that are categorized by the student survey about goal structures (Fejes, 2009). The former will be referred to as the *analytical approach*, while the latter will be referred to as the *holistic approach*.

Quantitative and qualitative research both underline the significance of the TARGET framework, however research findings draw the attention to further relevant components of the classroom environment, mainly to features of the social environment (e.g. Anderman, Patrick, Huda és Linnenbrink, 2002; Church, Elliot és Gable, 2001). There is a large body of survey research documenting an association between students' goals and goal structures. Anderman and Midgley (1997) reported one of the strongest relationships, they reported correlation coefficients of $r = 0.57$ ($p < 0.01$) between mastery goal and mastery goal structure among students in grade 6 ($n = 341$) in the English subject. At this point, it is important to note that the linkage of learning motivation and learning environment is indirect, it is mediated by

students' interpretation, consequently the same environment may generate different impacts due to the students's characteristics (Järvelä and Niemivirta, 1999, Réthyné, 2003).

While these results also imply that goals can be influenced by the manipulation of the learning environment, intervention studies can offer even more conclusive evidence for this. Interventions have clearly proven that both goals and goal structures can be shaped (e.g. Linnenbrink, 2005; Miller and Meece, 1997) although the magnitude of the changes reached is usually not as influential as expected (Fejes, 2010, 2011).

OBJECTIVES OF EMPIRICAL STUDIES

Developing instruments

The aim is to develop a system of instruments based on goal orientation theory that provide information on the motivational characteristics of both the students and their learning environments and also describe the relationship between students and their environments.

Questionnaire on the objectives of students

Goal orientation approach has not received enough attention in Hungary so far, therefore we do not have appropriate instruments. Although there are numerous international measures available (e.g. Dowson and McInerney, 2004; Midgley et al, 2000), they are not up to date partly due to the lack of consensus concerning the theoretical concept of students' goal and partly due to the rapid improvements in the field. Therefore, these instruments are not capable of describing the objectives of elementary school students. Since there are no appropriate questionnaires that could be adapted, the study proposes to develop an appropriate instrument.

Questionnaire on classroom environment

Up till now, only one instrument has been used to measure goal structures (Midgley et al, 2000). This instrument, in its latest version, differentiates between the dimensions of approach and avoidance to describe performance goal structures. However, recent results question the existence of such dimensions (e.g. Kaplan and Maehr, 2007). Moreover, the successful adaptation of a widely recognized scale for mastery goal structure in the United States of America remains uncertain in a country like Hungary where educational practice is different from that of the USA. All this implies the need to develop a relevant questionnaire for Hungary to describe goal structures.

Only a few aspects of the learning environment have been studied yet, although identifying these aspects would be essential for developing strategies for enhancing motivation. Hence we can see the need again to develop an instrument that, besides taking into account the international results, primarily focuses on the Hungarian conditions and classroom practices. Quantitative (e.g. Church, Elliot and Gable, 2001; Meece, Herman and McCombs, 2003) and qualitative research (e.g. Anderman et al, 2002; Patrick, Anderman, Ryan, Edelin and Midgley, 2001) both emphasize certain elements of the teacher practices as well as the characteristics of the social environment, therefore the instrument to be developed also takes into account these elements as well as the relevant goal structures in Hungary.

Exploring relationships

The relationships among goal orientations

In the American literature, we can see numerous examples for a common relationship pattern among the different types of goal orientations (I. Ross, Shannon, Sailsbury-Glennon and Guarino, 2002), however, the pattern is different among students in Asia and Europe (e.g. Lau

and Lee, 2008; Niemivirta, Rijavec and Yamauchi, 2001). These results question the universality of the relationship between the different motivational and cognitive variables that influence learning and goals. Understanding these relationship patterns in Hungary will be viewed from the perspective of the adaptability of the American results.

The relationship of goal structures

Goal structures in previous studies have been used to describe the aspects of particular learning environments connected to particular goals by qualitative methods (e.g. Anderman et al, 2002; Patrick et al, 2001). Results not only show that the relationship between various goal structures is context-dependent but also indicate that the direction and the intensity of this relationship can be broad (see Anderman and Midgley, 1997; Wolters, 2004). Examining the interconnection of goal structures gives us the opportunity to get a global picture about the school classes under investigation and to explore the differences and similarities between them from the perspective of motivation.

The relationship between goal orientations and grades

Although grades do not reflect student performance as accurately as competence surveys (Csapó, 2002), they have a strong relationship with the subject knowledge and skills of students and they mutually shape each other with learning motivation. Despite their inaccuracy, grades are the main indicators of the success at school (Józsa, 2007). Moreover, they are the most simple way of collecting information on student performance. By studying the relationship between goal orientations and grades, we can draw important conclusions on the impact of certain goal orientations on student performance.

The relationship between goal orientations and goal structures

It is a widely accepted, empirically supported fact that the goal orientations of students and the goal structures of the classroom are connected to each other (e.g. Anderman and Midgley, 1997; Linnenbrink, 2005). Describing these relationships give invaluable insight into the workings of the instrument. If the expected relationships are established, they confirm that the questionnaire developed to measure goal structures and the questionnaire developed to measure goal orientations are both working perfectly, hence they are capable of drawing conclusions on the interaction between the motivational characteristics of students and the relevant aspects of the learning environment.

The relationship between goal orientations and the teacher practices and the social environment

While studying the constructs of learning motivation, several questionnaires have established a relationship between learning motives and the learning environment (e.g. OECD, 2004; Willms, 2003). What is more, qualitative goal orientation theory research (e.g. Anderman et al, 2002; Patrick et al, 2001) as well as a few questionnaire-based studies (e.g. Church, Elliot and Gable, 2001; Meece, Herman and McCombs, 2003) further reinforced the fact that there is a relationship between the goals of students and certain elements of the learning environment. It is important to add here, though, that the results of qualitative research will need to be tested on a larger sample, and that most probably there are several other, not yet tested elements of the learning environment that are in a relationship with goal orientations.

The relationship of goal structures and teacher practices and the social environment

Neither the holistic nor the analytical approaches of the questionnaires exploring the relationship between goal orientations and goal structures take us closer to improving learning motivation. This is partly due to the fact that goal orientations seem to be quite stable personality traits (e.g. *Tuominen-Soini, Salmela-Aro and Niemivirta, 2011*), which are more difficult to manipulate than expected (e.g. *Linnenbrink, 2005; Miller and Meece, 1997*). On the other hand, research proves that the impact of goal structures on performance may not only be conveyed through goal orientations (*Murayama and Elliot, 2009*). A possible way to resolve this problem is to focus on goal structures and the environmental factors that influence them instead of goal orientations.

All studies that use holistic approaches to categorize school classes through goal structures and then identify classroom characteristics through qualitative methods follow the above logic. However, generalizing their conclusions is problematic partly due to the small size of their samples. Questionnaires based on analytical approach, though establish direct relationship between the goal orientations of students and their learning environments, do not give us information about goal structures, which seem to be more sensitive to the changes and manipulation of the environment.

A possible solution to this problem would be to combine the holistic and the analytical approaches. This way we could reach such elements of the learning environment that are statistically proven to play an important role in shaping learning motivation. While qualitative methods should not be ignored, the above mentioned combination gives the opportunity to examine whether the elements of the teacher practice that have already been explored by qualitative methods can be identified. This method could also help us explore how significant these elements are in relation to each other. Moreover, questionnaires on those teacher practices that are motivating may show the directions to follow for qualitative approaches. In other words, combining quantitative and qualitative data collection methods may give further impetus to exploring the learning environment from the point of view of motivation. In this process, the combination of holistic and analytical questionnaires have a key role.

HYPOTHESES

- It is possible to develop a system of instruments in Hungarian to explore the relationships between goal orientations and goal structures and the aspects of the teacher practices and the social environment among senior elementary school students.
- The relationship between goal structures and the aspects of teacher practices and the social environment can be studied with the help of questionnaires.
- Goal structures mediate between goal orientations and the characteristics of the teacher practices and the social environment.
- The intensity of the relationships between the performance approach goal and the two mastery goals are about the same.
- The relationship between the mastery approach goal and the performance approach goal is weak or not significant.
- There is no significant relationship between the work avoidance goal and any other goal.
- Mastery goals are connected to the mastery goal structure.
- Performance goals are connected to the performance goal structure.
- There is weak or no significant relationship between goal orientations and aspects of the teacher practice and the social environment.
- There is a relationship between goal structures and aspects of the teacher practices and the social environment.

- There is a relationship between favourable aspects of the social environment and mastery goal structure.
- There is a relationship between teacher practices defined by the TARGET framework and mastery goal structure.

METHODS

Data collection

Measurements were carried out in the spring of 2009, 2011 and in the autumn of 2011. At the first measurement both the *Student Goal Questionnaire* and the *Classroom Environment Questionnaire* had been used. The results had indicated the need to thoroughly improve the *Student Goal Questionnaire*, hence it was the main focus of attention at the second measurement. Improvement of the questionnaires was still an important aim of the third measurement as well, but this time the main focus was on examining the relationships. Figure 1 summarizes the measurement process.

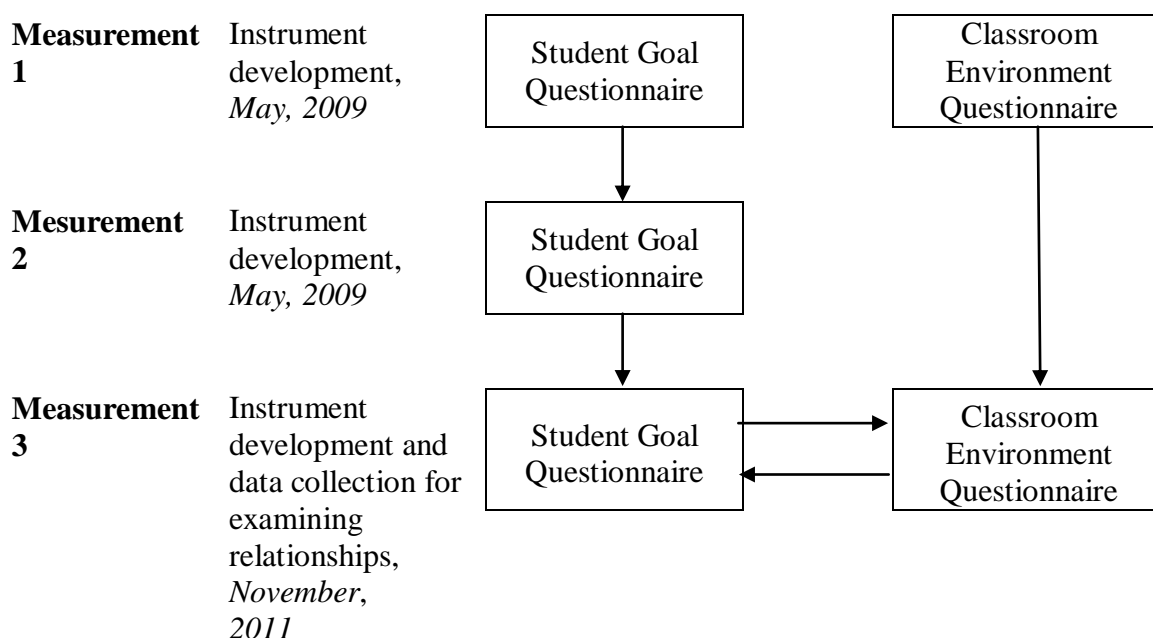


Figure 1
The measurement process

Sample selection

There were two important questions to be considered during sample selection from the perspective of age: (1) Which is the youngest age group that has been covered by previous studies on the personal goals of students (2) Considering the motivational characteristics of Hungarian students which age group is of special interest in Hungary? International studies show that grade 4 is the earliest where instruments on goal orientations have been successfully tested, but in Hungary senior school is of major importance due to the fact that motivation starts to decrease considerably from fifth grade.

The first measurement involved 629 students in grades 4-7. During the second measurement we tested the improved instrument on 313 students in the fourth and fifth grade, while the third measurement involved 898 students in grades 5-8.

Representativity was not an objective to be attained by the investigation on the context-dependent constructs of learning motivation since in this case the basic units of representativity should be the classes and not the students themselves (see *Hickey, 2003; Walker, Pressick-Kilborn, Sainsbury and MacCallum, 2010*). Therefore, the only aspect that needed to be considered in terms of the size of the sample was to test the instruments on a quite large number of students by grade so that we can clearly see whether the instruments are working properly and so that we can thoroughly explore the relationship between the different factors of learning motivation.

Furthermore, we thrived to involve students with disadvantaged, average and favourable family backgrounds and chose the schools to be participating in the investigation in light of this. The reason for working with students with different family backgrounds is the well-established relationship between the sociocultural background and reading comprehension (e.g. *Cs. Czachesz and Vidákovich, 1996; Molnár and Józsa, 2006; OECD, 2010*), which may have an influence on understanding the statements of the questionnaire.

Choosing the subject

We decided to test the instruments in Mathematics. This is usually the least preferred subject by students (*Csapó, 2000; Csikos, 2012*) but this is also the subject that is, in general, compulsory to be taught from the beginning of school to the end. Thus, if we successfully develop an instrument that works properly, we may get closer to solving one of the major issues of the Hungarian education system. International studies also prefer to use Mathematics in the field as it was proven to be an important subject of inquiry. Finally, another practical reason for choosing Mathematics was that the names of most other subjects are quite various among institutions, which could have caused problems during the phrasing of statements for the questionnaires.

Data analysis

Item response theory (IRT) is being used more and more often in Hungarian knowledge and skills assessments (e.g. *Molnár, 2003; Molnár and Józsa, 2006; Vigh, 2008*), however motivation research has not yet fully utilized the advantages offered by IRT (except for Kontra, see *Kontra, 2009*). On the other hand, IRT-based analysis used to describe the properties of the widely-used international instruments in goal orientation theory plays a more and more important role (pl. *Martin, Marsh, Debus és Malmberg, 2007; Muis, Winne és Edwards, 2009*).

While developing the *Student Goal Questionnaire*, we aimed at fulfilling the requirements of both classical test theory and item response theory. In order to reach this aim, IRT played an important role from the onset of instrument development, which was quite an innovation in the Hungarian practice.

RESULTS

The system of instruments

The *Student Goal Questionnaire* was developed based on the results of three consecutive surveys. Both classical test theory and item response theory played an influential role in the development process (Fejes and Vigh, 2011). The results of factoranalysis showed that 20 Lickert-type scale statements belonged to the expected latent dimension, 4-4 per goal type. The value of the Kaiser-Meyer-Olkin measure on the whole sample was 0.88, which is appropriate. Reliability values of goal types varied between 0.71 and 0.93 on the whole sample. The lowest values were found in grade 5, but they were always higher than 0.7 (Fejes and Vigh, 2012).

With analysis based on the partial credit model (see Masters, 1982), we identified bigger differences in the motivation of students across grades with regard to approach goals. The fit of the statements to the model is suitable in all sub-samples and goal types. Threshold parameters increase in line with the increase in the level of motivation. Statements relating to avoidance dimensions cover the motivational level of students on the whole sample appropriately, however the investigation identified another level of motivation with regard to approach goals, which is not covered by scale points. It is important to note that the most frequently used international questionnaires in the field also fail to cover all motivational levels (e.g. Martin and mtsai, 2008).

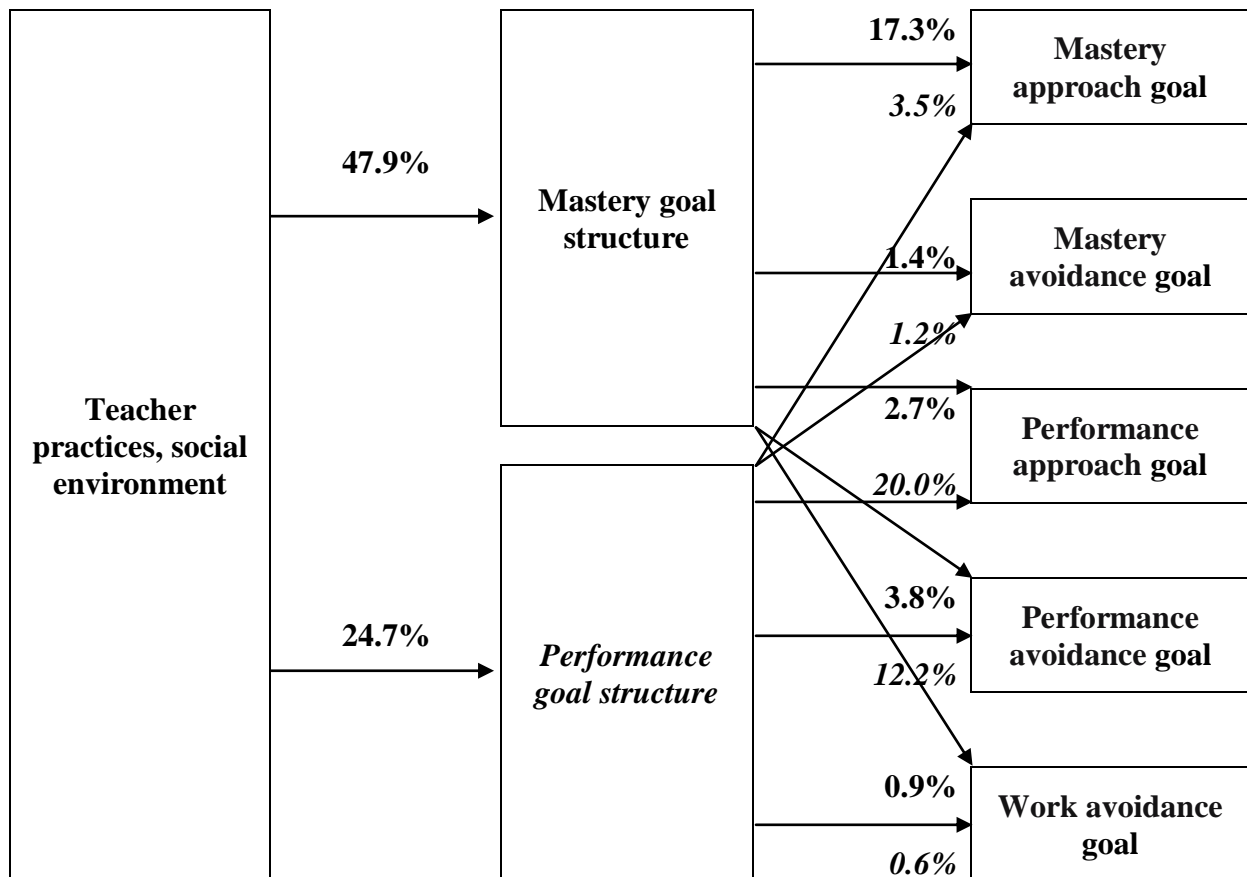
We developed another questionnaire to explore goal structures that describe motivational characteristics of the classroom with the help of a holistic approach and to identify some unique elements of the classroom environment such as the social environment and the teacher practices. The *Classroom Environment Questionnaire* was tested by two consecutive measurements and results confirmed its validity and reliability. The instrument consists of 48 Lickert-type scale statements. Its KMO measure is 0.90. 5-5 statements of the questionnaire cover the two goal structures (Cronbach- α : 0.79 and 0.85). The social environment and the teacher practices are covered by 9 scales in total, which consist of 3-6 statements (Cronbach- α : 0.66-0.85). The name of the scales are as follows: positive classroom atmosphere, teacher support, disciplinary problems, rule-oriented behavior of the teacher, promoting mutual respect among students, task, promoting competition, grouping of students, teacher evaluation emphasizing ones own personal responsibility.

The expected relationships were identified between goal orientations and goal structures in most cases (Figure 2). Besides others performance goals can be associated with performance goal structure, explained variance is 20% with regard to approach components, 12.2 % with regard to avoidance components. Besides others mastery goals can be associated with mastery goal structure, explained variance is 17.3% with regard to approach components, 1.4% with regard to avoidance components. We do not have a reference point with regard to the latter construct, results underline the meta analysis of Baranik, Bynum, Stanley, and Lance (2010), which describe that the operation of mastery avoidance goals is significantly different from those of other goal types.

Regression analysis showed that half of the student differences in mastery goal structure (47.9%) could be explained with the elements of the classroom's social environment and the teacher practices the investigation had chosen to examine while it was 24.7% in performance goal structure. In other words, our questionnaires are capable of establishing a relationship between different aspects of the environment and goal structures. Moreover, we successfully identified certain important elements of the environment.

We managed to connect a relatively small portion of the differences in goal orientations to the variables describing the teacher practices and the social environment. Explained variance was highest (15.2%) with regard to mastery approach goal. Results

suggest that goal structures mediate between goal orientations and the motivational aspects of the classroom environment. In summary, we can conclude that the relationship among the constructs of the system of instruments developed works as expected, thus they are capable of mapping the relationship between goal orientations and the classroom environment (Fejes, 2012).



Note: Explained variances relating to performance goal structure are in italics in order to differentiate between the effects of mastery and performance goal structure.

Figure 2
Correspondence of the measured construct based on explained variances

The characteristics of goal orientations among Hungarian students

Results suggest that the performance avoidance goal with the least favourable consequences and the mastery approach goal with the most favourable consequences have a significant relationship (0.49; $p < 0.01$). This relationship has not been found in studies carried out in the United States of America (0.13; $p < 0.01$; $n = 9014$), which implies that favourable constructs are less probable if goals are combined among Hungarian students. This finding seems to be a cultural difference, which has already been documented by other studies carried out outside of the USA (e.g. Dela Rosa, 2010; Lau and Lee, 2008).

Our analysis shows that the relationship between grades and goal orientations do not correspond to the expectation, which was based on the empirical results of the international literature, that mainly performance approach goal is responsible for the differences in grades among students. Grades of the students tested are instead connected to two dimensions of the mastery goal, which is perfectly in line with the workings of goal orientation theory.

Approach goal explains 9.5% of the differences in grades, while avoidance explains 6.3 %. The reason for this phenomenon may be the differences in the assessment practices of Hungarian teachers. For example, multiple choice tests are less frequently used in Hungarian classrooms than in American schools.

We can differentiate between classes based on mastery goals and the performance avoidance goal. The significance of these goals is similar. Based on these, we found that the goals of fifth graders were higher than those of sixth to eighth graders. It is important to note here that the performance approach goal may be linked to several unfavourable cognitive and motivational processes as per the results of international studies, therefore the above mentioned discrepancy contradicts the generally accepted tendency established by Hungarian studies that motivational characteristics of students are getting less and less favourable.

Characteristics of the classroom environment

Perception of the mastery goal structure to develop competences and perception of the performance goal structure to compare performance usually happens at the same time among Hungarian students, although there are extreme differences between the classes. Our investigation found classes where the correlation coefficient was 0.92 ($p < 0.01$), whereas in other classes no significant relationship was established. In general, there are bigger differences among the classes with regard to mastery goal structure, but in grade 5 performance goal structure plays a more important role in accounting for the differences among classes. This may imply that fifth graders tend to compare their performance with each other more often than in other classes examined.

Most of the variables representing teacher practices and the social environment differ in grade 5 again, in some cases the variables differ both in grade 5 and 6. The most important factors to mention here are task and promoting mutual respect among students, the latter gaining more and more importance in upper grades as it establishes relationships with other elements of the environment. The most significant variable that differentiates among classes is the one that represents disciplinary problems.

Results suggest that students in grades 6, 7 and 8 perceive the classroom environment similarly, motivational messages of the environment seem to be uniform in these grades, at least this is what we can see from the sample. In contrast, fifth graders experiences with regard to the motivational messages of the classroom environment differ from that of upper graders in several respects. This data may reflect the different attitude of teachers in working with fifth graders. Teachers may try to create a more supporting atmosphere for fifth graders in order to make the transition from junior school to senior school easier for them.

Motivational impacts of the classroom environment

Our data suggests that there is a relationship between the mastery approach goal and the grades given to students and the mastery goal structure can be accounted for most of the differences among students. This means if we identify those elements of the classroom environment that affect the mastery goal structure, indirectly, we also identify those elements of the environment that should be manipulated to influence school achievement.

The task variable is of key importance in mastery goal structure, but teacher support and promoting mutual respect also play an essential role ($r = 0.45-0.66$; $p < 0.01$). If we can make a favourable effect on these classroom characteristics, we may assume that the motivation and performance of students improves. Looking at the performance goal structure, we can see that task is the most important variable again. Other key factors here are the rule-oriented behaviour of the teacher and the promotion of competition ($r = 0.27-0.41$; $p < 0.01$).

Results also show us that the significance of the above mentioned environmental factors differs among grades. Based on the survey, we may assume that diversity and usefulness of the task, supporting of mutual respect among students as well as the role of teacher support are gaining more and more importance in upper grades.

UTILIZATION OF RESULTS

Motivational impacts of the classroom are hardly known in Hungary, which means the Hungarian educational society lacks empirical information about the strategies for enhancing motivation. Our system of instruments developed during this investigation represents a major step forward in this respect. The questionnaires help to identify some of the components of the teacher practices and the social environment that influence motivation. Goal structures holistically describing the learning environment may serve as reference points for further research, be it qualitative or quantitative, on a more thorough exploration of the motivational aspects of the environment. Although we know of several Hungarian instruments that test certain constructs of motivation, at present the Classroom Environment Questionnaire is the only one that describes the motivational characteristics of the environment.

The instruments developed during the investigation can be utilized by intervention programs as well. Most of the motivational constructs like goal orientations seem to be relatively stable personality traits, which means their ability to evaluate the motivational impacts of interventions is limited in the short term. On the other hand, goal structures may be more sensitive and less stable, therefore they can signify either the favourable or the unfavourable changes in the motivational aspects of the environment before the motivational characteristics of students changes in any way.

By exploring the classroom environment, we can fuel such intervention programs focusing on learning motivation, knowledge and skills and their combination that pay more attention on how learning motivation is shaped.

DIRECTIONS FOR FURTHER RESEARCH

The effects of goal orientations on performance has been described based on the international literature, this phenomenon has been examined only in relation to certain grades. Since learning motivation is context-dependent and we used our own instrument, it is essential to test the impacts of certain goals on student performance in more areas. Further reason for additional research is also evident from the fact that grades do not give a clear picture about the performance of students. In future investigations, it would be fruitful to examine constructs that provide information about the cognitive performance of students from a different perspective (e.g. learning strategies).

We suggest both qualitative and quantitative data collection methods to further develop the instrument described here and to identify more aspects of the classroom environment that influence motivation. These methods include the interview, open-ended questions and classroom observation. Once new statements are added to the questionnaires, we suggest conducting a large sample investigation to test the results. Our results show that collecting more information about the students' opinion on the variable named task may be of key importance in developing strategies for enhancing motivation.

We chose Mathematics as our domain of inquiry, however the relationships explored should be tested in other areas as well since we cannot be sure whether our results are relevant only in Mathematics, or conclusions can be drawn with regard to the other subjects as well.

Teachers' beliefs have a major influence on the implementation of the study results on the improvement of motivation within the framework of goal orientation theory. Therefore, it would be useful to explore what the teachers think about the theory (e.g. beliefs on the

comparison of student performance). This would also help to better understand the information collected with the help of questionnaires for students.

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