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GOAL ORIENTATIONS AS PREDICTORS OF STUDENTS' –WITH AND WITHOUT LEARNING DIFFICULTIES– MOTIVATION AND SELF-REGULATION IN MATHEMATICS

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Abstract: Three studies were conducted to examine the hypothesis that differences between students with and without learning difficulties in motivation can be accounted for by their goal orientations. In Study 1, participants were 308 typical students and 68 students with learning difficulties. Goal orientations, motivation, and self-regulation in mathematics were assessed through self-report questionnaires using scales with satisfactory reliability. Results indicated that there were significant differences between students with and without learning difficulties across all variables. The predictive role of goal orientations was examined using analyses of covariance indicating that, after controlling for the variability due to goal orientations, the between group differences regarding students' efforts, goal commitment and motivational force, diminished. Study 2 replicated the findings of Study 1, with a sample of typical students (n = 66) and students with learning difficulties (n = 30), regarding motivational force only. In Study 3, 38 typical students and 33 students with learning difficulties were selected using stratified random procedures. Results once again pointed to significant mean adjustments due to the contribution of goal orientations on self-regulation, motivational force, goal commitment and effort in mathematics. It is concluded that goal-orientations account for significant amounts of the variability of motivation and self-regulation variables that are instrumental for achievement purposes.

Key words: Goal orientation, Learning difficulties, Motivation.

A long lasting and enduring issue in the education of students with learning disabilities (LD) has been low academic achievement. Based on the federal definition in learning disabilities (United States Office of Education, 1977),

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the disorder has its basis on neurological deficits, manifested with low cognitive and metacognitive abilities, as well as achievement (Fletcher, Coulter, Reschly, & Vaughn, 2004). Although the definition outlines what learning disabilities are not (exclusionary criteria), it is silent with regard to motivational, emotional or other deficits that may inhibit learning. Particularly, with regard to emotions, learning disabilities *cannot be* the outcome of emotional disturbances; thus, emotional factors cannot represent *defining* characteristics of the disorder. From this point of view, by definition, students with and without LD should not differ based on motivation or emotions. Even if groups of students with and without LD differ on motivation, initial causes of underachievement should have their roots on neurological, cognitive or biological factors (Torgesen, 1986). The purpose of the present report was to test the hypothesis that, not only do students with and without LD differ on motivation (e.g., goal orientation, motivational force), but that goal orientations are accounting for significant between group differences in several achievement-related variables. In other words, a question posited in the present studies was: "If we control for individual differences in goal orientations, would differences between students with and without LD in self-regulation of learning disappear?"

Goal orientations and achievement goal theory

Goal orientations originated from the pioneering work of Ames (1992), Dweck (1986) and Nicholls (1984). These early theorists proposed that the attitudes, beliefs, and motivation a person brings to an achievement situation, partially determine subsequent involvement and achievement with academic tasks (see also Ainley, 1993). Although several terms have been used to define the same approximately constructs, all theorists suggested that approaching a task out of interest and the desire to understand and learn a subject matter for the sake of learning is associated with adaptive self-regulation and positive achievement outcomes (this orientation was termed mastery orientation, learning orientation, or task orientation). On the contrary, approaching a task with the purpose of demonstrating ability and competence over others in public situations has been considered a maladaptive orientation for self-regulation purposes (termed a performance, ego, or self-enhancing orientation). These theorists demonstrated that these two diverse ways of thinking are associated with distinct patterns of behaviors (e.g., persisting or giving up), and affect (e.g.., positive or negative) through acti-

vating different cognitive mechanisms. Achievement outcomes have also, at times, been dramatically different from adoption of the two early goal orientations, mastery and performance (e.g., Dweck & Leggett, 1988).

Since Dweck and Leggett's (1988) conceptualization of mastery and performance goals, several advances have taken place at both theoretical and methodological ends (Elliot & Thrash, 2002). Some of the theoretical ones are briefly discussed below. Elliot and Harackiewicz (1996) described the existence of performance avoidance goals by applying the classical approach-avoidance dichotomy to performance goals. Based on this notion, an individual may seek to outperform others (approach the goal) or avoid being the worst in a normative situation (avoid negative end states). This bifurcation has been clearly supported in the empirical literature (Elliot, 1999; Elliot, McGregor, & Gable, 1999; Sideridis, 2005a,b; Urdan, 2004; Wolters, 2004). Nicholls's (1984) presentation of ego goals included the concept of task avoidance as a means of presenting the least effort in an academic activity.

Lethwaite and Piparo (1993) added the orientation towards positive social experiences to the tripartite model of mastery-performance-task avoidance orientation of Dweck and Leggett (1988) and Nicholls (1984). They labeled this new orientation "positive social experiences" and they defined it as one's orientation towards seeking and pursuing social encounters. They added that this orientation involves being socially accepted and being judged likeable by other students. This orientation relates to Wentzel's work (1993, 1998) on social goals and their relationship to achievement. Last, recently Elliot and McGregor (2001) proposed an affective dimension of mastery goals, defined by an individual's feelings of worry and apprehension for not achieving personal, internally-based standards of success (i.e., mastery avoidance goals). Recently, more types of goals have been presented by Grant and Dweck (2003) but their independence from other similar constructs has not been verified.

Achievement goal orientations and empirical findings

Outcome based studies suggested that mastery and performance goals are linked to various behaviors and traits in contrasting ways (e.g., Kaplan & Midgley, 2000; Sideridis, 2006a,b). For example, a mastery orientation has been associated with increases in achievement (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Meece & Holt, 1993), intrinsic motivation

(Harackiewicz, & Elliot, 1993), adaptive learning strategies (Ames, 1992), increases in motivation (Elliot et al., 1999; Pintrich & Schrauben, 1992; Wentzel, 1993, 1996), increases in affect (Turner, Thorpe, & Meyer, 1998), and increases in the use of cognitive (Anderman, Griesinger, & Westerfield, 1998; Pintrich & Garcia, 1991) or metacognitive strategies (Botsas & Padeliadu, 2003; Greene & Miller, 1996). A performance orientation (generalized, that is, without the dichotomization of approach or avoidance) has produced direct positive links to achievement (Harackiewicz et al., 2002; Sideridis, 2005b), but also to disruptive behaviors (Kaplan, Gheen, & Midgley, 2002), academic cheating (Anderman & Midgley, 2004; Murdock, Miller, & Kohlhardt, 2004), self-handicapping (Urdan, 2004), learned helplessness (Sideridis, 2003; Sideridis, in press), negative affect (Turner et al., 2002), even the presence of psychopathological tendencies (Dykman, 1998; Sideridis, 2005a).

Recently, however, a number of researchers suggested that the negative patterns observed in students having a performance orientation may have been premature (Barron & Harackiewicz, 2001; Harackiewicz, Barron, Elliot, Tauer, & Carter, 2000). Depending on the nature of the task (challenging or not), the age of participants and other conditions (public vs. private evaluations), a performance orientation was associated with positive achievement outcomes and also acted as a positive mediator of other motivational variables for typical students (Elliot et al., 1999) and students with LD (Sideridis, 2005a). Thus, re-examination of the potential role of performance orientations to academic achievement following the dichotomization into approach and avoidance is needed, particularly for students with LD who, by definition, fit the profile of helpless students described by Dweck and Leggett[1] (1988). This examination is also particularly important given the limited amount of research conducted with students with LD (e.g., Fulk, Brigham, & Lohman, 1998; Pintrich, Anderman, & Klobucar, 1994; Sideridis & Tsorbatzoudis, 2003) and the existence of public policies that favor one type of orientation –e.g., high stakes testing which reflect a performance focus– (for a discussion see Sideridis, 2005c).

[1] Dweck was intrigued by the fact that students of the same ability (but different goal orientations) presented themselves with so diverse motivational profiles. Students with a performance orientation gave up significantly earlier and experienced elevated negative affect compared to students who adopted mastery goals. This is why she termed that orientation as "helpless" orientation (Dweck & Leggett, 1988).

Conceptually, goal orientations have been linked to a number of important, for the academic achievement, variables, some of which are examined in the present study. For example, a mastery orientation has been associated with enhanced self-efficacy and successful self-regulation, all important variables for the attainment of high academic achievement (Meece & Holt, 1993; Turner et al., 1998). From the motivational literature, effort, goal commitment, and motivational force have been positively linked to a mastery orientation and negatively to a performance orientation, but all have been important intervening variables of academic achievement (Dachler & Mobley, 1973; Elliot et al., 1999; Tubbs, Boehne, & Dahl, 1993), and are discussed below.

Motivational force is a construct that originated in the achievement motive tradition (e.g., Atkinson, 1964) and is defined as the multiplicative term reflecting expectancy and value (i.e., the affective element of motivation) and reflects the usefulness an individual assigns to a goal after accounting for her or his possibility of success and the expected outcomes of success (Tubbs et al., 1993). Hollenbeck and Williams (1987) added that the expectancy by value term reflects the tendency to achieve (Atkinson, 1964; McClelland, 1985). Although Tubbs et al. (1993) suggested that motivational force should relate to achievement in a curvilinear fashion, there is uncertainty regarding where a person's motivational force's function will actually peak (Atkinson, 1964), with the peak depending on individual and contextual factors. Latham and Steele (1983), however, have been critical of the early proposition which suggested an inverted-U relation. Thus, regarding the potential contribution of the motivational force's function as a discriminatory variable between students with and without LD the jury is still out and is an objective of the present study.

In goal-task theory (Locke & Latham, 1990), goal commitment has been proposed as a core predictive factor of achievement, particularly in organizational settings. Goal commitment reflects the motivation to achieve based on one's set of values that reflects commitment to the goal/organization/structure (Latham & Steele, 1983); the higher the commitment the higher the motivation. Several studies explored the potential causal role of goal commitment to performance and achievement in work settings. However, in the educational psychology literature very little attention has been given to goal commitment and references to studies in learning disabilities are nonexistent. Thus, the purpose of Study 1 was to examine possible differences between students with and without learning difficulties in goal orientations

and motivation, and also examine the hypothesis that goal orientations can predict student motivation (see also work by Georgiadis & Efklides, 2000). This hypothesis will be examined by adjusting group means (using goal orientations as covariates), and by subsequently comparing groups across motivational variables. The purpose of Studies 2 and 3 were to replicate and extend the findings of Study 1 with inclusion of other relevant constructs and samples of students with learning difficulties in mathematics.

STUDY 1

Method

Participants. Participants in Study 1 were 309 typical students and 68 students with learning difficulties, all of Greek origin. The learning difficulties group comprised students, who either possessed an identification using state criteria for learning disabilities or were identified by their teacher as having learning difficulties. Thus, I refer to these students as having learning difficulties in general, rather than that they come from the student population with learning disabilities.

Students were selected from 5th and 6th grade classrooms from the region of Macedonia in Northern Greece. There were 153 boys and 156 girls students in the typical student group (160 from Grade 5 and 149 from Grade 6) and 37 boys and 31 girls in the learning difficulties group (23 from Grade 5 and 45 from Grade 6).

Procedure. Early in the semester participants completed a battery of self-report measures tapping motivation and self-perceptions. The battery was administered to the students by their teachers prior to an evaluation of mathematics competence. Students were told that they should not spend too much time on any one item as first thoughts are usually best and that their

[2] It should be pointed out, all motivational constructs in the study originate in the achievement motivation tradition. However, they do represent different aspects of motivation. For example, performance goals are different from the original "motive to achieve" because they have been conceptualized as task-specific motivational urges; the remaining goal orientations described in the present studies do not really relate to the achievement motivation tradition. On the other hand, motivational force originated in goal theory (Locke & Latham, 1990) and represents one's overall tendency to achieve, without incorporating issues of importance or intrinsic motivation. Thus, although goal orientations and motivational force were expected to correlate, they were also expected to reflect unique motivational constructs as well.

participation will have no effect on their term grades. They were also told that no association would ever be made between student names and results from the analyses; thus, they were assured of the confidentiality of their responding. All assessments took place during the beginning of the Fall semester of the 2001-2002 academic year.

Measures

Goal-orientations. Using mainly items from Lethwaite and Piparo's (1993) Goal Orientation Scale, four constructs, namely mastery-approach, performance-approach, task-avoidance, and positive social experiences, were assessed with 28 items. All items followed the standard expression: "How important is it to you to...." The Goal Orientation Scale was supplemented with additional items from well established scales. For example, mastery-approach was assessed using three additional items from Elliot and Church (1997), and two from the Patterns of Adaptive Learning Strategies (Ablard & Lipschultz, 1998; Midgley, 2002). Performance-approach was assessed using four additional items from Elliot and Church (1997), two from Thorklidsen and Nicholls (1998), and two from Wigfield and Guthrie (1997). Task-avoidance was assessed with 3 additional items from Thorklidsen and Nicholls (1998). Sample items included: "How important is it to you to be able to understand mathematics?" (mastery-approach), "How important is it to you to outperform your classmates in mathematics?" (performance-approach), "How important is it to you to spend as little time in mathematics as possible?" (task-avoidance), and "How important is it to you to have a good time with your classmates?" (positive social experiences). Twenty three items referred to mathematics except for two of the performance items and one from the positive social experiences subscale. The scaling included 9 response options, from "not at all" to "very much so", in order to be more sensitive to student responding. Alpha coefficients using the present sample were for mastery-approach .88 and .92 for typical students and students with learning difficulties, respectively. Internal consistency estimates for performance-approach were .92 and .84 for typical students and for students with learning difficulties, for task-avoidance alpha estimates were .77 and .76 for typical students and students with learning difficulties, respectively, and for positive social experiences estimates were .66 and .81 for typical students and students with learning difficulties, respectively.

Table 1. Exploratory factor analysis of the Goal-Orientation Scale

Variables	1	2	3	4
1. Mastery-approach (How Important is it to you to...)				
learn math well	.726			
solve difficult math exercises	.833			
know how to solve math exercises	.867			
understand math	.908			
become better in math every day	.877			
do well in math	.904			
not do mistakes in math	.762			
acquire new knowledge in math	.802			
2. Performance-approach (How Important is it to you to...)				
be excellent in math				.361
outperform your classmates in math		.771		
get the best grade in your class in math		.707		
show your family how good you are in math		.694		
have other students look up on you		.451		
be pointed out as the best student in math		.787		
show your classmates how smart you are		.788		
be the only student to answer teacher's questions about math		.701		
finish up in class math assignments earlier than mates		.680		
be the best in math		.716		
3. Task-avoidance (How Important is it to you to...)				
avoid studying math			.713	
spend little time in math			.699	
have easy math exams			.533	
not have homework in math			.698	
have easy homework in math			.751	
not have to answer difficult math questions in class			.696	
4. Positive social experiences (How Important is it to you to...)				
enjoy solving math problems				.659
have a good time with your classmates				.742
hear people saying 'you are a nice kid'				.561
have good, friendly relations with your classmates				.826

Note. All factors were extracted with eigenvalues > 1 and as derived by the Scree plot. Percent of variance accounted for by each factor was for mastery (31.65), for performance (15.83), for avoidance (7.75) and for positive social experiences (9.57). The total amount of variance explained was 64.80%.

The goal-orientation scale was also subjected to an exploratory factor analysis with an independent sample of typical 5^{th} and 6^{th} graders ($N = 475$). Results, using the eigenvalue > 1 criterion and the scree plot (Gorsuch, 1983), verified the existence of a four-factor solution (i.e., mastery-approach, performance-approach, task-avoidance, and positive social experiences), which accounted for 63.1% of the variability of the goal orientation items. The internal consistency of the subscales was Cronbach's $\alpha = .95$ for mastery-approach, .90 for performance-approach, .88 for task-avoidance, and

.86 for positive social experiences (see Table 1). Further evidence regarding the validity of the scale and its use with elementary school students can be traced in Sideridis (2003, 2005a,b) and Sideridis and Tsorbatzoudis (2003).

Self-efficacy. This construct was assessed using a 9-item scale, developed using Bandura's Guide for Constructing Self-Efficacy Scales (Bandura, 2001). All items began with the phrase: "How well can you....." and were mathematics-specific. Examples include: "How well can you conduct calculations involving decimals?", "How well can you solve equations?", "How well can you do operations that involve fractions?", etc. The scaling included a 9-point response system ranging from "not at all" to "very much so". This hypothesized unidimensional scale was subjected to a principal components analysis using Varimax rotation with the full sample and produced a one-factor solution (i.e., self-efficacy in mathematics). This construct accounted for 66.8 % of the variability of the self-efficacy items with loadings ranging between .669 and .915. Internal consistency estimates were Cronbach's α = .94 for the typical student group and Cronbach's α = .93 for the learning difficulties group.

Self-regulation. The Zimmerman and Martinez-Pons (1986, 1988) Self-Regulated Interview Schedule (SRIS) was employed using 10 out of the 14 classes (measured by use of one item each) of self-regulatory strategies. These were: (a) *self-evaluation* "Do you review your homework before handing it in?" (b) *organizing and transforming* "Do you have a plan before starting work on an assignment?", (c) *goal-setting-planning* "Do you leave your homework for the last minute? (Reversed)", (d) *seeking information* "Do you use information from the library to complete your homework?", (e) *keeping records and monitoring* "Do you keep notes during lesson?", (f) *environmental structuring* "How easy is it for you to find a quiet place to study?", (g) *self-consequences* "Do you reward yourself when you do well in school assignments?", (h) *rehearsing and memorizing* "How well do you remember information from the lessons?", (i) *seeking social assistance* "When you have difficulties, do you ask your classmates, teachers, parents?", and (j) *reviewing records* "Do you use your notes in order to complete your assignments?" A 9-point response option was implemented ranging between not at all and very much so. Reliability and validity (e.g., discriminant, construct) have been reported elsewhere (see Zimmerman & Martinez-Pons, 1986, 1988). In the present study, the internal consistency of the items that comprised the SRIS (Zimmerman & Martinez-Pons, 1986) scale was Cronbach's α = .66 for the typical students and Cronbach's α = .72 for the

learning difficulties group. For analyses purposes a total score was used in the present study.

Goal commitment. Three items tapped direct and effort-based aspects of goal commitment (Tubbs, 1993). These items belonged to a pool of commonly used scales (e.g., Early, 1985; Erez & Arad, 1986; Hollenbeck, Williams & Klein, 1989; Latham & Steele, 1983; Mento, Cartledge, & Locke, 1980) and were: (a) "How determined are you to achieve excellent grades in mathematics?" (b) "How hard do you intend to study in order to achieve excellent grades in mathematics?", and (c) "How much do you care about achieving excellence in mathematics?" The scaling included 9 options, from "not at all" to "very much so." Internal consistency estimates were Cronbach's $\alpha = .78$ for typical students and Cronbach's $\alpha = .86$ for the learning difficulties group.

Effort. This construct was assessed with two items, a student and a teacher. The student item was: "How hard do you study for mathematics per day?" and the teacher item was: "Do you think that the student tries hard to learn mathematics?" The student item involved 9-options as the previous scales. The teacher item was scores on a dichotomous "yes" or "no" scaling.

Motivational force. It was comprised of the multiplicative term that uses "Expectancy" and "Value." Expectancy was assessed with one item: "What grade do you expect to receive in mathematics? " (Hollenbeck et al., 1989; Latham & Steele, 1983; Mento et al., 1980). Value was measured with two items, widely used in previous studies (Erez & Arad, 1986; Hollenbeck et al., 1989; Latham & Steele, 1983; Tubbs & Dahl, 1991): (a) "How pleased will you be if you achieve excellent grades in mathematics? " and (b) "Do you desire to achieve excellent grades in mathematics?" All items were scores on a 9-point scale ranging from "not at all" to "very much so". The internal consistency of the items that comprised value was Cronbach's $\alpha = .83$ for typical students and Cronbach's $\alpha = .93$ for the learning difficulties group.

Data analysis

Analysis of variance, covariance. A one-way analysis of variance (ANOVA) was employed to compare typical and LD students across all variables. This analysis was followed by an analysis of covariance in order to adjust means for the effects of the covariates (i.e., goal orientations). The alpha level was set to $p < .05$. Given that unequal sample sizes

are taken into account by the general linear model, no effort was made to create equal groups of students, particularly since the assumption of homogeneity of variances was met.

Effect size (gamma). Effects were also reported using standardized effect size indicators (Onwuegbuzie, Levin, & Leach, 2003).

Power analysis. Power analysis was estimated in order to test the hypothesis that the probability to find significant effects was over .80 as suggested by Cohen (1992). Using formulae from Howell (1999), power was .78 at $p < .05$ for $F(1, 96) = 6.0$, which would reflect a large effect size estimate. Thus, estimation of power was based on Cohen's d although one could use other estimates such as η^2.

Results - Discussion

Intercorrelations between measured variables. Table 2 displays the intercorrelations between measured variables for each group of participants. An examination of the correlations indicates interesting patterns for each group. For example, although mastery approach correlated positively with other orientations (besides task-avoidance which correlated negatively) for the typical students, the same did not hold for students with learning difficulties. For the latter group, mastery-approach correlated positively with task-avoidance, suggesting that an adaptive orientation was positively correlated with a conceptually maladaptive orientation. Also, in students with learning difficulties, performance-approach correlated positively with all other orientations (including task-avoidance) and effort, suggesting that students with learning difficulties resemble the performance-oriented avoidant type of low achievers described by Dweck and Leggett (1988). The respective correlations for the typical students were lower suggesting that performance-approach may not have a similar functional role as it is for students with learning difficulties. Also, for both groups, the significant positive correlation between mastery- and performance-approach orientations indicates that they both share common variance (rather than representing opposite poles in achievement motivation).

Comparisons between groups across constructs prior to and after controlling for goal orientations. To answer the first research question (examine between group differences in motivation and self-regulation in mathematics), a series of one-way analyses of variance were conducted (see Table 3 first two columns). Results indicated that there were statis-

Table 2. Intercorrelations among variables in Study 1

Variables	1	2	3	4	5	6	7	8
			Typical students					
1. Mastery-approach	--							
2. Performance-approach	.26**	--						
3. Task-avoidance	-.13*	.26**	--					
4. Positive social experiences	.56**	.33**	-.03	--				
5. Motivational force	.44**	.21*	-.08	.42**	--			
6. Effort	.41**	.20*	-.09	.31**	.35*	--		
7. Goal commitment	.51**	.29**	-.06	.48**	.60**	.44**		
8. Self-efficacy	.37**	.13*	-.13*	.24**	.48**	.37**	.39*	--
9. Self-regulation	.40**	.12*	-.14*	.35**	.32**	.56**	.40**	.40**
			Students with learning difficulties					
1. Mastery-approach	--							
2. Performance-approach	.66*	--						
3. Task-avoidance	.10	.35**	--					
4. Positive social experiences	.76**	.71**	.24*	--				
5. Motivational force	.59**	.40**	-.04	.61**		--		
6. Effort	.25*	.28*	.04	.20	.53**	--		
7. Goal commitment	.75**	.67**	.12	.72**		.71**	.38**	--
8. Self-efficacy	.42**	.22	.04	.41**	.55**	.43**	.30*	
9. Self-regulation	.46**	.33**	.14	.49**	.40**	.58**	.38**	.69**

Note. $^{*}p < .05$, $^{**}p < .01$.

tically significant differences between typical students and those with learning difficulties across all constructs. Students with learning difficulties had significantly lower scores on self-regulation, $F(1, 375) = 22.69$, $p < .001$, $ES = .58$, self-efficacy, $F(1, 375) = 90.95, p < .001$, $ES = 1.16$, value, $F(1, 375) = 23.69, p < .001$, $ES = .56$, expectations, $F(1, 375) = 80.51, p < .001, ES = 1.13$, motivational force, $F(1, 375) = 66.96, p < .001$, $ES = 1.04$, goal commitment, $F(1, 375) = 21.95, p < .001$, $ES = .57$, and effort $F(1, 375) = 7.75, p < .01$, $ES = .36$. All effects, but effort, also represented significant effects (above medium) using effect size indicators.

To answer the second research question (whether group differences can be attributed to the multiple influence of goal orientations), a series of analyses of covariance were conducted with all four goal orientations acting as covariates. Dependent variables were those in which initial group differences were observed. In essence a nonsignificant effect would suggest that if both groups were equal across goal orientations, their observed differences in motivation and self-regulation *may* not exist suggesting that goal orientations are significant predictors of students' self-regulatory beliefs, efficacy and other motivational variables.

Table 3. Un-adjusted and adjusted (for covariates) means (and standard deviation) comparing students with and without learning difficulties across constructs in Study 1

	Student group					
	Typical	Learning difficulties	Typical	Learning difficulties		
Constructs	U^a-Mean	U^a-Mean	A^b-Mean	A^b-Mean	U^a-F	A^b-F
Self-regulation	5.47 (.76)	4.96 (1.00)	5.41	5.23	22.69*	2.75
Self-efficacy	6.04 (.84)	4.87 (1.17)	5.98	5.13	90.95*	48.94*
Expectations	9.59 (.65)	8.68 (.94)	1.51	1.80	80.51*	2.12
Value	6.67 (.70)	6.14 (1.14)	6.60	6.53	23.69*	.53
Motivational force	64.24 (7.38)	54.89 (10.63)	63.63	58.31	66.96*	26.67*
Effort	6.10 (1.35)	5.58 (1.57)	6.02	5.96	7.75*	.10
Goal commitment	6.37 (.86)	5.80 (1.11)	6.28	6.23	21.95*	.20

Note. [a]Un-adjusted parameters. [b]Parameters that are adjusted for the contribution of goal orientations. *Indicates significance of the F statistic at $p < .05$.

First, a series of ANOVAs pointed out significant between group differences in mastery-approach, $F(1, 375) = 41.77, p < .001$, task-avoidance, $F(1, 375) = 5.84, p < .05$, and positive social experiences, $F(1, 375) = 39.07, p < .001$, with the students with learning difficulties having lower scores on those variables. As shown in Table 3 (columns 3 and 4), initial group differences in effort, goal-commitment, value, self-regulation, and expectations "disappeared" after controlling for and equating students on their goal orientations. Among covariates, significant mean adjustments were due to mastery-approach, $F(1, 368) = 47.51, p < .001$, performance-approach, $F(1, 368) = 8.52, p < .01$, and positive social experiences, $F(1, 368) = 24.40, p < .001$.

One purpose of the present study was to examine differences between students with and without learning difficulties in goal orientation, self-regulation, and motivation. A secondary purpose was to attribute possible group differences to the combined influence of goal orientations. Students with learning difficulties, compared to typical students, were inferior in all goal orientations and motivational variables with the exception of task avoidance orientation. These data suggest a low motivation profile for these students (see also Deci, Hodges, Pierson, & Tomassone, 1992; Durrant, 1993; Pintrich et al., 1994). Students with learning difficulties seemed to lack the necessary adaptive driving force (i.e., goal-orientation) to regulate other important variables (e.g., effort). With regard to the second objective of the present study, differences between students with and without learning difficulties on motivation were clearly predicted by initial dif-

ferences on goal orientations (significant covariates were mastery, performance, and positive social experiences orientations). This finding is particularly important as effort, goal-commitment, persistence and other motivational variables were previously found to be significant mediators of academic achievement (see Elliot et al., 1999; Pajares & Cheong, 2003). Thus, there is preliminary evidence that learning difficulties are strongly related to motivational tendencies. The analysis of covariance also suggested that of the 3 predictors, mastery orientation and positive social experiences accounted for most of the group-mean differences in motivation. Thus, learning for the sake of interest and enjoyment as well as positive social experiences appeared to differentiate students with and without learning difficulties in other motivational or self-regulatory variables. Other significant adjustments were made due to performance-approach orientation. On the other hand, task-avoidance was not associated with significant mean adjustments. The purpose of Study 2 was to replicate the findings of Study 1 with another population, students with learning difficulties in mathematics because there are various populations of students with specific learning difficulties (i.e., in language, math, etc.), and assess the regulatory role of goal orientations with motivational variables and self-efficacy as well.

STUDY 2

Method

Participants - Procedures. In all, 30 students with teacher-identified learning difficulties in mathematics and 66 typical students from Northern Greece participated in the study. There were 52 boys and 44 girls. Within groups gender distribution was as follows: for the students with learning difficulties in mathematics (18 boys and 12 girls) and for the typical students (34 boys and 32 girls). Of them, 45 students were attending Grade 5 and 51 Grade 6. Students completed self-report measures of motivation and self-efficacy during the early hours of a typical school day and were assured of the confidentiality of their responding. Specifically, students were assured of the fact that their responding would have no relationship with their term grades. All assessments were conducted during the end of the fall semester of the 2001-2002 academic year.

Table 4. Intercorrelations among variables in Study 2

Variables	1	2	3	4	5	6	7
			Typical students				
1. Mastery-approach	--						
2. Performance-approach	.64**	--					
3. Task-avoidance	.12	-.06	--				
4. Positive social experiences	.63**	.50**	.21	--			
5. Self-efficacy	.59**	.17	.36*	.51**	--		
6. Self-regulation	.52**	.32	.14	.54**	.51**	--	
7. Motivational force	.28	.17	-.07	.20	.42**	.10	
8. Perceived control	.29	.54**	-.04	.38*	.03	.41**	.41**
			Students with learning difficulties in mathematics				
1. Mastery-approach	--						
2. Performance-approach	.34*	--					
3. Task-avoidance	-.18	.26*	--				
4. Positive social experiences	.36**	.49**	.28*	--			
5. Self-efficacy	.37**	-.04	-.38	.14		--	
6. Self-regulation	.36*	.24*	.22	.27*	.24	--	
7. Motivational force	.46*	.34*	-.12	.64*	.58**	.16	--
8. Perceived control	.15	.01	-.06	.12	.61**	.19	.38**

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

Measures

Goal orientations, self-efficacy, self-regulation, and motivational force in mathematics were assessed as in Study 1. For typical students, alphas were .95 for mastery-approach, .89 for performance-approach, .80 for task-avoidance, and .73 for positive social experiences. The respective estimates for students with learning difficulties in mathematics were .93, .91, .76 and .84. For self-efficacy and self-regulation alphas were .95 and .76 for the typical student group and .94 and .69 for students with learning difficulties in mathematics. Perceived control[3] was assessed using a 3-item scale from Skinner (1995). The items were: "It is easy for me to receive good grades in mathematics", "If I decide to learn something well, I manage to accomplish that", and "I can't understand mathematics no matter what I do

[3] As a thoughtful reviewer suggested one could confuse the terms *perceived control* and *self-efficacy*. Self-efficacy according to Bandura (1977) reflects a set of specific beliefs about a person's capabilities to achieve specific end states. It is task-specific and it assesses "how well" a person can perform a skill. Perceived control relates strongly to Rotter's (1966) internal-external frame of reference, and it tests whether a person feels that he/she has the control to perform a task or whether he/she perceives outcomes as being uncontrollable (e.g., they are an act of God).

(reversed). Cronbach's α of the scale was .58 for typical students and .62 for students with learning difficulties in mathematics. The intercorrelations between measured variables are shown in Table 4.

Results - Discussion

Between group differences prior to and following the contribution of goal orientations. Results from a one-way ANOVA suggested that there were significant between groups differences in self-efficacy, $F(1, 94) = 20.24, p < .001, ES = .97$, motivational force, $F(1, 94) = 5.07, p < .05, ES = .56$, and perceived control, $F(1, 94) = 8.40, p < .01, ES = .71$. There were no significant between group differences on self-regulation, thus, this variable was not incorporated in step two of the analyses (i.e., the analysis of covariance). At step 2, after controlling for individual differences in goal orientations, results indicated that only the means in motivational force were significantly adjusted and there were no differences between the two groups, $F(1, 91) = 2.758, p =$ ns. All other effects remained significant, pointing to the existence of differences between students with and without learning difficulties in mathematics, although substantially adjusted for the contribution of goal orientations.

One purpose of Study 2 was to examine differences between students with and without learning difficulties in mathematics in self-efficacy, motivational force, and perceived control and examine if these effects would diminish after accounting for the linear contribution of goal orientations. Significant differences emerged in motivational force, self-efficacy, and perceived control, but not self-regulation. These findings agree with the general premise that students with learning difficulties, particularly in mathematics, lack the motivation necessary to achieve positive academic outcomes, or rely on external controls (e.g., Fulk et al., 1998; Pintrich et al., 1994). The analysis of covariance also suggested that initial between group differences in motivational force can be accounted for by incorporating information from their goal orientations. Although the means of the other variables (e.g., of self-efficacy) were somewhat adjusted after controlling for goal orientations, differences between groups remained significant. Thus, although self-efficacy has been widely reported to be a significant determinant of academic achievement (e.g., Bandura, 1977; Dermitzaki & Efklides, 2000; Pajares & Cheong, 2003), goal orientations did not account for significant amounts of its variability, contrary to the findings of Study 1. The purpose of Study 3 was

to replicate the findings of Studies 1 and 2 with additional samples of typical students and students with learning difficulties in mathematics, and assess if goal orientations can account for individual differences in self-regulation.

STUDY 3

Method

Participants - Procedures. During the Spring semester of the 2001-2002 academic year, 71 Greek elementary school students, completed a battery of self-report measures tapping motivation, self-regulation and goal orientations. There were 38 typical students and 33 students with learning difficulties in mathematics (34 boys and 37 girls; 29 from Grade 5 and 42 from Grade 6), all of Greek origin. The gender distribution within groups was 16 boys and 14 girls for the students with difficulties in mathematics (data on gender were missing for 3 students) and 19 boys and 19 girls for the typical students. The students with learning difficulties in mathematics were selected based on their scores at or below the 25th percentile on a teacher-rating scale or had been referred for learning difficulties in mathematics by their teachers. All students were educated in general education settings. The procedures for administration of the batteries were identical to both groups of students and were as in the previous studies.

Measures

The same measures of Study 1 were also administered to the students of Study 3. Internal consistency estimates for typical students were for mastery-approach, $\alpha = .93$, performance-approach, $\alpha = .82$, task-avoidance, $\alpha = .77$, positive social experiences, $\alpha = .76$, self-regulation, $\alpha = .75$, self-efficacy, $\alpha = .95$, and goal commitment, $\alpha = .78$. The respective estimates for students with learning difficulties in mathematics were .84, .91, .70, .73, .63, .92, and .59. Table 5 shows intercorrelations between measured variables.

Results - Discussion

Comparisons between groups across constructs. Significant differences between groups emerged in motivational force, $F(1, 69) = 817, p < .01, ES =$

Table 5. Intercorrelations among variables in Study 3

Variables	1	2	3	4	5	6
		Typical students				
1. Mastery-approach	--					
2. Performance-approach	.55**	--				
3. Task-avoidance	-.02	.18	--			
4. Positive social experiences	.80**	.67**	.09	--		
5. Self-regulation	.41*	.17	.18	.49**	--	
6. Self-efficacy	.41*	.21	.12	.41*	.75**	--
7. Motivational force	.59**	.14	-.16	.42*	.42*	.54**
	Students with learning difficulties in mathematics					
1. Mastery-approach	--					
2. Performance-approach	.12	--				
3. Task-avoidance	-.23	.12	--			
4. Positive social experiences	.39*	.42*	.01	--		
5. Self-regulation	.11	.24	.37*	.25	--	
6. Self-efficacy	.56**	-.04	-.11	.12	.15	--
7. Motivational force	.43*	.06	-.31	.37*	-.01	.47*

Note. $^*p < .05$, $^{**}p < .01$.

0.75, self-efficacy, $F(1, 69) = 20.67, p < .001, ES = 1.09$, self-regulation, $F(1, 69) = 4.80, p < .05, ES = 0.53$, goal commitment, $F(1, 69) = 9.99, p < .01, ES = 0.75$, and effort, $F(1, 69) = 3.78, p < .05, ES = 0.46$ on a one-tailed test, with the students with learning difficulties in mathematics having significantly lower scores on these variables.

Comparisons between groups after adjusting for the effect of goal orientations. To answer the second research question (whether group differences can be attributed to the multiple influence of goal orientations), again analyses of covariance were implemented with the four goal orientations being the covariates. Initial between group differences were observed in mastery-approach, $F(1, 69) = 9.95, p < .01$, and positive social experiences, $F(1, 69) = 3.18, p < .05$, with the students with learning difficulties in mathematics having significantly lower mean values. As shown in Figure 1 (upper panel), initial group differences in self-regulation diminished after controlling for all four goal orientations, $F(1, 65) = 1.82, p = .18$; the same was true for motivational force, $F(1, 65) = 2.55, p = .12$ (see Figure 1: lower panel); for goal commitment, $F(1, 65) = 2.39, p = .13$ (see Figure 2: upper panel), and effort, $F(1, 65) = 1.60, p = .21$ (Figure 2: lower panel). For self-efficacy, initial group differences remained, even after controlling for the variability due to goal-orientations, although the means were adjusted substantially, $F(1, 65) = 10.37, p = .002$.

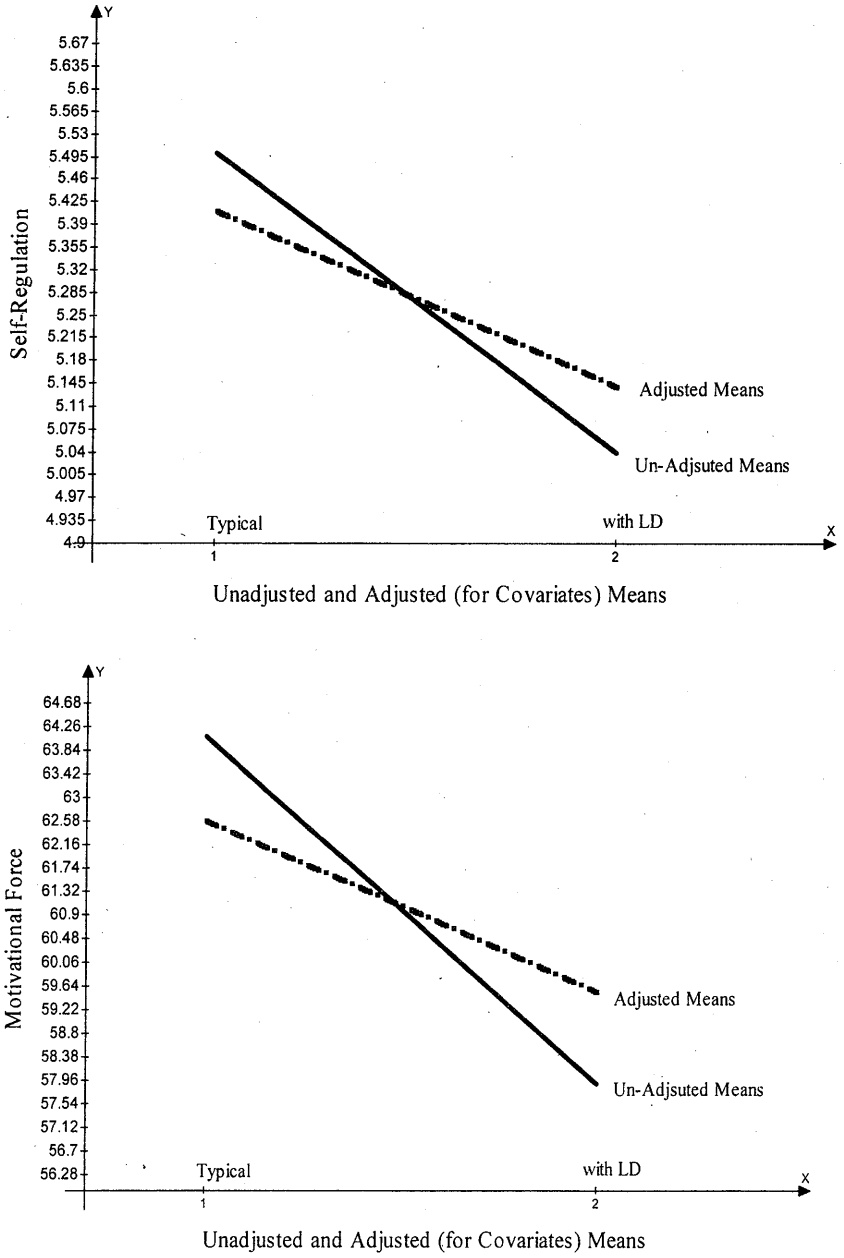

Figure 1. Unadjusted and adjusted means for self-regulation (upper panel) and motivational force (lower panel).

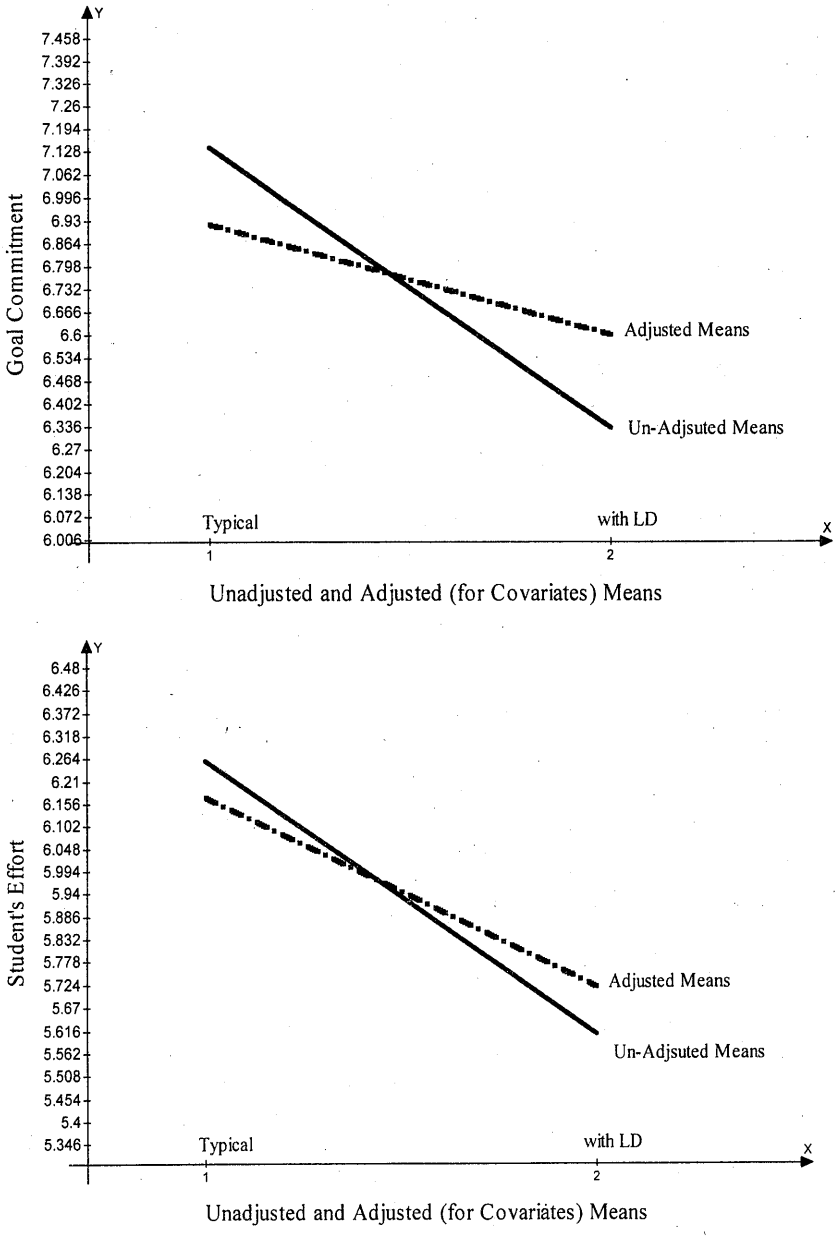

Figure 2. Unadjusted and adjusted means for goal commitment (upper panel) and effort (lower panel).

One purpose of Study 3 was to examine differences between students with and without learning difficulties in mathematics in goal orientation, motivational force, self-regulation, and self-efficacy. A secondary purpose was to attribute possible group differences to the combined influence of goal orientations. Similarly to Study 1, differences between groups emerged in mastery orientation, motivational force, self-efficacy and self-regulation. Once again, the combination of multiple goal orientations predicted the emergence of significant effects between groups, although previous studies have also favored the presence of one of the two goals (Meece & Holt, 1993). This study's findings agree with those of Study 1 and partially of Study 2 in that, goal orientations predict important, to the academic achievement, antecedents such as students' motivational force and self-efficacy. Once again, as in Study 2, the means in self-efficacy of both groups were substantially adjusted after controlling for goal orientations. This latter finding, however, indicates that variables other than goal orientation may be responsible for the development of perceptions of self-efficacy that are not related to motivation. A very important finding of Study 3 was that goal orientations predicted a very important mediator of academic achievement, namely self-regulation (Zimmerman, 1989).

GENERAL DISCUSSION

The purpose of all three studies was to examine possible differences between students with and without learning difficulties across goal orientations, motivation, and self-regulation, as well as to examine the hypothesis that goal orientations can predict student motivation and self-regulation. This latter hypothesis would hold true if group differences across constructs would diminish after controlling for goal orientations. Results indicated that: (a) students with and without learning difficulties differed from typical students on goal orientation (Studies 1, 2 and 3), motivation (Studies 1, 2 and 3), and self-regulation (Studies 1 and 3) and, (b) differences between groups on motivation (Studies 1, 2, 3) were accounted for by students' initial levels in goal orientations.

The first important finding was that students with and without learning difficulties held significantly different goal orientations. This finding is particularly important, as different goal orientations have been associated with different behaviors, self-perceptions, affective, and achievement outcomes (e.g.,

Pintrich, 2000). Typical students were significantly more mastery- oriented and this pattern of goal-directed behavior has been responsible for positive achievement outcomes (Elliot et al., 1999; Harackiewicz, Barron, Carter, Lelto, & Elliot, 1997). The significant role of a mastery orientation has been consistently documented in the literature with typical students, particularly at the college level (Barron & Harackiewicz, 2003; Elliot & Moller, 2003; Pintrich, 1989; Pintrich & Schrauben, 1992; Wentzel, 1996). Similarly to a mastery orientation, the positive social experiences orientation differentiated students with and without learning difficulties with the latter group having lower scores. Inclusion of this novel construct indicated that it is associated positively with motivation, through, maybe, its strong association with a mastery orientation. Students motivated by social means (i.e., seeking social relationships with peers) were most likely motivated to achieve and/or maintain their social status, partially through keeping their grades up. This relationship substantiates the important role of social goals documented earlier (see Wentzel, 1993, 1996) but should also be the subject of future investigations, specifically for students with learning difficulties and other disabilities who may be lacking social skills (Kamps et al., 1990). Lastly, task-avoidance did not differentiate the two groups, suggesting that motivational differences are based on the pursuit mainly of mastery goals and social goals (e.g., Luchow, Crowl, & Kahn, 1985). Even though a performance orientation has been initially considered to be a maladaptive orientation (Dweck & Leggett, 1988), recent evidence suggested that it correlates substantially both directly and indirectly with academic achievement (Barron & Harackiewicz, 2001; Elliot et al., 1999; Harackiewicz et al., 2000). Thus, being performance oriented does not necessarily imply low achievement. In fact, for students with learning difficulties, a performance-approach orientation has proved to be highly adaptive regarding intention to achieve (Sideridis, 2005b).

Also, the presence of mastery- and performance-approach goals has been associated with both adaptive and maladaptive outcomes. As Pintrich (2000) and Barron and Harackiewicz (2001, 2003) suggested, the presence of both mastery and performance goals may be associated with more adaptive outcomes, compared to the presence of one type of goals alone (see also Pintrich, Conley, & Kempler, 2003). Inspection of the means suggested that typical students were on the average, high on both mastery and performance orientations and this combined orientation may have been responsible for their enhanced achievement outcomes. On the contrary, students with learning difficulties had lower levels in mastery and performance goal

orientations and in positive social experiences, a finding that agrees with past studies (Fulk et al., 1998).

The second important finding was that, compared to typical peers, students with learning difficulties were least motivated to achieve academically, they were feeling less self-efficacious, and were less skilled in regulating their achievement behaviors (see also Deci & Chanlder, 1986). This finding agrees with previous studies in which students with learning difficulties lacked motivation (e.g., Fulk et al., 1998; Grolnick & Ryan, 1990; Luchow et al., 1985) in the form of persisting to a task or attaching high value to an achievement outcome (see also Bear, Minke, Griffin, & Deemer, 1998; Clever, Bear, & Juvonen, 1992; Sideridis, 2002). Studies in which students with learning difficulties were more persistent, compared to their typical peers or were no different in persistence, were also revealed (e.g., Friedman, & Medway, 1987; Wansart, 1990); thus, the literature on motivation is far from being conclusive. Past studies also agree with the premise that students with learning difficulties lack metacognitive and self-regulatory abilities (see Pintrich et al., 1994; Wansart, 1990), although their importance has been well documented (Efklides, 2001, 2002; Efklides & Tsiora, 2002). Furthermore, regarding self-efficacy, in the past students with learning difficulties reported viewing their abilities less favorably, compared to their peers (Graham & Harris, in press; Graham, Schwartz, & MacArthur, 1993) although the substantial role of self-efficacious beliefs is well documented in the literature (Michaels, Lodato-Wilson, & Margolis, 2005).

A third finding was that goal orientations were mostly responsible for initial group differences in motivation and partly in self-regulation. Significant mean adjustments in motivational variables were made due to three of the four covariates (mastery-approach, performance-approach, and positive social experiences orientations). This finding suggests that educators who work with students with learning difficulties can adjust their teaching style in order to account for the specialized effects that goal orientations exert on students' self-regulation of achievement behaviors. Adapting instruction to cultivate a mastery-oriented environment may result in students' regulation of their achievement behaviors, which in turn may have associated positive effects on their motivation (Patrick, 2004). The findings from the present study do not imply that goal orientations are the only important factors in the learning process. Previous studies identified a number of important variables such as attributions and locus of control, autonomy, perceived competence, and others (e.g., Deci et al., 1992). The importance

of the present study's findings lies on the fact that goal orientations accounted for significant amounts of the variability of very important antecedent variables such as motivational force and self-regulation, goal commitment, and effort.

The present studies have also specific limitations. First, causal inferences cannot be supported because the findings were based on correlational studies. Second, the samples of students came from populations of typical students and they most likely represent the lower end of the normal distribution on achievement in language or mathematics. A third limitation was that in some of the scales, internal consistency estimates were relatively low (e.g., self-regulation and goal-commitment). Last, some of the items were math-specific whereas others assessed more global constructs.

What is the applied nature of the present studies' findings? First, low motivation and low self-regulation are significant inherent characteristics of students with learning difficulties. It has recently been argued that these characteristics may eventually be used for the classification of students with learning difficulties (Sideridis, Mouzaki, Simos, & Protopapas, 2006). If goal orientations act as predictors of motivation and self-regulation, one may speculate that in future conceptualizations of the learning difficulties construct, motivation could be considered as a core identifying feature of the disorder. In fact, in a recent article Sideridis, Morgan, Botsas, Padeliadu, and Fuchs (2006) presented 5 studies in which motivation was a more effective predictor of student identification as having learning difficulties compared to an array of cognitive and metacognitive variables.

The present studies have practical implications for special and/or general education teachers. Teachers must cultivate and transmit to their students the joy of learning and the joy and value of mastering academic concepts. Teaching students to learn for the sake of learning may be the most important lesson of all, as students will learn to approach other tasks with the same "adaptive" orientation. Teachers may need to avoid creating competitive situations, as the effects regarding the regulation that is the outcome of performance goals have been mixed (Midgley, Kaplan, & Middleton, 2001; Sideridis, 2006b; Urdan, 2004; Wolters, 2004). On the contrary, a combination of mastery and performance orientation may act as an accelerator of learning (although this speculation must be substantiated with future empirical data, particularly for the population of students with learning difficulties). Another indirect implication from the present study's findings is a focus on teachers to teach metacognitive and self-regulatory

skills (Botsas & Padeliadu, 2003; Graham & Harris, in press). As Ellis (1986) stated, cognitive strategy training will not occur in the absence of motivation and, thus, one has to alter the motivation of students with disabilities in order for them to learn cognitive strategies and to be able to generalize them to appropriate ends. This line of research has produced several interesting findings but future studies may attempt to replicate and extend the present findings with children who possess more challenging behaviors such as those who present emotional and behavioral problems.

REFERENCES

Ablard, K. E., & Lipschultz, R. E. (1998). Self-regulated learning in high-achieving students: Relations to advanced reasoning, achievement goals, and gender. *Journal of Educational Psychology, 90*, 94-101.

Ainley, M. D. (1993). Styles of engagement with learning: Multidimensional assessment of their relationship with strategy use and school achievement. *Journal of Educational Psychology, 85*, 395-405.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261-271.

Anderman, E. M., Greisinger, T., & Westerfield, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology, 90*, 84-93.

Anderman, E., & Midgley, C. (2004). Changes in self-reported academic cheating across the transition from middle school to high school. *Contemporary Educational Psychology, 29*, 499-517.

Bandura, A. (1977). Self efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-214.

Bandura, A. (2001). Guide for constructing self-efficacy scales. In G. V. Caprara (Ed.), *La valutazione dell' autoefficacia* (pp. 15-37). Trento, Italy: Erickson.

Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*, 706-722.

Barron, K. E., & Harackiewicz, J. M. (2003). Revisiting the benefits of performance-approach goals in the college classroom: Exploring the role of goals in advanced college courses. *International Journal of Educational Research, 35*, 357-374.

Bear, G. G., Minke, K. M., Griffin, S. M., & Deemer, S. A. (1998). Achievement-related perceptions of children with learning disabilities and normal achievement: Group and developmental differences. *Journal of Learning Disabilities, 31*, 91-104.

Botsas, G., & Padeliadu, S. (2003). Goal orientation and reading comprehension strategy use among students with and without reading difficulties. *International Journal of Educational Research, 39*, 477-495.

Clever, A., Bear, G., & Juvonen, J. (1992). Discrepancies between competence and importance in self-perceptions of children in integrated classes. *Journal of Special Education, 26*, 125-138.

Dachler, H. P., & Mobley, W. H. (1973). Construct validation of an instrumentality-expectancy-task-goal model of work motivation. *Journal of Applied Psychology, 58*, 397-418.

Deci, E. L., & Chandler, C. L. (1986). The importance of motivation for the future of the LD field. *Journal of Learning Disabilities, 19*, 587-594.

Deci, E. L., Hodges, R., Pierson, L., & Tomassone, J. (1992). Autonomy and competence as motivational factors in students with learning disabilities and emotional handicaps. *Journal of Learning Disabilities, 25*, 457-471.

Dermitzaki, I., & Efklides, A. (2000). Aspects of self-concept and their relationship with language performance and verbal reasoning ability. *American Journal of Psychology, 113*, 621-638.

Durrant, J. E. (1993). Attributions for achievement outcomes among behavioral subgroups of children with learning disabilities. *Journal of Special Education, 27*, 306-320.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040-1048.

Dweck, C., & Leggett, E. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.

Dykman, B. M. (1998). Integrating cognitive and motivational factors in depression: Initial tests of a goal-orientation approach. *Journal of Personality and Social Psychology, 74*, 139-158.

Early, P. C. (1985). Influence of information, choice and task complexity on goal acceptance, performance, and personal goals. *Journal of Applied Psychology, 70*, 481-491.

Efklides, A. (2001). Metacognitive experiences in problem solving: Metacognition, motivation, and self-regulation. In A. Efklides, J. Kuhl, & R. Sorrentino (Eds.), *Trends and prospects in motivation research* (pp. 297-323). Dordrechts, The Netherlands: Kluwer.

Efklides, A. (2002). The systemic nature of metacognitive experiences: Feelings, judgments, and their interrelations. In M. Izaute, P. Chambres, & P-J. Marescaux (Eds.), *Metacognition: Prospects, function and use* (pp. 19-34). Dordrechts, The Netherlands: Kluwer.

Efklides, A., & Tsiora, A. (2002). Metacognitive experiences, self-concept and self-regulation. *Psychologia: An International Journal of Psychology in the Orient, 45*, 221-235.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169-189.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218-232.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*, 461-475.

Elliot, A. J., & McGregor, H. A. (2001). A 2x2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501-519.

Elliot, A. J., McGregor, H. A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology, 91*, 549-563.

Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology, 82*, 804-818.

Ellis, E. S., (1986). The role of motivation and pedagogy on the generalization of cognitive strategy training. *Journal of Learning Disabilities, 19*, 66-70.

Erez, M., & Arad, R. (1986). Participative goal setting: Social motivational and cognitive factors. *Journal of Applied Psychology, 71*, 591-597.

Fletcher, J., Coulter, W., Reschly, D., & Vaughn, S. (2004). Alternative approaches to the definition and identification of learning disabilities: Some questions and answers. *Annals of Dyslexia, 54*, 304-331.

Friedman, D. E., & Medway, F. J. (1987). Effects of varying performance sets and outcome expectations, attributions, and persistence of boys with learning disabilities. *Journal of Learning Disabilities, 20*, 312-316.

Fulk, B. M., Brigham, F. I., & Lohman, D. A. (1998). Motivation and self-regulation: A comparison of students with learning and behavior problems. *Remedial and Special Education, 19*, 300-309.

Georgiadis, L., & Efklides, A. (2000). The integration of cognitive, metacognitive, and affective factors in self-regulated learning: The effect of task difficulty. *Psychology: The Journal of the Hellenic Psychological Society, 7*, 1-19.

Gorsuch, T. (1983). *Factor analysis*. New York: Erlbaum.

Graham, S., & Harris, K. (in press). Teaching students with learning disabilities to be smarter writers: Self-regulated strategy development. In G. D. Sideridis & T. A. Citro (Eds.), *Best practices in learning disabilities*. New York: Kingsley.

Graham, S., Schwartz, S. S., & MacArthur, C. A. (1993). Knowledge of writing and the composing process, attitude toward writing, and self-efficacy for students with and without learning disabilities. *Journal of Learning Disabilities, 26*, 237-249.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*, 541-553.

Greene, B. A., & Miller, R. B. (1996). Influences on achievement: Goals, perceived ability, and cognitive engagement. *Contemporary Educational Psychology, 21*, 181-192.

Grolnick, W. S., & Ryan, R. M. (1990). Self-perceptions, motivation, and adjustment in children with learning disabilities: A multiple group comparison study. *Journal of Learning Disabilities, 23*, 177-184.

Harackiewicz, J. M., Barron, K. E., Carter, S. M., Lehto, A. T., & Elliot, A. J. (1997). Determinants and consequences of achievement goals in the college classroom: Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73*, 1284-1295.

Harackiewicz, J. M., Barron, K. E., Elliot, A. J., Tauer, J. M., & Carter, S. M. (2000). Short-term and long-term consequences of achievement goals: Predicting interest and performance over time. *Journal of Educational Psychology, 92*, 316-330.

Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology, 94*, 638-645.

Harackiewicz, J. M., & Elliot, A. J. (1993). Achievement goals and intrinsic motivation. *Journal of Personality and Social Psychology, 65*, 904-915.

Hollenbeck, J. R., & Williams, C. R. (1987). Goal importance, self-focus, and the goal-setting process. *Journal of Applied Psychology, 72*, 204-211.

Hollenbeck, J. R., Williams, C. R., & Klein, H. J. (1989). An empirical examination of the antecedents of commitment to difficult goals. *Journal of Applied Psychology, 74*, 18-23.

Howell, D. (1999). *Fundamental statistics for the behavioral sciences* (4th ed.). New York: Duxbury.

Kaplan, A., & Midgley, C. (2000). The relationship between perceptions of the classroom

goal structure and early adolescents' affect in school: The mediating role of coping strategies. *Learning and Individual Differences, 11*, 187-212.

Kaplan, A., Gheen, M., & Midgley, C. (2002). Classroom goal structure and student disruptive behavior. *British Journal of Educational Psychology, 72*, 191-211.

Latham, G. P., & Steele, T. R. (1983). The motivational effects of participation vs. goal setting on performance. *Academy of Management Journal, 26*, 406-417.

Lethwaite, R., & Piparo, A. J. (1993). Goal orientations in young competitive athletes: Physical achievement, social-relational, and experiential concerns. *Journal of Research in Personality, 27*, 103-117.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.

Luchow, J. P., Crowl, T. K., & Kahn, J. P. (1985). Learned helplessness: Perceived effects of ability and effort on academic performance among EH and LD/EH children. *Journal of Learning Disabilities, 18*, 470-474.

Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology, 80*, 514-523.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology, 85*, 582-590.

Mento, A. J., Cartledge, N. D., & Locke, E. A. (1980). Maryland vs. Michigan vs. Minnesota: Another look at the relationship of expectancy and goal difficulty to task performance. *Organizational Behavior and Human Performance, 25*, 419-440.

Michaels, C., Lodato-Wilson, G., & Margolis, H. (2005). Promoting self-efficacy and academic competency: Instructional implications for struggling secondary learners. In G. D. Sideridis & T. A. Citro (Eds.), *Research to practice: Effective interventions in learning disabilities* (pp. 90-122). Boston, MA: LDW.

Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology, 93*, 77-86.

Murdock, T. B., Miller, A., & Kohlhardt, J. (2004). Effects of classroom context variables on high school students' judgments of the acceptability and likelihood of cheating. *Journal of Educational Psychology, 96*, 765-777.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experiences, task choice, and performance. *Psychological Review, 91*, 328-346.

Onwuegbuzie, A., Levin, J. R., & Leach, N. L. (2003). Do effect sizes measure up? A brief assessment. *Learning Disabilities: A Contemporary Journal, 1*, 37-40.

Pajares, F., & Cheong, Y. F. (2003). Achievement goal orientations in writing: A developmental perspective. *International Journal of Educational Research, 39*, 437-455.

Patrick, H. (2004). Re-examining classroom mastery goal structure. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation: Volume 13. Motivating students, improving schools: The legacy of Carol Midgley* (pp. 233-263). Amsterdam: Elsevier.

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*, 554-555.

Pintrich, P. R., Anderman, E. M., & Klobucar, C. (1994). Intraindividual differences in motivation and cognition in students with and without learning disabilities. *Journal of Learning Disabilities, 27*, 360-370.

Pintrich, P. R., Conley, A. M., & Kempler, T. (2003). Current issues in achievement goal theory and research. *International Journal of Educational Research, 39*, 339-356.

Pintrich, P. R., & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In M. Maher & P. R. Pintrich (Eds.), *Advances in motivation and achievement: Goals and self-regulatory processes* (pp. 371-402). Greenwich, CT: JAI.

Pintrich, P., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in academic tasks. In D. Schunk & J. Meece (Eds.), *Students' perception in the classroom: Causes and consequences* (pp. 149-183). Hillsdale, NJ: Erlbaum.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*(Whole No. 609).

Sideridis, G. D. (in press). Why are students with learning disabilities depressed? A goal orientation model of depression vulnerability. *Journal of Learning Disabilities*.

Sideridis, G. D. (2002). Goal importance and students at risk of having language difficulties: An underexplored aspect of student motivation. *Journal of Learning Disabilities, 35*, 343-356.

Sideridis, G. D. (2003). On the origins of helpless behavior in learning disabilities: Avoidance motivation? *International Journal of Educational Research, 39*, 497-517.

Sideridis, G. D. (2005a). Goal orientation, academic achievement, and depression: Evidence in favor of a revised goal theory framework. *Journal of Educational Psychology, 97*, 366-375.

Sideridis, G. D. (2005b). Performance approach-avoidance orientation and its relationship to the academic achievement of students with and without spelling difficulties. *Reading and Writing Quarterly, 21*, 331-359.

Sideridis, G. D. (2005c). Goal orientations, classroom goal structures, academic achievement, and regulation in learning disabilities. In G. D. Sideridis & T. A. Citro (Eds.), *Research to practice: Effective interventions in learning disabilities* (pp. 193-219). Boston, MA: LDW.

Sideridis, G. D. (2006a). Goal orientations and strong oughts: Adaptive or maladaptive forms of motivation for students with and without learning disabilities? *Learning and Individual Differences, 16*, 61-77.

Sideridis, G. D. (2006b). Goal orientations, oughts and regulation in learning disabilities. *Learning Disability Quarterly, 29*, 3-18.

Sideridis, G. D., Morgan, P., Botsas, G., Padeliadu, S., & Fuchs, D. (2006). Prediction of students with LD based on metacognition, motivation, emotions, and psychopathology: A ROC analysis. *Journal of Learning Disabilities, 39*, 215-229.

Sideridis, G. D., Mouzaki, A., Simos, P., & Protopapas, A. (2006). Reading motivation, emotions and psychopathology as predictors of learning disabilities: A classification study. *Learning Disability Quarterly, 29*, 159-180.

Sideridis, G. D., & Tsorbatzoudis, Ch. (2003). Intra-group motivational analysis of students with learning disabilities: A goal orientation approach. *Learning Disabilities: A Contemporary Journal, 1*, 8-16.

Skinner, H. (1995). *Perceived control, motivation and coping*. Thousand Oaks, CA: Sage.

Thorklidsen, T. A., & Nicholls, J. G. (1998). Fifth graders' achievement orientations and beliefs: Individual and classroom differences. *Journal of Educational Psychology, 90*, 179-201.

Torgesen, J. K. (1986). Learning disabilities theory: Its current state and future prospects. *Journal of Learning Disabilities, 19*, 399-407.

Tubbs, M. E. (1993). Commitment as a moderator of the goal-performance relation: A case for clearer construct definition. *Journal of Applied Psychology, 78*, 86-97.

Tubbs, M. E., Boehne, D. M., & Dahl, J. G. (1993). Expectancy, valence, and motivational force functions in goal-setting research: An empirical test. *Journal of Applied Psychology, 78*, 361-373.

Tubbs, M. E., & Dahl, J. G. (1991). An empirical comparison of self-report and discrepancy measures of goal commitment. *Journal of Applied Psychology, 76*, 708-716.

Turner, J. C., Thorpe, P. K., & Meyer, D. K. (1998). Students' reports of motivation and negative affect: A theoretical and empirical analysis. *Journal of Educational Psychology, 90*, 758-771.

United States Office of Education. (1977). Assistance to states for education of handicapped children: Procedures for evaluating specific learning disabilities. *Federal Register, 42*, G1082-G1085.

Urdan, T. C. (2004). Predictors of academic self-handicapping and achievement: Examining achievement goals, classroom goal structures, and culture. *Journal of Educational Psychology, 96*, 251-264.

Wansart, W. L. (1990). Learning to solve a problem: A microanalysis of the solution strategies of children with learning disabilities. *Journal of Learning Disabilities, 23*, 164-170.

Wentzel, K. (1993). Motivation and achievement in early adolescence: The role of multiple classroom goals. *Journal of Early Adolescence, 13*, 4-20.

Wentzel, K. (1996). Motivation in context: Social relationships and achievement in middle school. In J. Juvonen & K. R. Wentzel (Eds.), *Social motivation: Understanding children's school adjustment* (pp. 226-247). New York: Cambridge University Press.

Wentzel, K. R. (1998). Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology, 90*, 202-209.

Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology, 89*, 420-432.

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96*, 236-250.

Zimmerman, B. J. (1989). A social-cognitive view of self-regulated learning. *Journal of Educational Psychology, 82*, 297-306.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal, 23*, 614-628.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of Educational Psychology, 80*, 284-290.