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# Self-Enhancing and Self-Defeating Ego Goals in Mathematics Lessons: Relationships Among Task and Avoidance Goals, Achievement, Self-Perceptions, Anxiety, and Motivation (A Scientific Educology)

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## Abstract

*Educology is the fund of knowledge about the educational process, which obviously occurs within and outside of schools. Educology includes, at the least, the fund of knowledge about past education (historical educology), about current states of affairs in education (scientific educology), about effective practices within education (praxiological educology), about meanings of terms and sentences in education (analytic philosophical educology) and about good education (normative philosophical educology).*

*This article is a work in scientific educology. It reports on an exploration of extant relationships among four dimensions of goal orientation in mathematics lessons (self-defeating ego orientation, self-enhancing ego orientation, task orientation, and avoidance orientation) and mathematics achievement, self-concept, self-efficacy, anxiety, and intrinsic motivation.*

*Participants in the study were 295 Norwegian elementary school students. Data were collected at two*

*points of time: (1) March and April of 1999, when the students attended their fifth year in school (Time 1) and (2) October and November of the same year, when the students attended their sixth year (Time 2).*

*Within-time regression analyses revealed that goal orientations were systematically related to achievement, self-conceptions, anxiety and motivation and that self-defeating and self-enhancing ego orientation related differently to all these variables.*

*Across-time analyses failed to show that goal orientation affected subsequent anxiety, motivation, and achievement, but it had some predictive value for subsequent self-concept and self-efficacy. In addition, across-time analyses indicated that achievement, self-conceptions, motivation and anxiety have predictive value for subsequent goal orientation.*

## Introduction

Recent educological research on motivation has focused on the importance of students' achievement goals in relation to their success in their school studies.

An achievement goal is distinguished in relation to the purposes of the individual (Ames, 1992). According to achievement goal theory, individuals approach achievement tasks with qualitatively different types of goals (Jagacinski, Hofmann & Strickland, 1996). Moreover, students' goal orientations are assumed to influence their classroom behaviour (Ames & Archer, 1988; Meece, Blumenfeld & Hoyle, 1988; Middleton & Midgley, 1997).

In this study, an examination and an analysis were undertaken of the relationships among achievement goals, academic achievement, academic self-perceptions, intrinsic motivation, and anxiety in school.

## Dimensions of Goal Orientation

Two goal perspectives in particular have been given special attention in educological research literature. These perspectives have been given various names: (1) *task orientation* versus *ego orientation* (Duda, 1993; Nicholls, 1989), (2) *learning* versus *performance goals* (Elliott & Dweck, 1988), and (3) *mastery* versus *performance orientation* (Ames & Archer, 1988). These orientations will be referred to as *task orientation* and *ego orientation* in this article.

*Task orientation* means that the focus of the students' attention is on the task (Nicholls, 1983) and that, in the mind's eye of the students, the tasks of learning, understanding, and developing new skills are ends in themselves (Ames & Archer, 1988; Duda & Nicholls, 1992; Lens, 1994; Nicholls, 1992). Task oriented students tend to see mastery as dependent on their effort, and their perceptions of ability are self-referenced (Duda, 1993).

*Ego-oriented students* are concerned with being judged able, and their perceptions of their ability tend to be normatively referenced. Ability is judged by comparison with others (Ames & Archer, 1988; Duda, 1993; Nicholls, 1983, 1989), and high ability is evidenced by doing better than others (Ames, 1992). The goal of ego-oriented students is typically described as that of establishing the superiority of their ability relative to that of others, to do better than others, or to outperform others (Ames & Archer, 1988; Duda, 1993; Duda & Nicholls, 1992; Nicholls, Cheung, Lauer & Patashnick, 1989).

However, being preoccupied with one's self and concerned about how one is perceived by others may lead to different goals for different students (Skaalvik, 1997; Skaalvik, Valås, & Sletta, 1994). Skaalvik (1997),

discriminated between *self-enhancing* and *self-defeating* ego orientation. Self-enhancing ego orientation means that one's goal is to be best or to demonstrate superior ability, which is the typical understanding of ego orientation. Self-defeating ego orientation, on the other hand, may result in trying not to be poorest and to avoid looking stupid. Similar distinctions have been made by Elliot & Harackiewicz (1996), Middleton & Midgley (1997) and Skaalvik et al. (1994).

Elliot & Harackiewicz and Middleton & Midgley distinguished between performance-approach and performance-avoidance goals, whereas Skaalvik et al. named the two dimensions of ego orientation *offensive* and *defensive* ego orientation. However, neither Skaalvik et al. (1994) nor Elliot & Harackievich (1996) measured both dimensions of ego orientation. Measuring both dimensions, Skaalvik (1997) found that self-enhancing and self-defeating ego orientation was factorially distinct and that they could be differentiated from task orientation and avoidance orientation (see also Middleton & Midgley, 1997; Middleton, Kaplan, & Midgley, 1998).

Harackiewicz, Barron, and Elliot (1998) point out that although some educological theorists have discussed task and ego orientation (mastery and performance goals) as if they were mutually exclusive, striving to outperform others is not necessarily inconsistent with trying to attain mastery.

In support of this view, a number of correlational studies has found task orientation and (self-enhancing) ego orientation to be essentially uncorrelated. Some studies even show that they are positively correlated (e.g., Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; for an overview, see Harackiewicz, Barron, & Elliot, 1998).

Measuring both self-enhancing and self-defeating ego-orientation, Skaalvik (1997) found task orientation to correlate close to zero with self-defeating ego orientation, but to be positively correlated with self-enhancing ego orientation. Moreover, in the Skaalvik (1997) study, the two dimensions of ego orientation were positively, but weakly correlated, whereas Middleton and Midgley (1997) found a correlation of 0.56.

## Relationships Among Achievement, Self-Perceived Abilities, Anxiety, and Motivation

Although students' goal orientations are assumed to influence patterns of cognition, affect, and behaviour in achievement settings (e.g., Dweck and Leggett, 1988), studies of relationships between goal orientations and achievement, self-perceived abilities, anxiety, and intrinsic motivation are few and inconclusive. Achievement and academic self-perceptions have often been presented as outcomes of goals (Middleton, Kaplan, & Midgley, 1998). Still, longitudinal studies are generally lacking, and the educological research evidence provides little information about causal relationships.

The few available educological studies show that both task and ego orientation are either not significantly correlated with achievement in school and with self-perceived abilities or that the associations are weak (Ames & Archer, 1988; Harackiewicz, et al., 1997; Nicholls, 1989; Skaalvik, 1997).

When significant correlations are found between task orientation and academic self-concept or self-efficacy, they tend to be positive (Middleton & Midgley, 1997; Meece, Blumenfeld & Hoyle, 1988; Nicholls, 1989; Nicholls, Patashnick & Nolen, 1985; Seifert, 1995; Skaalvik, 1997).

Inconsistent relationships have been found between ego orientation and students' academic self-concept (Ames and Archer, 1988; Middleton & Midgley, 1997; Nicholls, 1989; Schunk & Swartz, 1993; Seifert, 1995).

A possible explanation for the inconsistent results is that different educologists measure both goal orientations and self-perceptions in different ways. Moreover, ego orientation has been measured with instruments which resemble the definition of self-enhancing ego orientation in this article. Skaalvik reports small negative correlations between self-defeating ego orientation and both academic self-concept and self-efficacy and small positive correlations between self-enhancing ego orientation and academic self-concept and self-efficacy (Skaalvik, 1997; Skaalvik et al., 1994).

Educological studies of relationships between goal orientation and anxiety or intrinsic motivation are very few. There is some evidence that intrinsic motivation and anxiety in school may be related to students' goal orientation (Duda & Nicholls, 1992; Elliot and Harackiewicz, 1996; Middleton & Midgley, 1997; Kaplan & Patrick, 1996; Skaalvik, 1997).

## Purpose of the Study

This study replicates a cross sectional study by Skaalvik (1997) in which the nominated dimensions of ego orientation were tested. Moreover, the predictive value of goal orientations for achievement, self-perceived abilities, anxiety, and intrinsic motivation are analyzed in a cross sectional context and compared with previous data. Additionally, the same predictions are analyzed in a longitudinal perspective.

# Method

## Participants and Procedure

The participants in this study were 295 Norwegian elementary school students. Data were collected at two points of time: (1) first, in March and April 1999, when the students attended fifth grade (*Time 1*) and (2) in October and November 1999, when the students attended sixth grade (*Time 2*). Intact school classes were drawn from four school districts in a large region in Norway.

## Instruments

Students' goal orientations in mathematics were measured by four scales consisting of four items each. The items are displayed elsewhere (see Skaalvik, 1997). Examples of statements which constituted the items are:

> In math classes it is important for me to learn something new (*task orientation*);
>
> In math classes I try to get away with doing as little as possible (*avoidance orientation*);
>
> When I am in math classes it is important for me to avoid looking stupid (*self-defeating ego orientation*); and
>
> I always try to do better than other students in mathematics (*self-enhancing ego orientation*).

Response categories were (1) *false,* (2) *mostly false,* (3) *sometimes false/sometimes true,* (4) *mostly true*, and (5) *true*. Cronbach's alpha for self-defeating ego orientation, self-enhancing ego orientation, task orientation, and avoidance orientation in fifth grade were 0.75, 0.63, 0.63, and 0.74, respectively. Corresponding values in sixth grade were 0.81, 0.76, 0.67, and 0.83.

Mathematics achievement was measured by a 49 item mathematics test. The test had a Cronbach's alpha of 0.90 in fifth grade and 0.92 in sixth grade.

*Mathematics self-concept* was defined as *the general feeling of doing well or poorly in mathematics.* It was measured by an 11 item modified "Self Description Questionnaire" (Marsh 1990). Motivational and emotional items in the original scale (e.g., "I hate math") were replaced with items measuring perceptions of doing well or poorly. Examples of items are:

I always do well in math
I am hopeless in math

The scale displayed a Cronbach's alpha of 0.91 in both fifth and sixth grade.

*Mathematics self-efficacy* was defined as *expectations of being able to solve particular types of mathematics problems*. It was measured by presenting 24 sets of mathematics problems to the students. For each set, the students were asked: "How certain are you that you can do (solve) these kind of mathematics problems?" The items were answered according to a seven-point scale ranging from "not certain at all" (1) to "very certain" (7). Cronbach's alpha for the scale was 0.94 and 0.95 in fifth and sixth grade, respectively.

*Mathematics anxiety* was measured by a short (5 item) version of an eight item anxiety scale focusing on the emotionality dimension of anxiety (see Skaalvik & Rankin, 1995). Examples of items are:

I feel calm in math lessons, and
I am nervous in lessons in mathematics

Cronbach's alpha was 0.80 and 0.82 in fifth and 6th grade, respectively. *Mathematics intrinsic motivation* was defined as *interest in working with or liking to work with math.* It was measured with a short (nine item) version of a 15 item intrinsic motivation scale developed by Skaalvik & Rankin (1995). Examples of items are as follows:

Working with mathematics is fun, and

I like mathematics.

The scale had a Cronbach's alpha of 0.92 in both fifth and sixth grade.

**Data Analysis**

Firstly, separate analyses of *Time 1* and *Time 2* data were conducted by means of regression analysis, letting goal orientation predict achievement, self-perceptions, intrinsic motivation, and anxiety. This was done to control that the pattern of results was similar to previous results found in a cross sectional study by Skaalvik (1997). Analyses of *Time 1* and *Time 2* data revealed the same pattern of results. Therefore, in order to save space, only the results based on data from *Time 2* are reported. Secondly, regression analyses were conducted letting goal orientation measured at *Time 1* predict achievement, self-perceptions, intrinsic motivation, and anxiety at *Time 2*. Lastly, regression analysis was conducted with achievement, self-perceptions, intrinsic motivation, and anxiety measured at *Time 1* as predictor variables and goal orientation at *Time 2* as criterion variables.

## Results

Correlations among the observed variables at *Time 2* as well as statistical means and standard deviations are shown in Table 1. The relationships among the four dimensions of goal orientation found by Skaalvik (1997) were supported. Self-enhancing and self-defeating ego orientation showed a low, but positive, correlation (0.30). Task orientation was positively correlated with self-enhancing ego orientation (0.20), whereas it was not significantly correlated with self-defeating ego orientation (0.04). Avoidance orientation was positively correlated with self-defeating ego orientation

**Table 1**
**Correlations among the Variables, Statistical Means, and Standard Deviations (All Measures at Time 2)**

| | EGODEF | EGOOFF | TASK | AVOID |
|---|---|---|---|---|
| EGODEF | | | | |
| EGOOFF | 0.30 | | | |
| TASK | 0.04 | 0.20 | | |
| AVOID | 0.13 | 0.06 | -0.35 | |
| ASC | -0.24 | 0.24 | 0.23 | -0.30 |
| EFF | -0.22 | 0.18 | 0.33 | -0.26 |
| ANX | 0.48 | 0.11 | -0.14 | 0.27 |
| MOTIV | -0.08 | 0.16 | 0.45 | -0.60 |
| ACH | -0.13 | 0.09 | 0.08 | -0.11 |
| Mean | 16.99 | 10.98 | 19.05 | 11.06 |
| SD | 5.63 | 3.74 | 3.60 | 3.36 |

**Note.** EGODEF = defensive ego-orientation, EGOOFF = offensive ego-orientation, AVOID = avoidance orientation, TASK = task orientation, ASC = academic self-concept, EFF = self-efficacy for schoolwork, EST = self-esteem, MANX = anxiety in mathematics classes, VANX = anxiety in verbal arts classes. All correlations above .11 are statistically significant ($p < 0.05$).

**Table 1 (Continued)**
**Correlations among the Variables, Statistical Means, and Standard Deviations (All Measures at Time 2)**

| ASC | EFF | ANX | MOTIV | ACH |
|---|---|---|---|---|
| | | | | |
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| 0.62 | | | | |
| | | | | |
| -0.43 | -0.42 | | | |
| | | | | |
| 0.45 | 0.38 | -0.32 | | |
| | | | | |
| 0.30 | 0.30 | -0.27 | 0.16 | |
| | | | | |
| | | | | |
| | | | | |
| 27.66 | 66.89 | 11.40 | 10.67 | |
| 6.79 | 12.81 | 4.35 | 4.27 | |

(0.13), but was not significantly correlated with self-enhancing ego orientation (0.06). Task orientation was negatively correlated with avoidance orientation (-0.35).

Zero order correlations between goal orientation and other variables in the study were also in accordance with previous findings. Both mathematics self-concept and self-efficacy were positively associated with self-enhancing ego

orientation (0.24 and 0.18, respectively), whereas these constructs were negatively related to self-defeating ego orientation (-0.24 and -0.22, respectively). Self-concept and self-efficacy were also positively related to task orientation (0.23 and 0.33, respectively) and negatively related to avoidance orientation (-0.30 and -0.26, respectively).

Moreover, anxiety was positively related to both self-defeating and self-enhancing ego orientation (0.48 and 0.11, respectively) and to avoidance orientation (0.27), whereas it was negatively related to task orientation (-0.14). The association between anxiety and self-defeating ego orientation was relatively strong.

Intrinsic motivation was not significantly related to self-defeating ego orientation (0.08) and weakly related to self-enhancing ego orientation. However, intrinsic motivation was relatively strongly related to task orientation (0.45) and to avoidance orientation (-0.60). Mathematics achievement did not relate strongly to goal orientation. Achievement was not significantly related to task orientation or to self-enhancing ego orientation, and was negatively, but weakly related to self-defeating ego orientation (-0.13) and to avoidance orientation (-0.11).

Regression analyses of cross sectional data were conducted in order to compare the data with previous cross sectional data. In these analyses, goal orientation was defined as a predictor variable, predicting achievement, self-perceptions, intrinsic motivation, and anxiety. The analyses based on data from *Time 2* are shown in Table 2. These analyses revealed that self-defeating and self-enhancing ego orientation were differently associated with the dependent variables. Mathematics achievement, self-concept, and self-efficacy were negatively predicted by self-defeating ego orientation (beta values were -0.15, -0.31, and -0.28,

respectively) and positively predicted by self-enhancing ego orientation (0.13, 0.33, and 0.22, respectively).

Furthermore, anxiety was positively predicted by self-defeating ego orientation (0.47), but not significantly predicted by self-enhancing ego orientation (-0.02), whereas intrinsic motivation was significantly and positively predicted by self-enhancing ego orientation, but it was not significantly predicted by self-defeating ego orientation (0.16 and -0.08, respectively). Both self-efficacy and intrinsic motivation were positively predicted by task orientation (0.24) and negatively predicted by avoidance orientation (-0.16, -0.52, respectively). Avoidance orientation also predicted self-concept negatively (-0.25). These results replicate results previously reported by Skaalvik (1997), they and demonstrate that self-defeating and self-enhancing ego orientation are differently associated with a series of variables.

**Table 2**
**Set of Beta Weights and Multiple**
**Regression Coefficients -Data Collected at *Time 2***

| **Predictor** | **Dependent Variables** | | | |
|---|---|---|---|---|
| **Variables** | | | | |
| | SC | EFF | ANX | MOT |
| EGODEF | 0.31*** | -0.28 | 0.47*** | -0.08 |
| EGOENH | 0.33*** | 0.22*** | -0.02 | 0.16*** |
| TASK | 0.09 | 0.24*** | -0.10 | 0.24*** |
| AVOID | -0.25*** | -0.16 | 0.18** | -0.52*** |
| | | | | |
| R2 | 0.25 | 0.22 | 0.29 | 0.45 |
| F | 24.01 | 20.77 | 29.17 | 60.13 |
| df | 4/290 | 4/290 | 4/290 | 4/290 |

**Note.** * = p <0 .05, ** = p <0 .01,*** = p < 0.001. EGODEF = self-defeating ego orientation, EGOENH = self-enhancing ego orientation, TASK = task orientation, AVOID = avoidance orientation, SC = self-concept in mathematics, EFF = self-efficacy for mathematics, ANX = anxiety in mathematics classes, MOT = intrinsic motivation in mathematics, ACH = mathematics achievement.

The next step in the data analysis was to conduct regression analysis in a longitudinal perspective. As could be expected, letting goal orientation at *Time 1* (instead of goal orientation measured at *Time 2*) predict achievement, self-perceptions, anxiety, and motivation measured at *Time 2*, did not change the general picture shown in Table 2.

Table 3, however, shows the results of a series of regression analyses defining achievement, self-perceptions, intrinsic motivation, and anxiety at *Time 2* as criterion variables and both goal orientation at *Time 1* and a measure of the relevant criterion variable at *Time 1* as predictor variables. Thus, the ability of goal orientation to predict subsequent measures of each criterion variable was measured over and above the stability of the criterion variable.

About 50 % of the variance in the criterion variables could be explained by the predictor variables. However, goal orientation added little to the predictions made by previous measures of the criterion variables, and only two of these predictions were statistically significant. Self-defeating ego orientation at *Time 1* made a weak negative prediction of self-efficacy at *Time 2* (-0.14), whereas self-enhancing ego orientation at *Time 1* made a weak positive prediction of self-concept at *Time 2* (0.12). The main conclusion, therefore, is that in a longitudinal perspective and controlled for previous measures of mathematics achievement, self-concept, self-efficacy, anxiety, and

intrinsic motivation, goal orientation had practically no predictive value for these variables.

Lastly, regression analyses were conducted with goal orientation measured at *Time 2* as criterion variables. Predictor variables were mathematics achievement, self-

**Table 3**
**Set of Beta Weights and Multiple Regression Coefficients - Predictor Variables Measured at *Time 1* and Dependent Variables Measured at *Time 2***

| Predictor Variables | Dependent Variables at Time 2 | | | | |
|---|---|---|---|---|---|
| at Time 1 | SC | EFF | ANX | MOT | ACH |
| EGODEF | -0.03 | -0.14* | 0.09 | 0.06 | -0.01 |
| EGOENH | 0.12* | 0.08 | -0.06 | -0.04 | 0.07 |
| TASK | 0.01 | -0.02 | 0.06 | -0.05 | -0.01 |
| AVOID | -0.08 | -0.03 | 0.06 | -0.09 | -0.09 |
| SC | 0.60*** | | | | |
| EFF | | 0.64*** | | | |
| ANX | | | 0.55*** | | |
| MOT | | | | 0.69*** | |
| ACH | | | | | 0.72*** |
| | | | | | |
| R2 | 0.46 | 0.49 | 0.38 | 0.52 | 0.57 |
| F | 48.37 | 54.99 | 36.16 | 62.38 | 68.99 |
| df | 5/289 | 5/289 | 5/289 | 5/289 | 5/263 |

Note. * = p < 0.05, ** = p < 0.01, *** = p < 0.001. EGODEF = self-defeating ego orientation, EGOENH = self-enhancing ego orientation, TASK = task orientation, AVOID = avoidance orientation,, SC = self-concept in mathematics, EFF = self-efficacy for mathematics, ANX = anxiety in mathematics classes, MOT = intrinsic motivation in mathematics, ACH = mathematics achievement.

concept, self-efficacy, anxiety, and intrinsic motivation measured at *Time 1*. In each analysis, a measure of the relevant goal orientation at *Time 1* was also included as a predictor variable (Table 4). The stability coefficients were somewhat lower for goal orientation than comparable stability coefficients for self-perception, motivation,

**Table 4**
**Set of Beta Weights and Multiple Regression Coefficients with Goal Orientation at *Time 2* as Dependent Variables**

| Predictor Variables | Dependent Variables at Time 2 | | | |
|---|---|---|---|---|
| at Time 1 | EGODEF | EGOENH | TASK | AVOID |
| ACH | 0.03 | -0.03 | -0.12* | 0.07 |
| SC | 0.10 | 0.10 | 0.07 | 0.10 |
| EFF | -0.01 | 0.14* | 0.14* | -0.09 |
| MOT | -0.03 | 0.05 | 0.05 | -0.15* |
| ANX | 0.20 | 0.22*** | 0.00 | 0.02 |
| EGODEF | 0.44** | | | |
| EGOENH | | 0.47*** | | |
| TASK | | | 0.42*** | |
| AVOID | | | | 0.50*** |
| | | | | |
| R2 | 0.30 | 0.34 | 0.28 | 0.52 |
| F | 18.74 | 24.11 | 17.83 | 62.38 |
| df | 6/276 | 6/276 | 6/276 | 5/289 |

Note. * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$. EGODEF = self-defeating ego orientation, EGOENH = self-enhancing ego orientation, TASK = task orientation, AVOID = avoidance orientation, SC = self-concept in mathematics, EFF = self-efficacy for mathematics, ANX = anxiety in mathematics classes, MOT = intrinsic motivation in mathematics, ACH = mathematics achievement.

achievement, and anxiety (see Table 3). Controlled for corresponding ego orientation at *Time 1*, both self-enhancing and self-defeating ego orientation at *Time 2* were positively predicted by anxiety at *Time 1* (0.22 and 0.20, respectively). In comparison, goal orientation at *Time 1* did not predict anxiety at *Time 2* controlled for previous measure of anxiety (Table 3). Both task orientation and self-enhancing ego orientation at *Time 2* were positively, but weakly predicted by self-efficacy at *Time 2* (0.14). Motivation at time one also predicted avoidance orientation at *Time 2* negatively (-0.15).

## Discussion

This study confirms previous findings. As in previous studies, it shows that in a mathematics context one may discriminate between two relatively independent dimensions of ego orientation. These dimensions are *self-enhancing* and *self-defeating* ego-orientation. A common feature in the two dimensions of ego orientation is that ego oriented students are preoccupied with themselves. They compare their abilities to other students, and they preoccupy themselves with how they are perceived by other students. Self-enhancing ego orientation is defined by the goal of demonstrating superior abilities, whereas self-defeating ego orientation is defined by the goal of avoiding looking stupid or being negatively judged by others.

In accordance with previous educological research, the two dimensions of ego orientation were weakly, but positively correlated. Thus, there was a weak tendency that students who were oriented towards demonstrating superior abilities also were preoccupied with avoiding showing their weaknesses. Moreover, both self-defeating and self-enhancing ego orientation were weakly related to task orientation and avoidance orientation, although task orientation and

avoidance orientation were moderately and negatively related. As previously demonstrated, task orientation correlated close to zero with self-defeating ego orientation, whereas it correlated positively, but weakly with self-enhancing ego orientation. Thus, it is important to note that neither of the two dimensions of ego orientation predicted task orientation negatively.

This study demonstrates that the two dimensions of ego orientation are differently related to other variables. In fact, they related differently to all other variables in the study. The (cross sectional) regression analyses displayed in Table 2 show that self-enhancing ego-orientation relates positively to self-concept, self-efficacy, and achievement, whereas self-defeating ego-orientation relates negatively to these constructs. Moreover, self-defeating ego orientation relates positively and relatively strongly to anxiety, whereas self-enhancing ego orientation does not relate significantly to anxiety. Similarly, self-enhancing ego orientation relates positively to intrinsic motivation, whereas self-defeating ego orientation is not significantly related to this construct.

Goal theorists traditionally assume that ego goals have a number of negative effects, for instance increasing anxiety and decreasing intrinsic motivation, effort, and achievement (see for instance Harackiewicz et al., 1997, 1998). This assumption is not always supported in empirical studies. For instance, Harackiewicz et al.(1997) found no negative effects of ego goals on interest. Also, Covington (2000) in a review of research, concludes that no clear pattern has emerged from those studies exploring the association between performance (ego) goals and either task persistence or the degree of effort extended. The failure to confirm negative relations with ego goals has likely occurred because, initially, researchers did not distinguish between

self-enhancing and self-defeating ego goals, and most studies have used measures of self-enhancing ego goals. The present result showing that self-defeating and self-enhancing ego orientation are differently related to a number of constructs is therefore highly significant. It shows that self-defeating ego orientation negatively predicts self-concept, self-efficacy, anxiety, and achievement. However, it does not show detrimental effects of self-enhancing ego orientation, and it even indicates positive relationships among the dimensions of ego orientation and self-perceptions, intrinsic motivation, and achievement.

Table 2 also shows that task orientation is positively related to self-efficacy and intrinsic motivation. Nonetheless, in accordance with previous research (e.g., Harackiewicz et al., 1997), there was no evidence that task orientation predicted achievement. Task orientation may still have small indirect effects on achievement through, for instance, self-efficacy and intrinsic motivation. Avoidance orientation is negatively related to academic self-perceptions and intrinsic motivation.

Although cross sectional analyses reveal systematic relations among dimensions of goal orientation and academic self-perception, intrinsic motivation, anxiety, and achievement, the longitudinal analyses provide little evidence that these variables are affected by achievement goals. When controlled for previous measures of the criterion variables, for example, achievement and intrinsic motivation, measures of goal orientation at *Time 1* had little predictive value for subsequent measures of the criterion variables. That is, goal orientation has little predictive value for self-concept, self-efficacy, anxiety, intrinsic motivation, and achievement over and above the stability of these constructs. Significant beta values were found only for self-

concept and self-efficacy. Self-defeating ego orientation predicted self-efficacy negatively, whereas self-enhancing ego orientation predicted self-concept positively. Hence, these results provide limited support for a model in which goals affect self-perceptions, anxiety, intrinsic motivation and achievement, which are commonly accepted beliefs about the effects of achievement goals.

The regression analyses shown in Table 4 are therefore based on an alternative model where achievement, self-perceptions, anxiety, and intrinsic motivation predict goal orientation. The results give some support to such a general model. When controlled for previous measures of the relevant dimensions of goal orientation, anxiety predicted subsequent measures of both self-defeating and self-enhancing ego orientation, intrinsic motivation predicted subsequent avoidance orientation, achievement predicted subsequent task orientation, and self-efficacy predicted subsequent measures of self-enhancing ego orientation and task orientation. Taken together, these results indicate that goal orientation primarily may be a consequence of achievement, academic self-conceptions, intrinsic motivation, and anxiety. The results provide some evidence that goal orientation may affect academic self-conceptions.

In conclusion, this study confirms that achievement goals are systematically related to achievement, academic self-perceptions, intrinsic motivation, and anxiety. However, the results do not provide much evidence that these constructs are affected by achievement goals. The questions often raised by researchers is how to increase task goals and decrease ego goals in order to reduce anxiety and increase self-concept, intrinsic motivation and achievement. An equally important educological question seems to be how to increase academic self-concept and intrinsic

motivation and reduce anxiety in order to foster task goals and reduce self-defeating ego goals.

The findings in this study however, need to be confirmed in subsequent research. In future research, it will be important to explore systematically relationships among goal orientation and relevant constructs at different grade levels. Furthermore, an important task for future research will be to examine possible third variables through which achievement goals may be related to anxiety, intrinsic motivation, self-conceptions, and achievement. Also, future research ought to include social goals, both because our understanding of social goals lags behind in general (Covington, 2000) and because we have too little understanding of the interplay between social goals and other academic goals.

The results of this study imply that the distinction between self-enhancing and self-defeating ego goals is an important one. They further imply that both educologists and educators should pay particular attention to self-defeating ego orientation. Detrimental effects of self-enhancing ego orientation, which is often claimed in the literature, are less evident.

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