

**IMPLICIT THEORIES OF INTELLIGENCE AND
GOAL ORIENTATIONS IN RELATION
TO SCHOOL ACHIEVEMENT**

Adina-Petronela VECHIU

Alexandru Ioan Cuza University of Iași
petronela.vechiu@uaic.ro

Roxana-Elena LEONTE

Alexandru Ioan Cuza University of Iași

Abstract

This paper targets the exploration of the connection between the implicit theories of intelligence, the goal orientations and the school achievement in high school students. The group of participants contains 209 students from Iasi County. These students have filled in two research tools: Implicit Theories of Intelligence Questionnaire (Dweck, 2000) and Achievement Goal Questionnaire (Elliot & McGregor, 2001). School achievement has been operationalized considering the yearly average grades and it has been self-reported. The results have shown that the implicit theories of intelligence, as well as both categories of mastery-approach goals orientation, represent meaningful predictors of school achievement.

Keywords: entity theories, incremental theories, performance-approach goals, mastery-approach goals, school achievement.

Introduction

The focus of the hereby paper is represented by the social-cognitive model of motivation Dweck & Leggett (1988). The theoretical framework confers researchers the possibility of explaining using specific terms the motivational processes that can influence academic results, as well as characterize the students' behavior as being adaptive or maladaptive. Both the implicit theories of intelligence, as well as achievement goals orientation, have captivated the attention of

researchers who analyzed the mechanisms behind the learning process (Ames & Archer, 1988; Elliot & Dweck, 1988; Elliot & Church, 1997; Dweck & Leggett, 1988). As a result of the completed studies, there has been noticed that the mastery-approach goals the students set for themselves, but also the course of action they take to achieve these goals, can be determined by the beliefs regarding the flexibility of their intellectual abilities (Dinger & Dickhauser, 2013; Robins & Pals, 2002; Dweck & Leggett, 1988). Due to the fact that most of the studies which analyzed the implicit theories and the goals orientation, in connection with school achievement have focused on the dichotomy or trichotomy of goal orientations, the hereby paper aims to enrich the literature on this subject, applying the 2x2 theoretical framework for examining the liaisons between the implicit theories of intelligence, goal orientations and school achievement for high-school students.

Implicit theories of intelligence and school achievement

The implicit theories (IT) are represented by belief systems, which determine the interpretation of personal or other individual's characteristics, or of the distinctive features of a situation. These aspects are especially useful for monitoring and processing information, to react to certain events or diverse circumstances. The implicit theories are not isolated ideas. They can, more likely, fulfill an organizational function, combining objectives, beliefs and behaviors to obtain a meaning system (Hong, Chiu, Dweck, Lin & Wan, 1999; Molden & Dweck, 2006). According to Miele & Molden (2010), mentalities create meaning systems, namely, they organize objectives, attributes, feelings of helplessness, belief in effort etc., tracing the outline of two thinking patterns, which lead to specific behaviors, respectively. People's beliefs on the flexibility of human attributes can be split into two categories: entity theories (fixed mindset) or incremental theories (growth mindset) (Dweck & Yeager, 2019).

Several researchers from the educational field have offered a reply to the papers of Carol Dweck and her collaborators, highlighting that, depending on the main implicit theories regarding intelligence, individuals have a tendency towards certain behaviors (Hong and co., 1999). When people conceive intelligence as being immutable, they try to find validation for their abilities through achieving achievement goals or avoiding failure (Dweck, & Leggett, 1988), and high-level efforts are perceived as an indicator of low abilities. Therefore, individuals who possess a fixed mentality regarding intelligence show a low-drive endurance when it comes to finishing tasks that could negatively affect their reputation. The entity theories are usually associated with

individuals who conceive intelligence as a fixed, uncontrollable, determined by birth, relatively globally-spread, as well as stable, characteristic (Dweck & Leggett, 1988; Dweck, 2012). Those who possess high fixed mentality scores believe that intelligence cannot be changed by the learning process or by perpetual effort and perseverance. On the other hand, the incremental theories (growth mindset) target those beliefs or conceptions which perceive intelligence as an ability which can be developed and improved by sustained efforts during the learning process, being modifiable and controllable, at the same time (Dweck & Reppucci, 1973, Dweck & Sorich, 1999 Costa & Faria, 2018). The research studies have shown that the individuals who consider that intelligence and mandatory learning abilities can undergo changes are more likely to take on learning goals and they view the challenging tasks as a growth opportunity and a chance to improve their skills. In the previously mentioned case, effort is the main tool for overcoming difficult situations, and strenuous activities are viewed as information sources for the learning process (Chiu, 1997; Marksteiner, Nishen & Dickhäuser, 2021; Murphy & Dweck, 2010).

Implicit theories of intelligence have shown strong motivational consequences and they are proven to influence the learning process. Research studies have shown that theories on intelligence can influence the academic behavior of the pupils and students. The empirical research done on secondary school students has revealed that the incremental perspective on intellectual abilities is strongly connected with self-regulation learning strategies and behaviors, as well as a high efficiency and resilience level, having motivational adaptive profiles (Chen & Usher, 2013; Yeager & Dweck, 2012). The teenagers who believe that intelligence is a flexible ability have proven to be keener on difficult tasks, because they are able to foresee development opportunities. These beliefs lead to a higher effort and good academic results probability, failure being perceived as a challenge and attempt to overcome obstacles (Diaconu-Gherasim & Butnaru, 2013, Haimovitz & Dweck, 2017). However, several studies have shown that entity theories could be a risk factor for the school career, given that they are a positive predictor of complex tasks avoidance goals, these fixed beliefs leading to certain feelings, such as disappointment, hopelessness, helplessness, as well as a decrease in the emotional involvement (King & McInerney, 2014; Blackwell, 2007; De Castella & Kyrne, D., 2015).

Goal orientations and school achievement

The achievement goal theory, one of the most outstanding theories constructed on the motivation matter, contributes to identifying the reasons that lead to a student's involvement in

school assignments. This theory supposes that the affect, knowledge and students' behavior ranges depending on the goals they have set (Dinger & Dickhauser, 2013; Ames, 1992).

Based on the classification done by Dweck & Leggett (1988), which creates a distinction between mastery goals and performance goals, and that of Elliot & Church (1997), which enforces the approach/avoidance dichotomy when it comes to categorizing performance goals, resulting in performance – approach goals and performance – avoidance goals, Elliot & McGregor (2001) expanding the concept of goal orientation, implementing the aforementioned dichotomy in the case of mastery goals. Therefore, a 2x2 theoretical pattern for achievement goals is obtained, which comprises four types of goals: (1) performance – approach goals, which imply that the student is focused on proving and validating their competences. In this case, the competence can be defined by normative terms and it has a positive significance, given that the students measure their own performance by comparison to the performance of the others (Elliot & McGregor, 2001). The students who take on these goals believe that they possess several abilities, strive to publicly prove their achievements and capabilities, as well as surpassing others (Diaconu – Gherasim & Măirean, 2016; Putwain et al., 2013; Bipp et al., 2012; Was, 2006; Wolters, 2004). (2) Performance – avoidance goals refer to the avoidance of situations that could lead to failure or obtaining lower results, compared to the ones of the classmates, as well as gaining negative feedback or assessments from others. Those individuals who manifest these goals are aware of their lack of abilities and, accordingly, they avoid public demonstrations which could prove this deficiency (Diaconu – Gherasim & Măirean, 2016; Putwain et al., 2013; Bipp et al., 2012; Was, 2006). (3) Mastery – approach goals reflect the eagerness of a student to develop their personal competences, abilities and skills, to enrich their knowledge and to persevere in carrying out duties (Diaconu – Gherasim & Măirean, 2016; Wolters, 2004). (4) Mastery – avoidance goals imply the involvement in certain learning activities, without having the ability to control them, focusing on avoiding misunderstandings and, sometimes, avoiding the tasks altogether, due to low self-confidence in their abilities to successfully accomplish the tasks (Diaconu – Gherasim & Măirean, 2016; Elliot, 1999).

The specialized literature agrees with the meaningful effects of goal orientation on academic performance (Cerasoli & Ford, 2014; Cellar, Stuhlmacher, Young et. al., 2010; Payne et al., 2007; Dupeyrat & Mariné, 2005; Vande Walle et al., 2001). However, there are certain research studies which did not identify a positive connection between these two variables (Mattern, 2005; Gul & Shehzad, 2012).

It is noticeable, when it comes to the 2x2 goal orientation theoretical framework, which we will apply in our study paper, as well, that the relationship model is diverse. On this line, some studies have identified positive connections between performance – approach goals and school achievement (Dinger et al., 2013; Urdan, 2004; Lopez, 1999), whereas several others have detected negative associations (Luo et al., 2013) or they have not identified any connection whatsoever (King & McInterney, 2014). Performance – avoidance goals have been negatively corroborated to school achievement (Dinger et al. 2013; Luo et al., 2013; Zusho et al., 2005; Elliot & Church, 1997) or they have not been considered student performance predictors (Bipp & van Dam, 2014).

Mastery – approach goals have been positively corroborated with school achievement (Keys et al., 2012), while some other research papers have not identified any relationship between these goals and school achievement (Bipp & van Dam, 2014; King & McInterney, 2014), mastery – avoidance goals being negatively associated with school achievement (Luo et al., 2013; Elliot & McGregor, 2001).

It has been proven that the impact of goal orientations towards school achievement can be indirect and mediated by other factors, such as: self-regulated learning strategies, shallow and profound learning strategies, type of motivation (intrinsic and extrinsic), effort, perceived competence, achievement emotions (Putwain et al., 2013; Barzegar, 2012; Kaplan & Maehr, 2007; Dupeyrat & Mariné, 2005; Leondari & Gialamas, 2002; Pintrich, 2000; Dweck & Leggett, 1988).

Implicit theories of intelligence, goal orientations and school achievement

Dweck and her collaborators (Dweck & Leggett, 1988; Dweck, 2000) have presented the implicit theories as achievement goals predictors, making out the case that implicit theories create a belief system, which determine the establishment of a certain achievement goal. A considerable number of empirical studies has been identified, these papers following the aforementioned theoretical framework in explaining the connection between implicit theories and school achievement, on the goal orientation theory basis (Howell & Buro, 2009; Robins and Pals, 2002; Leondari & Gialamas, 2002; Elliot and McGregor, 2001; Elliot, 1999; Dweck & Leggett, 1988; Bempechat, Londra and Dweck, 1991). The results generally indicate that incremental theories of intelligence can predict mastery goals, whereas entity theories are more likely to foresee performance – approach goals and performance – avoidance goals (Chen & Wong, 2014; Dinger & Dickhäuser, 2013; Dupeyrat & Mariné, 2005).

Several research studies have tested Dweck's social-cognitive model of motivation. Therefore, mastery-approach goal orientations has been introduced as a mediating factor to explain the connection between implicit theories of intelligence and school achievement. Data has shown that mastery-approach goal orientations has partially interposed the connection between incremental belief of intelligence and English academic results among Sudanese high-school students. However, there has been no noticeable mediation effect of these aspects when it comes to the association between entity beliefs and academic results (Elhassan et al., 2021). A recently published study, written by Liu (2021), proposes a regression model, focused on implicit theories of intelligence and goal orientations, which explains 13,8% of the variance of the variable mathematical achievement. Another research paper, published by Diaconu – Gherasim and co. (2019), on a sample of 362 Romanian middle-school students, has shown that the incremental theory has positively predicted school achievement, being thoroughly mediated by performance – approach goals and performance – avoidance goals, whereas the entity theory has negatively predicted school achievement.

Scope and hypotheses

The hereby research study aims to supplement the social-cognitive model of motivation Dweck & Elliot with some empirical evidence. Therefore, the scope of this paper is to analyze the relationship between implicit theories of intelligence, goal orientations and school achievement among high-school students. According to the research scope, we have tested a main hypothesis:

H1. Implicit theories of intelligence (incremental and of entity) and goal orientations suggestively explain variations in school achievement.

Method

Participants. The sample consists of N = 209 high-school students (118 girls and 91 boys) from Iași County (Romania), who voluntarily took part in the study. The average grade of these students ranges between 5.80 and 10.

Tools. The Achievement Goal Questionnaire (AGQ; Elliot & McGregor, 2001) has been used to measure the four types of achievement goals, each scale containing three items, gauged on a Likert scale, starting from 1 (absolutely false in my case) to 7 (absolutely true in my case). The Cronbach internal consistency coefficient has the value of .692. Mindset Questionnaire (Dweck, 2000) has been utilized to measure the students' type of mentality. The tool is made of 20 items,

assessed on a Likert scale, ranging from 0 (absolute agreement) to 3 (absolute disagreement). This tool possesses a good internal consistency, as shown by the Alpha Cronbach coefficient, which has a value of .712. School achievement has been operationalized in accordance with the general average grade from the previous study year and it has been self-reported.

Procedure. The aforementioned tools have been applied in the online environment, altogether with a questionnaire containing social-demographical data (gender, age, environment). The average grade from the previous study year had been previously self-reported by the students. The students have acknowledged that the participation is voluntary and that their answers will be confidential.

Results

In order to check if there is any corroboration between each performance-approach goals, mastery-approach goals and the students' type of mindset, a Pearson correlation coefficient has been computed. It is noticeable, as shown by the 1st table, that there is no significant association, statistically speaking, between performance-approach goals and fixed mindset ($r = .13$, $p = .849$), in comparison to performance-avoidance goals, which present a positive correlation with fixed mindset ($r = .318$, $p = .00$). Moreover, mastery-approach goals and mastery-avoidance goals have a positive connection with growth mindset ($r_{map} = .327$, $r_{mav} = .373$, $p = .000$).

Table 1. Means, standard deviation and correlation matrix for continuous variables (N= 209)

	Correlation coefficients (Pearson)	M	SD	1	2	3	4	5	6	7
1	Performance-approach goals	11,10 53	5,223	1	,112	,100	,027	,013	,056	-,033
2	Performance-avoidance goals	13,72 25	4,602 42	,112	1	,143*	,198**	,318**	,181**	,199**
3	Mastery-approach goals	15,74 16	3,578 82	,100	,143*	1	,375**	,023	,327**	,235**
4	Mastery-avoidance goals	17,97 61	3,466 10	,027	,198**	,375**	1	,073	,373**	,119
5	Fixed Mindset	19,39 71	5,076 36	,013	,318**	,023	,073	1	,361**	,433**
6	Growth Mindset	22,71 77	4,436 70	,056	,181**	,327**	,373**	,361**	1	,489**
7	School achievement	8,896 2	,9646 6	- ,033	,199**	,235**	,119	,433**	,489**	1

According to the relationships suggested in literature, as well as our hereby preliminary analysis, a multiple hierarchic regression has been applied, in order to analyze the fixed mindset (included in model 1), performance-approach goals (included in model 2), performance-avoidance goals (included in model 3), as predictors of school performance. Results have shown that model 1 has the highest adjusted coefficient (.183, $p < .01$); therefore, the fixed mindset influences school performance the most. Thereby, students with a high level of fixed mindset ($b = .433$, $p = .000$) have better school performance.

Table 2. Unstandardized and standardized regression coefficients and Model Summary

Coefficients and Model Summary									
Model	B	SE	β	R	R ²	Adjusted R ²	SE	Change Statistics R ²	F
1	,082	,012	,433	,433a	,187	,183	,87184	,187	47,648
2	,082	,012	,433	,434 ^b	,189	,181	,87315	,001	,378
	-,007	,012	-,039						
3	,078	,013	,410	,440 ^c	,193	,182	,87266	,005	1,235
	-,009	,012	-,047						
	,016	,014	,074						

Note:

Model 1: *entity mindset*

Model 2: *entity mindset, performance-approach goals*

Model 3: *entity mindset, performance-approach goals, performance-avoidance goals*

The analysis of growth mindset (included in model 1), of mastery-approach goals (included in model 2) and of mastery-avoidance goals (included in model 3), as school achievement predictors, has been accomplished by applying the multiple hierarchic regression. It has been noticed that model 3 has the highest adjusted motivation coefficient (.243, $p < .01$) and it demonstrates the school achievement in the best way possible. Thus, students with a higher level of growth mindset ($b = .491$), having a high-level of mastery-approach goals ($b = .114$) and a low score for mastery-avoidance goals, are more inclined to obtain better school achievements.

Table 3. Unstandardized and standardized regression coefficients and Model Summary

Coefficients and Model Summary									
Model	B	SE	B	R	R ²	Adjusted R ²	SE	Change Statistics R ²	F
1	,106	,013	,489	,489 ^a	,239	,235	,84354	,239	65,024
2	,100	,014	,461	,495 ^b	,245	,238	,84207	,006	1,723
	,023	,017	,084						
3	,107	,014	,491	,504 ^c	,254	,243	,83907	,009	2,473
	,031	,018	,114						
	-,030	,019	-,107						

Note:

Model 1: growth mindset

Model 2: growth mindset, mastery-approach goals

Model 3: growth mindset, mastery-approach goals, mastery-avoidance goals

Discussions and conclusions

The results of our research have presented, roughly speaking, the theoretical model of implicit theories of intelligence and goal orientations, having obtained, just as is the case of other previous studies (Chen & Wong, 2014; Dinger & Dickhäuser, 2013; Blackwell et al., 2007; Cury et al., 2006; Dupeyrat & Mariné, 2005; Robins & Pals, 2002), significant connections between the incremental theory and mastery goals. Nevertheless, contrary to our expectations and to the results achieved by other researchers (Magno, 2013; Cury et al., 2006), there has not been identified any association between performance-approach goals and entity theories. However, according to other study papers (Barzegar, 2012; Cury et al., 006), there is a noticeable positive correlation between the fixed minddset and performance-avoidance goals. These results could be construed by the fact that performance-avoidance goals are more likely connected to extrinsic motivation, students being more vulnerable when faced with failure or negative feedback, especially when they have a low self-esteem or they doubt the mandatory competences for carrying out tasks, that they may possess (Wimmer et al., 2018). Another aspect of consequence is that the subjects who have expressed a tendency towards entity beliefs choose performance-approach goals, conveying their desire for maintaining the acquired social status, given by good grades (Su and co., 2021; Rickert and co., 2014). To this effect, several researchers mention aspects regarding threats against the

ego, which seem to arbitrate the relationship between implicit beliefs and mastery-approach goals orientation. Threats against the ego could be defined as any type of communication or behavior which could have a negative impact on the ego (Burnette, 2010; Burnette and co., 2013). This phenomenon is especially encountered in highly competitive school environments, where a competitive climate is propagated among classes, which can include gaining good grades by all means, not necessarily in hopes of learning by overcoming challenges and approaching difficult tasks (Diseth et al., 2014; Hennerdal, 2020; Escalante, 2021).

The regression analyses that have been construed until the present day have shown that the fixed mentality is the best school achievement predictor, in comparison to models which have subsumed performance-approach goals and performance-avoidance goals. Another relevant predictive model, when it comes to school achievement, includes growth mindset, mastery-approach goals and mastery-avoidance goals. These results may have educational connotations, because they focus on the importance of individual motivational factors in determining a positive school career.

Limitations and future research aims

Given the fact that this study paper has a transverse research purpose, the hereby presented model being tested only on high-school students, there is no possibility of generalizing the results. Future studies may expand these aspects, using a greater number of students involved, from different schooling levels. Another limitation of this paper may be represented by self-reported measurements. Albeit many researchers have used this data gathering method, it would be interesting to consider, in the future, a team-reporting activity, involving the teacher as well. Furthermore, even though the 2x2 theoretical framework of the achievement goal orientations furnishes a thorough theoretical enlightening on the differences between achievement goals, it is widely known that students are able to simultaneously adopt more than one type of goals (Pintrich, 2000). Also, future research might test several mediating and moderating factors, which could bring to attention some further clarifications about the connection between the social-cognitive model of motivation Dweck & Elliot and school achievement.

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