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Implicit Theories as Antecedents of Motivation and Behavior



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7 A Longitudinal Analysis of Dweck's Motivation-Process-Model in the Classroom

Markus Dresel

In academic achievement-situations, it is not uncommon to observe negative affects on motivation and behavior patterns after failure which do not correspond with existing abilities. This typically comprises one experiencing the noncontingency between effort and outcome (Abrahamson, Seligman & Teasdale, 1978), having a functional deficit in action-control (a state-orientation; Kuhl, 1983), or making an attribution of failure to the lack of one's own abilities (Dweck, 1975; Dweck & Reppucci, 1973; Dweck & Licht, 1980). Fear reactions have been observed as well (Mikulincer, 1989). The wish to leave the domain and, if this is impossible (as is common in the classroom), a reduced persistence (Diener & Dweck, 1978; Andrew & Debus, 1978; Weiner, 1985) are the consequences of this helplessness. Further failures are then pre-programmed, as it were.

For contrast, adapted cognition - and action patterns exist which manage failure. These consist of a focusing on future performance-situations (an action-orientation; Kuhl, 1983) as well as an attribution of failure to a lack of own effort or external causes (Dweck, 1975; Dweck & Reppucci, 1973; Dweck & Licht, 1980). This results in the maintenance of expectancies and persistence at future performance-requests (Andrews & Debus, 1978; Weiner, 1986).

7.1 Dweck's Motivation-Process-Model

Dweck's Motivation-Process-Model (Dweck & Leggett, 1988; Dweck, 1989) has made available a theory concerning the conditions of helpless versus mastery behavior patterns. The model includes two central statements, which are briefly presented here.

(1) The goals pursued by individuals in performance-situations are influenced mainly by assumptions (*implicit theory of intelligence*; also called *naïve talent concept*) about whether their talent is a fixed attribute

with a definite expression (therefore an entity) or if their aptitude is modifiable, which has a particular level only temporarily. Concerning goals, motivation theorists distinguish between two different motivational orientations (e.g. Ames & Ames, 1984; Nicholls, 1984; 1989; Dweck, 1986). On the one hand persons can aim for the acknowledgement of their abilities or attempt to avoid others' perceptions of their lack of ability; in this case, the incentive lies outside the action itself. The pursuance of such goals is abbreviated by the term *performance goal-orientation*. On the other hand, one can be interested in making progress in learning and developing his/her abilities. These goals distinguish themselves in the fact that the incentive lies in the action itself and is attended to under the concept of *learning goal-orientation*. In Dweck's Motivation-Process-Model, these two orientations are conceptualized as two different peculiarities at one dimension, i.e. either a performance goal- or a learning goal-orientation is present (Dweck & Leggett, 1988). According to Dweck, persons who hold an entity view of their abilities are more performance goal-oriented, while persons who have an incremental theory are more likely to be learning goal-oriented (Dweck & Leggett, 1988; Dweck, 1989).

(2) The second central statement of Dweck's theory involves the relations between motivational orientation, academic self-concept and the behavior patterns that people show in performance situations (particularly after failure). Dweck and her colleagues (Dweck & Leggett, 1988; Dweck, 1989) postulate an interaction between motivational orientation and academic self-concept. Accordingly, performance goal-orientation as well as a low academic self-concept are necessary preconditions of helpless behavior patterns. This means two aspects: First, the relevant person must have a performance goal-orientation in addition to a low confidence in his/her own abilities in order for behavior patterns of helplessness to be observed in him/her after failure. Second, a learning goal-orientation protects one from maladaptive outcomes of a low academic self-concept; consequently, along with this comes a character which works to immunize against symptoms of helplessness.

7.2 Findings regarding Dweck's Motivation-Process-Model

Dweck's theory underwent a series of studies for empirical investigation. However, the theory was seldom tested as a whole; rather, in the most cases only one of the two central statements were tested. Exceptions to this are

represented in studies by Stipek and Gralinski (1996), Schlangen and Stiensmeier-Pelster (1997a) and Broome (1998).

Stipek and Gralinski (1996) could confirm the postulated correlation between naïve talent concept and motivational orientation. However, they failed in their attempt to confirm the overall model with structural-equation analyses. Schlangen and Stiensmeier-Pelster (1997a) demonstrated in their attempt to test the model as a whole with German pupils in the sixth grade the presence of mastery behavior after failure, which conforms with a flexible theory of intelligence, a learning goal-orientation, and a high academic self-concept. Their investigations did not leave room for any counterarguments concerning pupils who have an entity theory, because these were hardly represented in this sample. The authors come, at another point (Schlangen & Stiensmeier-Pelster, 1997b), to the conclusion that the findings concerning Dweck's theory, which were attained mainly in the United States, are not easily transferable to a German setting (for example, Leggett, 1985 [cited from Dweck & Leggett, 1988] reports that a proportion of approximately 30% of this age-level are entity-theorists). In an empirical study that was carried out in the eighth grade over the period of one year, Broome (1998) could predict domain-specific helplessness towards the end of the year directly from the naïve talent concept of the students at an earlier measuring point. The interaction between motivational orientation and domain-specific academic self-concept could only be shown in this study in that helpless behavior patterns could be predicted from the configuration "stable talent-concept – performance goal-orientation – low academic self-concept" and a mastery behavior pattern from the configuration "flexible talent-concept – learning goal-orientation – high academic self-concept" at the same time, as well as at a later time in the school year. An immunizing effect of the learning goal-orientation on a low academic self-concept could be shown in neither the cross-sectional nor the longitudinal analyses.

Except for these simultaneous analyses, which included all components of Dweck's Motivation-Process-Model, a large number of studies exists that are concerned with partial aspects of the theory. The role of implicit theory of intelligence regarding the modifiability of one's own talent as an antecedent condition in the origin of goals in performance situations was proven in several studies which were all carried out in the United States (Bandura & Dweck, 1985 [cited from Dweck & Leggett, 1988]; Dweck & Bempechat, 1983; Dweck, Tenney & Dinces, 1982; Stipek & Gralinski, 1996). Studies that were conducted in Central Europe indicate that the connection between naïve talent concept and motivational orientation described by Dweck cannot be transferred unrestrictedly to European ratios.

In these studies, the expected result is not systematically found (Spinath & Stiensmeier-Pelster; Schober; both in this volume).

In addition to research dealing with the link between implicit theory of intelligence and motivational orientation, a series of studies were carried out concerning the second central statement concerning the interacting mechanism between academic self-concept and goals which people pursue in performance situations. While the relationships contained in Dweck's model between academic self-concept and academic performance behavior on the one hand as well as between motivational orientation and academic performance behavior on the other hand could each be confirmed (Meyer, 1984a; 1984b; Nicholls, Cobb, Wood, Yackel & Patashnick, 1990; Stiensmeier-Pelster, Balke & Schlangen, 1996; Köller, 1998; Köller & Baumert, 1998; Dresel, in press), there has been, until now, little empirical evidence for the postulated interaction between the two mechanisms. In a laboratory study with fifth grade pupils, Elliott and Dweck (1988) could prove the expected interaction hypothesis. Likewise, Stiensmeier-Pelster, Balke and Schlangen (1996) could show the expected connections between academic self-concept, motivational orientation and helpless behavior in one study involving the experimental manipulation of motivational orientation. In comparison, Miller, Behrens and Greene (1993) found results in their field study with undergraduates, which do not support the postulated interaction. Dupeyrat and Mariné (in this volume), who disassociated learning and performance goal-orientation in two separate dimensions, could also find no proof for the postulated function of the academic self-concept on the two motivational orientations in their analysis of persistence, depth of processing and learning strategies.

7.3 Multidimensional Conceptualization of Motivational Orientation

As already mentioned, in her theoretical model, Dweck (Dweck, 1986; Dweck & Leggett, 1988) considers performance and learning goal-orientations to be different expressions on *one* dimension. Based on the work of Nicholls and his colleagues (e.g. Nicholls, 1984; Nicholls, Patashnick & Nolen, 1985; Nicholls, 1989), both of the orientations are often proposed as largely independent dimensions. Empirical research studies confirm the possibility of multiple motivational orientations, in the frame of which learning and performance goals can be pursued independently from one another (Pintrich & Garcia, 1991; Wentzel, 1991; Harackiewicz & Sansone, 1991). Furthermore, more recent studies

differentiate on the side of the performance goal-orientation between an *approach component* (in the sense of an approach of achievement situations with the goal of good evaluations) and an *avoidance component* (in the sense of an avoidance of achievement situations, in order to prevent getting bad evaluations) as positively correlated, but nonetheless separate dimensions (Elliot & Harackiewicz, 1996; Elliot & Sheldon, 1997; Middleton & Midgley, 1997). Empirical studies show that apparently the avoidance component alone (mediated by a sinking intrinsic motivation) is responsible for the correlations between performance goal orientation and dysfunctional behavior (e.g. Elliot & Harackiewicz, 1996). Middleton and Midgley (1997) pointed out correlations between the avoidance component and self-efficacy, as well as help seeking with difficulties and test anxiety, which they could not prove for the approach component. Finally, Elliot and Sheldon (1997) show in their experiment with college students that the effect of the avoidance component is mediated by the academic self-concept.

7.4 Purpose of the Present Study

7.4.1 Integrating the Multidimensional Conceptualization of Motivational Orientation in Dweck's Motivation-Process-Model

This study is designed to test, under an explanatory perspective, whether Dweck's Motivation-Process-Model is suitable to predict helpless behavior when performance and learning goal-orientations are considered as independent constructs and additionally, when a differentiation is made between approach- and avoidance components. In this case, two aspects which correspond with Dweck's model as described above seem particularly interesting: Firstly, a differentiated view of motivational orientation could supply information about the correlation with the implicit theory of intelligence, which therefore seems especially interesting because the empirical examination of this correlation, as already reported, proves to be rather unclear in a Central Europe setting (Spinath & Stiensmeier-Pelster; Schober; both in this volume). Here, in particular, the differentiation between approach- and avoidance component on the part of performance goal-orientation can contribute to the explanation for the origin of motivational orientations. Secondly, it is of interest, which of the three components of motivational orientation is responsible for the interacting effect postulated by the theory of Dweck, or whether an interaction is

possibly related to several components. In this case as well, the explanation for the function of avoidance component, which is assigned an important role in recent studies (Elliot & Harackiewicz, 1997; Elliot & Sheldon, 1997; Middleton & Midgley, 1997), seems particularly desirable.

7.4.2 Naïve Talent Concept as a Stable Attribute

Dweck conceives the implicit theory of intelligence concerning the modifiability of one's own talent as a largely stable attribute. After the first years of school when the development from a more incremental to a more stable talent concept is seen, the naïve talent concept stabilizes. This is explained by Dweck (1989) by means of performance comparisons beginning in the first school years (see also Harari & Covington, 1981; Stipek, 1981). The assumption concerning the modifiability of one's own talent was indeed temporarily subject to change through, for example, an experimental manipulation with suitable texts (Dweck, Tenney & Dinces, 1982; Bergen, 1991; the latter quotes Dweck, Hong & Chiu, 1993), but altogether, Dweck attributes at least a habitual character to the implicit theory of intelligence (Dweck & Leggett, 1988).

Broome (1998) supplies this question with domain-specific information, in which the pupils' (physics-related) naïve talent concepts were subject to development towards an entity theory in the course of the school year that he studied. According to this, the implicit theory of intelligence regarding the modifiability of one's own talent is not only changeable by an experimental manipulation, rather, it is subject to substantial changes over the course of the school year due to experiences in classes. Nevertheless, empirical findings for the general academic domain are still missing.

7.4.3 Longitudinal Predictability of Helpless Behavior Patterns

With her Motivation-Process-Model, which was designed for the general academic context, Dweck and her research group attempt to provide a model for the *genesis* of helpless behavior patterns and in turn imply a longitudinal validity of the connections which the model postulates (Dweck, 1986; Dweck & Leggett, 1988). Until now, though, the prediction of the nascency of helplessness could only be domain-specifically demonstrated in Broome's (1998) study, whereas, as already mentioned, the immunizing character of the learning goal-orientation was not shown. Aside, there is no further proof for a longitudinal validity of Dweck's Motivation-Process-

Model. In the present study, it should be determined whether or not the longitudinal predictability of helplessness which is suggested in Dweck's theory can be empirically proven in the general academic context.

7.5 Method

7.5.1 Design and Participants

In order to examine the aforementioned theme, a longitudinal study was conducted in a German "Gymnasium" (college preparatory high school). At both the beginning and the end of one school year, a survey was carried out. The sample contained 78 pupils in grades 6 to 9 with a mean age of 13,7 ($SD=1,7$) years at the first measurement. The ratio of sexes was balanced, 46% of the sample being girls. For the second measurement, 69 pupils from the original sample could be assessed.

7.5.2 Measurements

Implicit Theory regarding the Modifiability of One's Own Talent. To measure the naïve talent concept, a German version of the existing scale consisting of three items by Dweck, Chiu and Hong (1995) was used. This scale has already been used by several authors (e.g. Broome, 1998). The scale was used to determine whether the concerned person sees his/her (school-relevant) talent more as an unchangeable quality (therefore having an entity theory of his/her own talent), or whether he/she considers his/her abilities as expandable (therefore having an incremental theory of his/her own talent). The scale value increases with supposed talent modifiability. A post-hoc reliability analysis returned satisfactory results (Cronbach's- α were .78 and .79, at the first and second measurements, respectively).

Motivational Orientation. To account for a multidimensional conceptualization of motivational orientation, a German version of the Motivational Orientation Scales (MOS; Nicholls et al., 1985) by Balke and Stiensmeier (MOS-D; 1995) was used. This instrument differentiates between learning and performance goal-orientations as well as between approach- and avoidance components. The subscales "Verstehen" (Understanding), "Überlegenheit" (Superiority) and "Unterlegenheitsvermeidung" (Inferiority-avoidance) consist of six, five and two items, respectively. The scales that were originally developed for undergraduate

students were adapted for the school context through the reformulation of several items. Details concerning this adaptation are available from Broome (1998). By means of a principal-component-analysis using a Oblimin rotation, the three subscales could be reproduced at both measuring points. The internal consistency of the subscales were, with the exception of the avoidance performance goal orientation in the first measurement (Cronbach's- α : .68), high (Cronbach's- α each higher than .82).

Academic Self-concept. In order to measure academic self-concept, the scale "Confidence in own abilities", developed by Dweck and Henderson (1988) was employed. This scale assesses how secure a person is in his/her cognitive abilities. The German translation of this four item scale has, in turn, been used several times (e.g. Schober, in this volume). At both measuring points the internal consistency was, with Cronbachs α s of .66 and .63, borderline satisfactory.

Attributions. In reliance on the operationalization of helplessness often used by Dweck and her research group, the explanation of failures as a lack of talent was used as an indicator measured with the subscale "Intern-Stabil-Negativ" (internal-stable-negative) for the academic setting by Schneewind and Pausch (1990). The raw data was poled wherein a higher value corresponds to a strong attribution of failure to internal, stable causes. The internal consistency was in an acceptable range with a Cronbach's- α of .82 and .75 at the first and second measurements, respectively.

7.6 Results

7.6.1 Descriptive Statistics

In Table 1, the means and standard deviations of all recorded measures from both measuring points are shown.

Here it is first noticeable that pupils in the present study attribute their failures only to a very small extent to a lack of talent as internal and stable. Additionally, they have, on average, a relatively high academic self-concept. Their strongest motivational orientation is learning goal-orientation, followed by approach-performance goal-orientation, which is on the other hand more strongly pronounced than the avoidance-performance goal-orientation. (These differences in the strength of the separate motivational orientations could each be secured to at least the 1%-level by *t*-tests for paired samples at both measuring points.) Finally, the mean for the implicit

theory of intelligence concerning the modifiability of one's own talent was just under the middle of the scale. So, on average, pupils tend to have an entity theory. In summary, pupils have a relatively positive motivation set at both the beginning and the end of the school year; symptoms of helplessness are rather weakly pronounced in the sample.

Table 1: Descriptive statistics and intercorrelations of predictor and criteria variables of Dweck's Motivation-Process-Model at beginning and end of the school year.

Variable	Range	t	<i>M(SD)</i>	1.	2.	3.	4.	5.
1. NTC	1-6	t1	3,23 (1,08)					
		t2	2,99 (0,95)					
2. LO	1-5	t1	3,89 (0,73)	.13				
		t2	3,76 (0,67)	.22*				
3. PO-AP	1-5	t1	3,45 (0,87)	.03	.44***			
		t2	3,39 (0,78)	-.09	.24*			
4. PO-AV	1-5	t1	2,89 (0,99)	-.16	.14	.43***		
		t2	2,63 (1,15)	-.22*	.18	.42***		
5. ASC	1-6	t1	4,16 (0,75)	.14	.37**	.12	.09	
		t2	4,26 (0,68)	-.04	.11	.31*	-.03	
6. A	1-4	t1	1,75 (0,50)	-.19	-.41***	-.09	.12	-.66***
		t2	1,71 (0,42)	-.01	-.07	.01	.30*	-.35*

Notes: NTC: naïve talent concept, LO: learning goal-orientation, PO-AP: performance goal-orientation - approach component, PO-AV: performance goal-orientation - avoidance component, ASC: academic self-concept, A: attribution; *** $p < .001$, ** $p < .01$, * $p < .05$

7.6.2 Cross-sectional Analyses

Correlations between the Separate Components of Dweck's Motivation-Process-Model. In the observation at the beginning as well as at the end of the school year, no statistically significant correlations between any of the components of motivational orientation and the implicit theory of intelligence concerning the modifiability of one's own talent appeared

(Table 1). In the case of the learning goal-orientation and the avoidance component of performance goal-orientation, correlations signed consistent to the theory; however, none of these correlations could be confirmed to the 5%-level.

Furthermore, in relation to the naïve talent concept it is of importance that no correlations with the academic ability-self concept appeared (consistent with Dweck's assumptions). However, no direct influence of the naïve talent concept on helpless reactions (operationalized as failure attributions to a lack of ability) was determined, as is reported by some authors (e.g. Broome, 1998).

Several clear correlations resulted between the separate components of motivational orientation (Table 1). Learning goal-orientation is positively correlated with the approach component of performance goal-orientation, which corresponds to earlier findings (Duda & Nicholls, 1992; Köller & Baumert, 1998). In addition, the expected correlation between approach- and avoidance component of performance goal-orientation was statistically confirmed (see Middleton & Midgley, 1997). Learning goal-orientation and avoidance-performance goal-orientation were not correlated at either measuring point.

At the beginning of the school year, a negative correlation (which corresponds to the theory) between learning goal-orientation and the indicator for helpless reactions, the talent attribution, was discernible after failure (Table 1). At the end of the school year a moderate positive correlation between this dysfunctional attribution and the avoidance component of performance goal-orientation appeared. There was no observable correlation at any measuring point regarding the approach component of performance goal-orientation.

Furthermore, the academic self-concept correlated negatively with the explanation of failures as a lack of talent. This correlation was particularly very strong at the beginning of the school year (Table 1).

Interaction Effect of Motivational Orientation and Academic Self-concept.

In testing the second central statement of Dweck's Motivation-Process-Model, which states that motivational orientation is mediated by the academic self-concept, the attributional style after failure was examined at both measuring points, independently from one another. This was conducted by means of a hierarchical multivariate regression analysis, wherein the attributional style was predicted from the components of Dweck's theory. In turn, three product-terms were calculated through the multiplication of the components of motivational orientation with the postulated mediator, academic self-concept (see Mossholder, Kemrey & Bedlian, 1990). In

addition, a fourth product-term was generated with the naïve talent concept, in order to control a possible direct interaction between implicit theory of intelligence and academic self-concept. In addition to the resulting four product-terms, all of the predictor variables of the Dweck-Model (the naïve talent concept, the components of the motivational orientation as well as the academic self-concept) were included in the analysis. This was done in order to take into account all of the potential relationships between the separate components with the dependent variable. All in all, nine variables were specified at each measuring point as potential predictors for the stepwise regressions, which were admitted to the final regression model under the precondition that they heightend the explained variance at a significance level of $p < .15$. The raw scores of both attributional style variables were each subtracted from the scale mean before the analysis (see Cohen & Cohen, 1983). The results of both regression analyses are shown in Table 2.

Table 2: Results of the hierarchical multivariate regression analyses at both measuring points regarding the prediction of internal stable failure attributions.

Measuring Point	Predictor	β_{final}	p_{final}	ΔR^2	R^2
Beginning of school year	1. ASC	-1.34	***	.432	.432
	2. PO-AV x ASC	.27	**	.040	.458
	3. LO	-.86	**	.038	.510
	4. LO x ASC	1.07	*	.037	.547
End of school year	1. ASC	.12	n.sig.	.120	.120
	2. PO-AV	1.43	**	.094	.214
	3. PO-AV x ASC	-1.22	*	.050	.265

Notes: A predictor was accepted in the model, if it raised the R^2 at $p < .15$.

NTC: naïve talent concept, LO: learning goal-orientation,

PO-AP: performance goal-orientation - approach component,

PO-AV: performance goal-orientation - avoidance component,

ASC: academic self-concept, A: attribution;

*** $p < .001$, ** $p < .01$, * $p < .05$

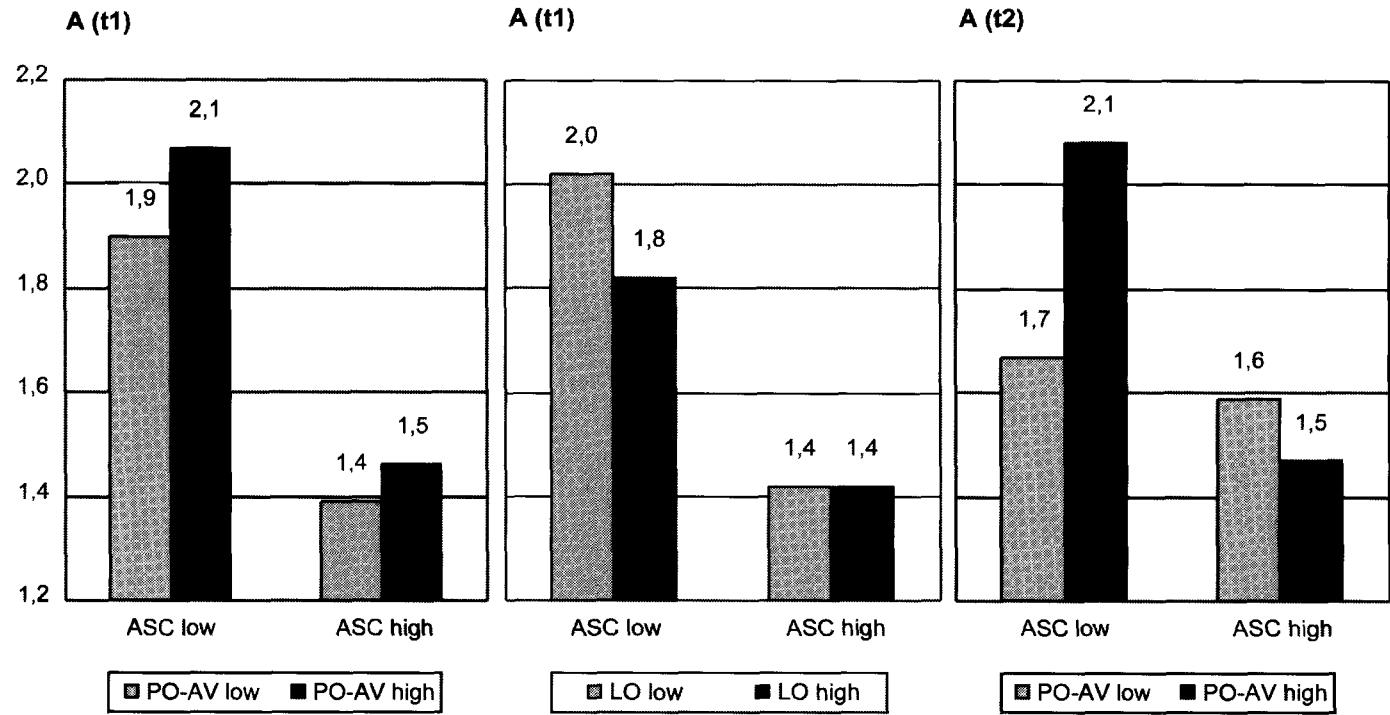
The first result of this analysis is that no significant direct influence of the naïve talent concept was shown at any measuring point. Moreover there was no influence moderated by the academic self-concept. This finding confirms the assumption made by Dweck's Motivation-Process-Model (Dweck & Leggett, 1988; Dweck, 1989), that an influence of the naïve talent concept

(when at all present) is moderated by motivational orientation. At the beginning as well as at the end of school year, academic self-concept was the strongest predictor, which refers to the strong unmoderated correlation with helpless versus mastery behavior patterns (see Table 1). At both points in the school year, the explained variance was raised significantly through affiliating the product "avoidance-performance-goal-orientation x academic self-concept". This finding confirms Dweck's (Dweck, 1986; Dweck & Leggett, 1988) interaction hypothesis for the avoidance component of performance goal-orientation: a weakly pronounced avoidance tendency immunizes against dysfunctional behavior patterns, which can be the result of a low academic self-concept. In other words, according to Dweck, a low confidence in one's own abilities first affects maladaptive behavior when the concerned person simultaneously pursues the goal of hiding his subjectively perceived lack ability from others. This effect is more obvious at the end of the school year than at the beginning (Figure 1). In addition, the interaction hypothesis could be confirmed for learning goal-orientation at the first measuring point. For this component of motivational orientation a shape which is analogous to the avoidance-performance goal-orientation arises: a high learning goal-orientation protects against the effects of a low academic self-concept, while hardly any connections result between learning goal-orientation and behavior patterns, when confidence in one's own abilities is high (Figure 1). Besides the mediated influences of motivational orientation, an unmediated effect at the beginning of the school year for learning goal-orientation and an unmediated effect at the end of the school year for avoidance component of performance goal-orientation could be confirmed. It is remarkable that the approach component of performance goal-orientation could not raise the explained variance at any measuring point, neither mediated via the academic self-concept nor as a direct predictor.

Different degrees of explained variance arose at both measuring points: while the predictive capability of the model was rated to be high at the beginning of the school year with $R^2=.55$, the explained variance amounted to only $R^2=.27$ at the end of the school year.

7.6.3 Longitudinal Analyses

A three-level procedure was chosen for the examination of the longitudinal validity of Dweck's theory (Dweck, 1986; Dweck & Leggett, 1988). In the first step, the stability of the naïve talent concept was examined with correlation measures and a two-dimensional frequency distribution.



Notes: LO: learning goal orientation, PO-AV: performance goal orientation-avoidance component, ASC: academic self-concept; A: attribution

Figure 1: Means of the failure attributions dependent upon academic self-concept and goal orientation.

In the second step, the relationships between the measured variables at the beginning of the school year and those at the end of the school year were assessed with correlation analyses. In particular, this was done in order to contribute to the relationship between naïve talent concept and motivational orientation in a longitudinal perspective. Finally, in the third step, attributional style at the end of school year was predicted by independent variables measured at the beginning of school year. This was done in order to investigate Dweck's postulated interaction effect longitudinally.

Stability of the naïve talent concept. In order to analyze the stabilities of the single components of Dweck's Motivation-Process-Model, particularly that of these naïve talent concept, the intercorrelations of the single variables were ascertained between the two measuring points (main diagonal in Table 3). It is shown that the correlation of the implicit theory of intelligence regarding the modifiability of own talent over a school year is relatively small. In this case it is particularly important that in comparison to this, the helpless reaction after failure, which is manifested by an internal and stable attribution, is apparently much more stable. The difference in the strength of the two correlations could be statistically confirmed at the 1%-level with a test for dependent correlation coefficients (Steiger, 1980). The three components of motivational orientation and the academic self-concept indicate nearly the same level of stability as the naïve talent concept

Table 3: Intercorrelations of the components of Motivation-Process-Model between the two measuring points

		End of school year					
Variable		1.	2.	3.	4.	5.	6.
Beginning of school year	1. NTC	.36**					
	2. LO		.43***	.21 ⁺			
	3. PO- AP			.52***	.28*		
	4. PO- AV	-.37**		.29*	.40**		
	5. ASC				-.24 ⁺	.44***	-.40**
	6. A				.34**	-.50***	.66**

Notes: NTC: naïve talent concept, LO: learning goal-orientation, PO-AP: performance goal-orientation - approach component, PO-AV: performance goal-orientation - avoidance component, ASC: academic self-concept, A: attribution.

Only correlations at $p < .10$ are shown. *** $p < .001$, ** $p < .01$, * $p < .05$, + $p < .10$

(Table 3). Moreover, it is observed that as with the naïve talent concept, it could also be shown for learning goal-orientation, the avoidance component of performance goal-orientation, and academic self-concept that their stabilities are significantly lower than that of internal stable attribution after a failure ($p < .05$).

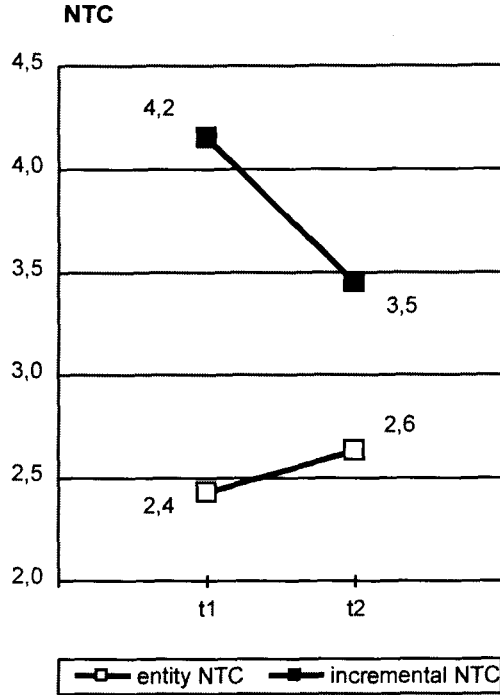
In order to more closely investigate the (obvious) changes in the pupils' naïve talent concepts over the course of one school year, the sample was separated with a median-split into entity- and incremental theorists at both measuring points. Table 4 shows the two-dimensional frequency distribution and, subsequent, percentage stabilities within the two groups.

Table 4: Two-dimensional frequency distribution (beginning x end of the school year) and stability of the naïve talent concept

		End of the school year	
		Entity theory	Incremental theory
Beginning of school year	Entity theory	27 (71%)	11 (29%)
	Incremental theory	12 (41%)	17 (59%)

Notes: The stabilities in brackets in each line add up to 100%. Both distinctions were obtained at each of the two measuring points through a median-split.

The higher stability resulted in the group of entity theorists: 71% of the pupils who saw their talent as a fixed quality at the beginning of the year also portrayed this view at the end of the school year. However, 41% of the pupils who were characterized by an incremental theory at the beginning of the school year were after the course of one year subject to the assumption that their talent has entity qualities. Therefore, incremental theorists more often became entity theorists over the course of the school year than vice versa (Figure 2, p. 144). The fact that changes were different in both groups was statistically confirmed by an analysis of covariation (ANCOVA), which found a significant main effect for the factor of group membership at the beginning of the school year ($F(1,67)=3.98, p < .05$), in which the naïve talent concept at the end of the school year was employed as a dependent variable, while using the same variable at the beginning of the school year was used as a covariate. In order to control possible developmentally determined influences on the transformation of the naïve talent concept, correlations with the age of the participants were calculated, where no significant effects were found at either measuring point.



Note: NTC: naïve talent concept

Figure 2: Development of the naïve talent concept dependent upon original talent concept at the first measuring point

Longitudinal correlations between the components of Dweck's Motivation-Process-Model. The results of correlation analyses between the components of Dweck's theory at the beginning and the end of school year are shown in Table 3 (variables apart the main diagonal). As in the cross-sectional analysis, the first central statement of the theory, according to which the implicit theory of intelligence is the antecedent condition of motivational orientation, could not be proven: significant correlations between the pupils' naïve talent concept at the beginning of the school year and their motivational orientations at the end of the school year could not be observed.

As evidence against the postulated unidirectionality presumed in Dweck's model, the moderate correlation ($r = -.37$, $p < .01$) between

avoidance-performance goal-orientation at the first measurement and the naïve talent concept at the second measurement must be assessed. According to this, a strongly pronounced goal-orientation aimed at concealing a lack of talent at the beginning of the school year comes along with an entity theory at the end of the school year. Furthermore, a negative attributional style at the beginning of school year correlates with a high avoidance component at the end of school year ($r=.34, p<.01$), while the reverse correlation could not be found.

Longitudinal Analysis of the Interaction Effect of Motivational Orientation and Academic Self-Concept. To verify the longitudinal predictability of helpless reactions after failure and the effect of the motivational orientation mediated by the academic self-concept, a regression analysis was done in which all those predictors of the cross-sectional analyses were used which raised R^2 with $p<.15$ in at least one of the measuring points. The results are shown in Table 5.

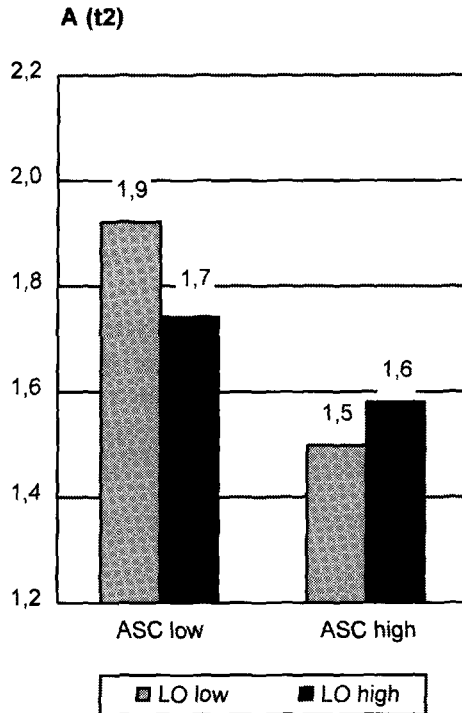
Table 5: Result of the regression analysis concerning the prediction of the internal stable failure attributions at the end of the school year from predictors at the beginning of the school year

Predictor (t1)	Dependent Variable: A (t2), $R^2=.272/.542$	
	β	p
A	--/.67	--/***
ASC	-2.16/-1.85	**/**
LO	-2.40/-2.24	**/**
PO-AV	.79/.38	n.sig./n.sig.
LO x ASC	3.44/3.35	**/**
PO-AV x ASC	-.70/-.46	n.s./n.s.

Notes: Each of the first values shows the results without, and each of the second with the inclusion of the failure attribution. In the model, those predictors were admitted which raised the R^2 at $p<.15$ at least once in the cross-sectional regression analyses. NTC: naïve talent concept, LO: learning goal-orientation, PO-AP: performance goal-orientation – approach component, PO-AV: performance goal-orientation - avoidance component, ASC: academic self-concept, A: attribution.
*** $p<.001$, ** $p<.01$

In the present sample, the pupils' attributional style at the end of the school year could be predicted significantly from their academic self-concept and

their learning goal-orientation at the beginning of the school year. In addition, the interaction-term between the two could raise the explained variance (Table 5). With this result, the mechanism presupposed by Dweck regarding the effect of the motivational orientation moderated through academic self-concept is confirmed longitudinally for learning goal-orientation (Figure 3).



Notes: LO: learning goal-orientation, ASC: academic self-concept, A: attribution.

Figure 3: Means of failure attributions at the end of school year depending upon academic self-concept and learning goal-orientation at the beginning of school year

The interaction effect between the avoidance component of the performance goal-orientation and the academic self-concept shown at both measuring points in the cross-sectional analysis could not be statistically confirmed in

the longitudinal prediction of dysfunctional behavior. Remarkably, the portion of explained variance is just as high at $R^2=.27$ as with the prediction from variables which were collected at the end of the school year (thus at the same measuring point as the dependent variable; compare with Table 2). With a further regression analysis, in which, additionally, the failure attribution at the beginning of the school year were used as a predictor variable, the portion of explained variance could be raised to $R^2=.54$. The significance levels of the predictors used in the first regression remained the same (Table 5).

7.7 Summary and Discussion

The present empirical study, which was conducted in an academic achievement setting with 78 German students and contained two data collections using questionnaires at the beginning and end of the school year, attempted to examine the validity of Dweck's Motivation-Process-Model (Dweck & Leggett, 1988; Dweck, 1989). This included the attempt to test newer conceptualizations of motivational orientation, according to which not only learning and performance goal-orientations are conceived as separate constructs, but in which there also exists a differentiation between an approach and an avoidance component (Elliot & Harackiewicz, 1996; Elliot & Sheldon, 1997; Middleton & Midgley, 1997). In addition to the focus of research, which subjected the model of helpless behavior patterns to a cross-sectional test at a certain point in time, interest was directed towards the usefulness of the theory for longitudinal prediction of dysfunctional behavior in achievement situations, therefore at the genesis of symptoms of helplessness. In addition to naïve talent concept's time-stability (which is high, as implied by Dweck), the present study empirically comes across the two main statements of Dweck's Motivation-Process-Model. These concern (1) the correlation between naïve talent concept and motivational orientation according to which individuals who have an entity theory of their own talent tend more to have a performance goal-orientation and individuals who view their talent in an incremental sense more likely follow a learning goal-orientation, and (2) the effect of motivational orientation, which is moderated by the academic self-concept, according to which performance goal-orientation as well as a low academic self-concept are necessary conditions for the formation of helplessness.

Clear changes in the naïve talent concept were found over the period of a school year through an analysis of time-stability. Above all, pupils who had an incremental theory of their own school-related talent at the beginning of

the year developed a stronger view of their talent as a fixed characteristic over the course of the school year, while most pupils who followed an entity theory in the beginning retained this over the course of time. This finding is inconsistent with Dweck's assumptions (Dweck & Leggett, 1988), according to which the implicit theory of intelligence concerning the modifiability of one's own talent gets dispositional character at the latest after the first years of elementary school (Dweck, 1989). In the face of the presented findings naïve talent concept can be characterized at most as habitual, and the question arises about the conditional factors of certain naïve talent concepts. A general trend related to the developmental stage of the pupils can be excluded on the basis of the present data set, since a correlation between naïve talent concept and age was shown at neither measuring point. Rather, there is evidence that the unidirectionality in Dweck's Motivation-Process-Model represents too strong a simplification of the processes in achievement situations (see also Schober, in this volume). There is every indication in the correlations between unfavourable attributional style at the beginning and the avoidance-performance goal-orientation at the end of the school year on the one hand, and between avoidance component at the beginning and implicit theory of intelligence at the end of the school year on the other hand, that a multidirectional conceptualization of the Motivation-Process-Model could possibly supply further enlightenment for processes acting a part in achievement situations.

In the examination of the relations between implicit theory of intelligence and motivational orientation, the links theoretically postulated by Dweck could be neither cross-sectionally or longitudinally confirmed, even when tendencies towards correlations with learning goal-orientation and avoidance component of performance goal-orientation resulted, which were in unison with Dweck's theory. These results contribute to the non-uniform state of results relating to Central Europe and further query the clarity and strength of the relations specified in Dweck's Motivation-Process-Model (see Schlangen & Stiensmeier-Pelster; Schober; both in this volume). Even if several alternative attempts of antecedents of various motivational orientations exist, (e.g. Harackiewicz, Barron, Carter, Letho & Elliot, 1997), future research should be concerned with the genesis of goal-orientations that are significant in achievement-related situations.

The interaction between motivational orientation and academic self-concept at the onset of symptoms of helplessness specified in the theory, which until now could only be proven to a limited extent in the classroom setting (Broome, 1998), could be confirmed in the present study. However, non-uniform findings were also shown here: if above all in the cross-sectional view a strongly pronounced avoidance component of the

performance goal-orientation paired with a low academic self-concept led to dysfunctional behavior patterns, in longitudinal prediction of helpless behavior Dweck's postulated interaction effect could make a significant contribution exclusively through the learning goal-orientation. A further restriction arises from the very different portions of explained variance of helplessness, which were found at both measuring points: If the model could be assigned a strong capability to explain behaviour patterns in the cross-sectional analysis at the beginning of the school year, in which the interaction hypothesis could be confirmed for the avoidance tendency as well as for the learning goal-orientation, the portion of explained variance in the cross-sectional view at the end of the school year and in the longitudinal analysis would be rather low. However, the character of a positive pronunciation of motivational orientation, which has an immunizing effect on helpless behavior patterns could be shown even under these restrictions.

In conclusion, this study shows, despite the named restrictions, that the admission of the multidimensional concept of motivational orientation, particularly a differentiation between approach- and avoidance components, demonstrates a successful attempt at further enlightenment of motivational processes in achievement situations. So it was shown, as in other studies (e.g. Middleton & Midgley, 1997), that the approach component of motivational orientation can hardly represent a contribution to the explanation of helplessness. If future research relating to Dweck's Motivation-Process-Model takes this distinction into consideration, the integration of this approach with competitive findings (e.g. Elliot & Sheldon, 1997) seems possible.

7.8 References

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