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Angaben zur Veröffentlichung / Publication details:

Ziegler, Albert, Barbara Schober, and Markus Dresel. 2005. "Primary school students'implicit theories of intelligence and maladaptive behavioral patterns." *Education Science and Psychology* 6: 76–86.

http://www.gesj.internet-academy.org.ge/en/list_artic_en.php?b_sec=edu&issue=2005-06.

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Primary School Students' Implicit Theories of Intelligence and Maladaptive Behavioral Patterns¹

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Abstract

Based on Dweck's motivational-process-model an investigation was made of the qualities inherent in theories held of one's own intelligence in middle childhood and whether they can influence maladaptive behavior. In two studies with N=122 and N=226 primary school students, implicit theories as well as goal orientation, confidence in one's own intelligence and various indicators of maladaptive behavior after failure were measured in the domains of mathematics and music. First it was shown that, for at least 20% of primary school students, vulnerability after failure is a reality. By means of Configural Frequency Analyses, it was shown that the risk of maladaptive behavior was highly probable under the conditions specified by the model. Entity theorists of intelligence with a performance goal orientation and low confidence in their own intelligence were vulnerable to different kinds of maladaptive behavior. More over, the studies provide evidence for the domainspecificity of implicit theories (mathematics vs. music) and their prediction of maladaptive behavior.

Keywords: *Implicit theories, Goal orientation, Motivation*

Failures in achievement settings are not only an unavoidable evil in learning processes, but can also serve an important function in self-regulated learning. However, only some students see opportunities in failures; in many cases failures do not direct students' attention to their learning processes but rather give rise to self-criticism.

According to Dweck's motivational-process-model (Dweck, 1999; Dweck & Leggett, 1988), the reactions students exhibit depend on their respective theories about the malleability of their intelligence. In this model two opposing, (domain-specific) "implicit personality theories" about own intelligence (IPT) are contrasted. Whereas some students hold an incremental theory of their intelligence, others see their intelligence as a fixed entity which cannot be changed. These IPTs of one's intelligence (or to be more precise, the theories about the ability to alter it) lead to specific interpretations and behavior patterns in the context of achievement situations and inhibit others.

According to Dweck's model, students who hold an incremental theory are likely to develop a learning goal orientation (Dweck, 1991). They want to improve their level of competence and to understand something new. Entity theorists, on the other hand, want to certify their competence and are oriented towards performance goals. They endeavor to obtain positive judgments on their achievements and want to avoid negative judgments. Of course, only when students are convinced that they can change their basic abilities and obtain new competencies, as they are within an incremental theory, does it make sense to develop learning goals. This clarifies why learning and performance goals lead to different ways of dealing with failure. While the performance goal oriented student sees no reason to continue with a matter after large amounts of negative evaluation - the domain is obviously one that exceeds his or her competencies - a learning goal oriented student sees negative feedback more as a source of information on things which he or she can/must

¹ We would like to thank Carol S. Dweck for her helpful comments on an earlier version of the paper and Thomas Raul for the translation.

improve in order to reach his or her learning goal. Thus, a learning goal orientation offers a better emotional safeguard, even after failures, to further pursue an activity (Dweck, 1999).

However, entity theorists who adhere to a performance orientation will not necessarily demonstrate maladaptive behavior (Dweck & Leggett, 1988). In order to explain the development of extreme maladaptive behavior one also has to consider the student's confidence in his or her intelligence. A performance goal oriented student with high confidence in his or her abilities would not immediately react to a setback with helpless behavior, although he or she would be prone to such behavior after accumulated negative feedback.

Indeed, the effect of the implicit theories of one's own intelligence has been shown in various studies (e.g. Dweck, 1999; Ziegler, 2001). Compared to entity theorists, incremental theorists demonstrate adaptive behavior after experiences of failure (Hong, Chiu, Dweck, Lin & Wan, 1999). It has also been shown that students with a learning goal orientation are better adapted to achievement situations than students with a performance orientation (e.g. Dresel, 2001).

Many empirical findings have been presented which confirm the usefulness of this model with older students (even if there are still facets of the model for which empirical data are lacking; see Ziegler, 2001). In comparison, the stockpile of empirical findings regarding the motivational systems of younger children is dissimilarly sparse. Dweck (2002) summarized some of this literature, according to which children aged 7 to 8 years were already in command of early concepts of their intelligence or ability. At this stage ability is increasingly perceived as an internal and potentially stable quality which is derived, for example, from social comparisons (e.g. Butler, 1999; Droege & Stipek, 1993). Dweck (2002) further contends that different children of this age can also have different theories on the alterability of their own abilities of intelligence.

The obvious point here is that, apart from all the evidence for Dweck's assumptions, we do, however, need more empirical data, especially about younger students. (1) It is unclear, which implicit theories are primarily held by grade school students and what impact they have on reactions after setbacks. (2) Moreover, as long as the term "maladaptive behavior" covers very different, theoretically distinct, concepts such as learned helplessness or state orientation, it has to be shown which concepts can be predicted by IPT at this age. (3) Furthermore, there is a general need for studies which allow for a full test of the motivational-process-model, i.e. those which include all the core variables of the motivational-process-model (IPT, motivational goal orientation, confidence in one's intelligence). (4) The model takes domain-specificity explicitly into account. For example, there is clear evidence that the IPT in achievement contexts and in social contexts has to be differentiated (Dweck, 1996). Nevertheless, whether a single IPT of intelligence underlies all academic areas or if an IPT for each academic subject exists is quite unclear (see Dweck, 2002).

In order to examine the aforementioned issues, we conducted two studies with primary school students.

STUDY 1

In the first study we investigated the motivational-process-model in two domains, music and mathematics. These two subjects have nearly opposite images. Music exists as a subject in German schools to provide balance to subjects like mathematics which are considered to be academically central. This is emphasized by the fact that marks in music courses are irrelevant for the progression to advanced academic institutions. Another reason to choose these subjects is the fact that, from a gender based perspective, music in Germany is seen as a "girls' subject", while mathematics is seen as a typical subject for boys (Ziegler, 2001). So the present study can also supply information pertaining to the question of whether these differences are also reflected in gender-specific IPTs.

Method

Participants. A total of 67 boys and 55 girls in the third grade participated in the study. The average age among the boys was 8.7 (SD=.51) years, that for the girls was 8.8 years (SD=.50).

Materials. Domain-specific measurements were made for the implicit theory of one's own intelligence, goal orientation and confidence in one's own intelligence. With this goal in mind, Dweck's original items (Dweck, 1999) were adapted to both mathematics and music. For example, the original item for the measurement of the IPT of intelligence "You can learn new things, but you can't really change your basic intelligence" was changed to "You can learn new things in mathematics, but you can't really change your basic mathematical intelligence." In a preliminary investigation with 26 third grade students it was confirmed that the items could be understood. Analogous to the considerations of Dweck and Leggett (1988) we grouped the three measures of the students at each case into three categories: For the IPT we differentiated incremental theorists, entity theorists and indifferent students. Regarding goal orientation we applied the categories learning goals, performance goals and challenging performance goals. Finally we categorized students' confidence in their own intelligence as high, medium or low. Two measures of maladaptive behavior were included: Domain-specific versions of a helplessness scale (HiS; Bretkopf, 1985) and an attributional style questionnaire for children (AEM; Widdel, 1975). The HiS measures helplessness as the belief of a person that in a given situation no course of action is available to them which would adequately cope with unpleasant events or demands. Based the suggestions made by Bretkopf (1985) we classified the primary school students as "helpless", "at risk to become helpless", or "not helpless". The AEM consists of scenarios portraying success and failure situations and asks students to choose the response that best explains their success or failure. In the present study we focused on the stability dimension of attributions to failure, i.e. if the students attributed failure to a variable or stable cause (comp. Weiner, 1985).

Procedure. The tests were administered during the regular school instruction periods. Each item was read out loud by the investigator, and the students wrote their answers out in a prepared booklet. The session lasted about 40 minutes.

Results

The consistency for each of the Dweck's scales was satisfactory (Cronbach's alphas>.76); for the helplessness scale and the attributional style measure consistencies were, however, only $\alpha=.67$ and $\alpha=.64$. Therefore, results here must be interpreted with caution.

Frequency analyses. The first step in our analysis was concerned with the results of the predictor variables of the motivational-process-model, and specifically, the proportion of students who fell into each category on the different variables. Table 1 shows that most students employ an entity theory of their domain specific intelligence in mathematics as well as in music. Only a small minority of students (8% in mathematics and 21% in music) believed in an incremental theory. Gender differences were not found. The consistency across both domains, although at first glance rather high, was not sufficient to allow one to speak of a general IPT of intelligence. Of the 122 students, 67 were classified identically in music and in mathematics, that is only 55%.

Table 1.

Frequencies of different IPTs, goal orientations and confidences in one's own intelligence in study 1

	Implicit Theory			Goal Orientation			Confidence		
	Entity	Indifferent	Incremental	Performance Goal	Seek Challenge	Learning Goal	Low	Medium	High
<u>Mathematics</u>									
Boys	47	14	6	14	16	37	4	6	57
Girls	42	9	4	18	4	33	2	14	39
Total	89	23	10	32	20	70	6	20	96
<u>Music</u>									
Boys	46	9	12	23	11	33	20	14	33
Girls	34	7	14	12	6	37	2	8	45
Total	80	16	26	35	17	70	22	22	78

Most of the students, 57%, strove towards a learning goal in mathematics and in music, whereas in both domains about every fourth student sought to attain a performance goal. In the field of mathematics, girls were less likely to work towards challenging performance goals than boys ($\chi^2(2)=6.81$, $p<.05$, Cramér's V=.24). Only 66 of the 122 children demonstrate the same goal orientation in both domains (54%), and, considering the unequal cell distributions, this once again indicates strong domain-specific influences (V=.23).

Confidence in one's own mathematical or musical intelligence was very high for both boys and girls, although boys demonstrated more confidence in mathematics ($\chi^2(2)=6.12$, $p<.05$, V=.22), and girls more in music ($\chi^2(2)=17.20$, $p<.001$, V=.38). Also, only 71 of the 122 were classified into identical categories (58%).

Approximately 11% of the students were classified as helpless in mathematics, and a further 11% as being at risk of becoming helpless (cf. Table 2), but no significant gender differences were to be seen here. Comparable results were found for music, although gender differences also came into play ($\chi^2(2)=11.02$, $p<.01$, V=.30): Among the 28 children classified as helpless or at risk of becoming helpless 23 were boys (82%). Only four children could be classified as helpless in both domains (3%).

Table 2.

Frequencies of the indicators of maladaptive behaviors in study 1

	Helplessness			Attribution of Failure	
	Helpless	At risk	Not helpless	Stable	Variable
<u>Mathematics</u>					
Boys	6	6	55	13	54
Girls	7	8	40	10	45
Total	13	14	95	23	99
<u>Music</u>					
Boys	12	11	44	15	52
Girls	2	3	50	7	48
Total	14	14	94	22	100

Unfavorable attributions of failure to stable causes in both mathematics and music were just under 20%. Gender differences could not be statistically supported. Only 8 children attributed failure to stable causes in both subjects (7%, $V=.21$).

Direct influences of the IPT. In the next step we wanted to determine if the IPT has a direct influence on the other core variables of the model and on maladaptive behavior in the two domains (as was found in other studies). Therefore we considered all other variables as functions of the three categories of the IPT. Overall, the goal orientation for entity theorists was very similar to that for incremental theorists. Contrary to theoretical assumptions, we found that in mathematics unchallenging performance goals were pursued by those employing an incremental theory ($\chi^2(4)=13.01$, $p<.05$, $V=.23$). For mathematics the confidence in one's own domain-specific intelligence among incremental theorists is more often lower than that found for entity theorists ($\chi^2(4)=49.82$, $p<.001$, $V=.45$). Similar, but somewhat weaker differences were also isolated for the subject of music ($\chi^2(4)=13.41$, $p<.01$, $V=.23$). No significant differences could be found for the indicators of maladaptive behavior. Therefore, among primary school students we found no evidence to support a direct connection between IPT and maladaptive behavior.

Testing the full model. Next we wanted to examine the full model including the moderator variables. Since relations in the motivational-process-model are formulated in a way that is similar to a binary decision tree, we applied a Configural Frequency Analysis (Krauth, 1985a, b). Due to low frequencies in some of the cells, some of the results were combined: First, we merged children with an incremental and an indifferent view of their intelligence. Moreover, for both confidence in one's intelligence and helplessness middle and high levels were combined, as were performance goal oriented children and those striving towards challenging performance goals. Although Configural Frequency Analyses are based on Fisher's exact test, in face of the very small cell frequencies in mathematics (only 9% of the students subscribed to an incremental theory and not all possible combinations of IPT, goal orientation, confidence in one's intelligence, and maladaptive behavior could be observed), the analyses could only be carried out for the music domain. The results are displayed in Table 3. Fully in line with theoretical predictions, helplessness and a maladaptive attributional style in response to failure were significantly predicted for those children with the configuration of an entity theory, a performance goal and a low level of confidence in musical intelligence (Dweck & Leggett, 1988). Moreover, there was also evidence for an invulnerable type, defined by the opposite expressions of these three variables. In other words those children who employ an incremental theory, strive towards a learning goal and display a high/middle level of confidence are significantly better protected against a maladaptive attributional style and tend to be better safeguarded against helplessness.

Table 3. Significant Configurations as yielded by the Configural Frequency Analysis in study 1

IPT	Goal Orientation	Confidence	Behavior	p
<u>Vulnerable types</u>				
Entity	Performance goal	Low	Helpless or at risk	.016
Entity	Performance goal	Low	Stable attribution	.004
<u>Invulnerable types</u>				
Incremental/indifferent	Learning goal	High/medium	Not helpless	.141
Incremental/indifferent	Learning goal	High/medium	Variable attribution	.058

Discussion of Study 1

Study 1 served a descriptive function in that it provided information within the theoretical framework of the motivational-process-model about the motivational set of primary school children, considering aspects of domain-specificity and two indicators of maladaptive behavior. Additionally, study 1 provided a test of the motivational-process-model, including the two aspects, of whether direct links between IPT and maladaptive behavior can be affirmed and if the model as a whole can be proven.

Clearer than expected, most of the children saw their mathematical and musical intelligence as being a fixed entity. At the same time, most children oriented themselves on a learning goal. This directly disputes the theoretical assumptions of a link between IPTs and goals (which has been proven for older students in some studies; see Henderson & Dweck, 1990). This – as well as the absence of a direct connection between IPT and maladaptive behavior – could be interpreted as an indication of a still rather incoherent motivational system among younger children (Dweck, 2002; Nicholls & Miller, 1984). In fact, the lack of a direct link between IPT and goal orientation is also consistent with some other contradictory studies (see Ziegler, 2001), so it could also be interpreted as an indication of a problem within the theory.

The fact that, in the mathematics domain, those employing an incremental theory display a low level of confidence in their own mathematical intelligence was also not predicted. This finding seems to be, however, simple to explain. Those with an incremental theory do not just believe that they can build on their competencies, but that they can also lose them as well. Thus, the low level of confidence in a subject like mathematics among incremental theorists is a finding that, in principle, fits in with the model, and even makes clear, that some theoretical specifications of the IPTs could be reasonable (Dweck, 1996; Ziegler, Dresel & Schober, 2001).

A comparison of the results of the model variables (IPT, goal orientation, and confidence) for mathematics and music clearly shows that the aspect of domain specificity is important. Only between 50% and 60% of the children were classified identically in both domains, which is insufficient for the assumption of a single IPT underlying all achievement subjects.

In considering the results in both domains it is not unexpected, with respect to gender, that girls would demonstrate a higher level of confidence in their musical intelligence, and that boys would demonstrate more confidence in mathematics (e.g. Heller & Ziegler, 1996). It is however unexpected that just as many boys as girls would be classified as being either helpless or at risk of becoming helpless in mathematics, while in music, where one would expect to see less helplessness, that boys would be more helpless and that just as many children would be helpless here as in mathematics. In both domains about 20% of the children showed clear indications of maladaptive behavior. This shows, that for a substantial proportion of younger students, vulnerability after failure is reality that mustn't be underestimated (see Dweck, 2002).

Although the motivational-process-model was not successful in predicting the relationship between IPT and goal orientation, it benefits from a high level of support from the Configural Frequency Analysis. The vulnerable type postulated by the model could be resolutely confirmed when considering attributions or helplessness scales. Simultaneously, there was evidence for the respective invulnerable type, i.e. students with the opposite pattern seem to be unlikely to show maladaptive behavior after failure.

To summarize, the data set draws a partially unexpected picture of the motivational set of primary school children when viewed in terms of the motivational-process-model. Domain-specificity seems to play an important role. There are no indications of a direct influence of the IPT on maladaptive behavior, but strong support for the model when the moderator variables are also considered.

STUDY 2

Study 2 aimed to accomplish three different goals. First, due to the theoretically unexpected results we wanted to replicate the main findings. Second, we wanted to test the motivational-process-model in the domain of mathematics under better conditions. This was attempted with a larger sample. Third, two additional indicators of maladaptive behavior were to be considered.

Method

Participants. 226 students in the third and fourth grades participated in the study. The average age of the 126 boys was 9.2 ($SD=.71$) years and that of the girls was 9.3 ($SD=.77$) years.

Materials. The same domain-specific measurements for the subject of mathematics described in the method section in study 1 were administered. In order to form indicators of maladaptive behavior in the domain of mathematics, the helplessness scales and the attributional style questionnaire were employed (see study 1). Additionally, state orientation was measured with the HAKEMP (Kuhl, 1985) and a single item (“How much interest do you have in mathematics?”) with options ranging from 1 (“not at all”) to 5 (“very much”) indexed mathematical interest (or in terms of maladaptive reactions: the lack of interest). Based on the measures, the children were classified as state oriented or as action oriented (see Kuhl, 1985); with respect to interest they were assigned to one of the three categories “low”, “medium” and “high”.

Procedure. The investigation was conducted by applying the identical procedure as in study 1.

Results

The analysis of the internal consistency of the scales resulted in satisfactory values ($\alpha>.71$) with the one exception being the HAKEMP ($\alpha=.64$).

Frequency analyses. Table 4 contains a description of the measures of the motivational-process-model with respect to gender. All in all, the results are very similar to those obtained in study 1. Most of the children subscribed to an entity view of their own mathematical intelligence and no gender differences were found. Again, most primary school students pursued a learning goal. Similar to study 1, a gender effect was to be seen in goal orientation ($\chi^2(2)=8.60$, $p<.01$, $V=.20$). This could be attributed to the higher proportion of girls who pursued a learning goal and a lower proportion of girls who pursued a challenging achievement goal. The confidence in one’s own mathematical intelligence for both boys and girls was relatively high, although the boys tended to score better than the girls ($\chi^2(2)=3.68$, $p<.08$, $V=.13$).

Table 4.

Frequencies of different IPTs, goal orientations and confidences in one’s own intelligence in study 2

	Implicit Theory			Goal Orientation			Confidence		
	Entity	Indifferent	Incremental	Performance Goal	Seek Challenge	Learning Goal	Low	Medium	High
Boys	97	18	11	42	30	54	10	37	79
Girls	84	12	4	39	9	52	11	39	50
Total	181	30	15	81	39	106	21	76	129

The results for the indicators of maladaptive behavior are contained in Table 5. About 8% of the students were classified as being helpless in mathematics, a further 15% are considered to be at risk of becoming helpless. Factors indicating a risk of helplessness were more frequent among girls than among boys ($\chi^2(2)=9.15$, $p<.01$, $V=.20$). A further indicator of maladaptive behavior considered was state orientation, i.e. the dysfunctional preoccupation with one’s own situation instead of giving proper attention to the successful management of one’s tasks. Indeed 31% of the children could be classified as being state oriented, and a marginal gender effect was found

($\chi^2(1)=1.69$, $p<.10$, $V=.09$). About 20% of the children admit to having absolutely no interest in mathematics. Furthermore, no gender differences could be recorded here. Almost every fourth student showed an unfavorable attributional style. Here a gender effect occurred, reflecting that girls did, more often than boys, attribute failures to stable causes ($\chi^2(1)=3.63$, $p<.05$, $V=.13$).

Table 5.

Frequencies of the indicators of maladaptive behavior in study 2

	Helplessness		Attribution of Failure		State Orientation		Interest			
	Helpless	At risk	Not helpless	Stable	Variable	State oriented	Action oriented	Low	Medium	High
Boys	14	13	99	23	103	34	92	25	21	46
Girls	3	21	76	29	71	35	65	66	54	120
Total	17	34	175	52	174	69	157	35	25	60

Direct influences of the IPT. Similar to study 1, unexpectedly no relationship between the IPT of one's mathematical intelligence and goal orientation could be confirmed. Additionally, and as expected in Dweck's assumptions, there is no evidence to confirm a relationship between IPT and confidence in mathematical talent. However, some direct links between theories about intelligence and maladaptive behavior could be found here. Children with an incremental theory were significantly more often highly interested in mathematics than children with an entity theory (47% vs. 24%, $\chi^2(2)=6.32$, $p<.05$, $V=.18$). Only one of the 15 children with incremental theories demonstrated state oriented reactions after failure, while 59 of the 181 entity oriented children are state oriented ($\chi^2(1)=4.39$, $p<.05$, $V=.15$). Out of the children employing an incremental theory not one single child is either helpless or at risk of becoming helpless, while out of the children employing an entity theory 26 are at risk of becoming helpless and 15 can already be classified as being helpless. The difference, however, was only significant at the 10%-level ($\chi^2(2)=4.30$, $p<.06$, $V=.15$). Finally, the results for attributions followed the expected pattern in that only one child out of 15 with an incremental theory attributed failures in a stable manner, while 42 of the 181 with an entity theory did so ($\chi^2(1)=2.21$, $p<.07$, $V=.10$).

Testing the full model. Although the sample size was increased considerably, some very low cell frequencies were observed. Therefore, in order to apply the Configural Frequency Analysis we combined the categories in the same manner as in study 1. Additionally, for mathematical interest, children with medium and high levels were combined. Table 6 shows which types achieved statistical significance in the Configural Frequency Analysis. The motivational-process-model was strongly supported in that the one type postulated by the model is confirmed for all indicators of maladaptive behavior: Entity theorists who were performance goal-oriented and had a low level of confidence were clearly more at risk of exhibiting patterns of maladaptive behavior. However, for three of the four indicators of maladaptive behavior (helplessness, maladaptive attributional style and lack of interest) a further type was proven significant: Children who did not subscribe to an entity theory (incremental or indifferent), were performance goal-oriented and had low confidence. Further analyses revealed that these theoretically unexpected configurations exclusively contained children with indifferent IPT, none with an incremental theory.

Performance goal-oriented children with low confidence in their own mathematical intelligence are therefore only protected from maladaptive behavior when they believe in an incremental theory of their own intelligence. With respect to state orientation a further configuration was found, in addition to the one postulated by the model, i.e. entity theorists who pursue a learning goal and have low confidence in their own intelligence are also vulnerable to the development of a state orientation.

Table 6.

Significant Configurations as yielded by the Configural Frequency Analysis in study 1

IPT	Goal Orientation	Confidence	Behavior	p
<u>Vulnerable types</u>				
Entity	Performance goal	Low	Helpless or at risk	.02
Entity	Performance goal	Low	Stable attributions	.04
Entity	Performance goal	Low	State oriented	.04
Entity	Performance goal	Low	Very low interest	.04
<u>Other types</u>				
Incremental/indifferent	Performance goal	Low	Helpless or at risk	.03
Incremental/indifferent	Performance goal	Low	Stable attributions	.01
Incremental/indifferent	Performance goal	Low	Very low interest	.007
Entity	Learning goal	Low	State oriented	.07

Discussion of Study 2

Generally, the findings of study 1 could be replicated. Only a few children subscribed to an incremental theory of their mathematical intelligence and, at the same time, most children pursued a learning goal. study 2 also revealed that girls who pursue a performance goal avoid challenges more than boys. Again, we observed, that more than 20% of the students show maladaptive reactions after failure.

Although very few of the children subscribed to an incremental theory of their mathematical intelligence, some direct links to the indicators of maladaptive behavior were found here. In other words children with an incremental theory display higher levels of interest in mathematics and are less often state oriented. There were also trends for fewer incremental children to be helpless or at risk of becoming helpless and for more of them to attribute failures more favorably. This provides us with the first evidence that the early forms of implicit theories of one's own intelligence, which are presumed to be in place among the 8-10 year olds in our sample, can have decisive consequences in the face of failure (comp. Cain & Dweck, 1995).

The results of the Configural Frequency Analysis supply strong evidence for the motivational-process-model. No matter which of the indicators of maladaptive behavior one considers, the vulnerable type can always be predicted. Entity theorists who pursue a performance goal and display low confidence are more prone to develop maladaptive behaviors. Regarding the additional vulnerable types found, it is remarkable, that these types never included incremental theorists, they were exclusively children whose IPT was classified as indifferent. In contrast to study 1, however, an invulnerable type could not be documented. It should be noted that, in the strict sense, invulnerable types cannot be expected as long as Dweck's model is primarily a model oriented on explaining maladaptive instead of invulnerable reactions (Dweck & Leggett, 1988).

CONCLUSION

In two studies with primary school students, Dweck's motivational-process-model received strong support. In mathematics as well as in music, regardless of the kind of indicator of maladaptive behavior being considered, children who display an entity theory, pursue a performance goal, and display low confidence in their own domain-specific intelligence show unfavorable results with respect to the indicators of maladaptive behavior. There are, however, indications that children whose IPT is usually classified as indifferent can also show signs of maladaptive behavior. These children warrant stronger consideration in future studies and should not be so hastily excluded from analyses. Furthermore, the differences seen between the fields of music and mathematics lead to the conclusion that the assumption of the domain-specification of the motivation-processmodel must be taken seriously.

Apart from the model support, we also found some unexpected results: we were able to demonstrate a weak direct connection between the IPT and maladaptive behavior in our second study – presumably through an increased sample with more statistical power – but the assumed link between IPT and goal orientation was not found. As stated earlier, this may be an expression of the incoherence of the motivational system among younger children (Dweck, 2002). On the other hand, it can't be precluded, that variables moderating the link between IPT and goal orientation exist. Since this presumption not only exists regarding primary school student (e.g. Schober, 2001), future research has to focus on this question in particular. In general, longitudinal studies are desirable here in order to derive valid causal and developmental conclusions regarding Dweck's indubitably highly potent motivational-process-model.

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Article received: 2005-05-24