European Journal of Psychology of Education
2007, Vol. XXII, n° 1, 63-76

Quality of parental support and students' emotions during homework: Moderating effects of students' motivational orientations

Martin Knollmann
Elke Wild
University of Bielefeld, Germany

Two studies investigated the relationship between parental support, students' motivational orientations, and students' emotions during homework. It was assumed that intrinsically motivated students would feel better when parents provided much learning autonomy, while extrinsically motivated students would experience more positive affect when directive parental support was given. In study I, students (N=181) reported their emotions after having read two vignettes (autonomy-supportive vs. directive parental support). In study II, 38 students reported their motivation, the perceived quality of parental support, and their emotions after each of 21 homework sessions. Results of extreme group comparisons (intrinsic vs. extrinsic motivation) partly supported the assumed Aptitude-Treatment-Interaction: Even when students' academic self-concept was controlled, extrinsically motivated students tended to report more negative affect than intrinsically motivated students under autonomy-supportive conditions; for directive parental support, the reverse trend was discovered. Consequences for homework interventions are discussed.

Students' emotions during learning have become a growing research area in educational psychology. Emotions have been recognized as an integral part of virtually every learning process (Schutz & DeCuir, 2002); therefore, several efforts have been made to clarify when and how emotions arise in different learning contexts. Most studies have concentrated on emotions in the classroom (e.g., Mayring & Rhoeneck, 2003); although students spend a considerable amount of time on extracurricular activities, research into emotions during homework is scarce. Overall, the results of the available studies point out that students experience a wide range of emotions when they do homework (Pekrun, Goetz, Titz, & Perry, 2002; Warton, 2001). Negative affect is most commonly observed, though some students also seem to experience joy (Chen & Stevenson, 1989) or at least do not think that "homework is dull and boring" (Bryan, Nelson, & Mathur, 1995).

This study is part of the ongoing research project "Fostering Self-Determined Forms of Learning Motivation at Home and in School", which has been granted to Elke Wild by the German Research Foundation (WI 1607/1-1, 1-2).

The presence and quality of parental support is a major factor influencing students' emotions during homework (Hoover-Dempsey, Battiato, Walker, Reed, DeJong, & Jones, 2001; Warton, 2001). Some studies found that students enjoy doing homework with parental assistance more than doing it alone (Leone & Richards, 1989; Shumow, 1998), while other studies showed that for many students, parental homework involvement is an important stressor (e.g., Dirks, Klein-Haeβling, & Lohaus, 1994; Spirito, Stark, Grace, & Stamoulis, 1991). These different findings indicate that students' emotions are not primarily influenced by the mere presence or absence of parental involvement, but rather by its quality.

Studies exploring how the quality of instruction at home and in school influences learning emotions found that autonomy supportive instruction, emotional support, and a clear structuring of learning foster students' emotional well-being (e.g., Patrick, Skinner, & Connell, 1993; Pekrun et al., 2002). By contrast, over-structured and controlling instruction and negative feedback generally seem to have a negative impact on students' emotions (e.g., Glaeser-Zirkuda & Fuss, 2004; Hock & Krohne, 1989). From the perspective of appraisal theories of emotion, however, emotions are not directly triggered by contextual characteristics such as quality of parental instruction. Rather, they also depend on a persons' motivation in a given situation (Lazarus, 1991). Emotions are evoked if a match (positive emotions) or a mismatch (negative emotions) between motivation and situation is perceived; thus, the *quality* of a students' motivation should determine if parental instruction is appraised as congruent or incongruent and triggers positive or negative emotions, respectively. Especially parental instruction which is perceived as directive (e.g., setting the goals for learning, structuring the learning process, giving much help and hints) without being controlling (e.g., criticising, building up pressure, making negative remarks, threatening with negative consequences) could have more complex effects on students' emotions during homework, depending on students' motivation.

The purpose of the two studies reported here was to gain more insight into how students' motivation and the quality of parental support contribute to differences in emotional experience during homework. It was assumed that students with predominantly intrinsic motivational orientations prefer autonomy-supportive parental support and experience negative affect when parents provide directive instruction; the reverse was assumed for predominantly extrinsic motivated students. The rationale for this assumption is laid out throughout the following paragraphs.

With regard to qualitative aspects of motivation, the distinction between extrinsic and intrinsic motivational orientations has become a prominent theoretical framework for educational research. Despite a plethora of different definitions, intrinsic motivational orientations can be broadly defined as habitual tendencies (trait level) or actual intentions (situational level) to get engaged into learning because learning itself is valued as interesting, enjoyable or otherwise satisfying (e.g., Deci & Ryan, 1985; Harter, 1981). In contrast, extrinsic motivational orientations commonly are defined as tendencies or intentions to engage into learning in order to obtain consequences that are not an immediate or constitutive part of the learning activity (cf., Rheinberg, 2002). Extrinsic motivational orientations can be further divided into tendencies or intentions to achieve positive consequences such as good grades or other students' approval and tendencies or intentions to avoid negative consequences such as getting bad grades or being perceived as incompetent by others (e.g., Pintrich, 2000). Although intrinsic and extrinsic motivational orientations are not mutually exclusive (i.e., a learners' habitual or situational motivation can be characterised by varying degrees of both intrinsic and extrinsic aspects; cf., Hidi & Harackiewicz, 2000), it can be assumed that in most cases one of the two tendencies prevails and thus can be seen as the dominant motivational orientation, either on the trait level or the situational level.

This conceptualisation of intrinsic and extrinsic motivation together with the concept of appraisal (Lazarus, 1991, see above) can be used to predict which emotions students with clear preferences for one motivational orientation experience when parents provide autonomy-supportive *vs.* directive support during homework. Predominantly intrinsic motivated students should appraise learning opportunities in which they can explore the task on their own and self-regulate their learning as congruent to their motivation and therefore experience positive

emotions. In contrast, they should experience incongruent (i.e., negative) emotions when they are confronted with highly structured and directive instruction which aims at optimal learning outcomes rather than optimal learning processes, because this kind of support opposes their striving for learning autonomy and the enjoyment of the learning process itself (cf. Deci & Ryan, 1985). Predominantly extrinsic motivated students, on the other hand, might appraise the latter as congruent, as they are primarily motivated by learning outcomes and do not strive for the development of learning competence or the enjoyment of learning. Thus, they might appraise the presence of much help and structure as an optimal environmental condition for the fast and easy achievement of the desired outcome and/or as protective against possible failure and therefore experience positive emotions. In contrast, these students might appraise autonomy-supportive learning environments as incongruent, due to the fact that these environments usually require a much higher investment of time and effort to reach the desired learning outcome and/or offer a higher risk for possible failure; this should result in negative emotions. Preliminary empirical support for these assumptions comes from studies that found that extrinsically motivated students tend to interpret cognitive apprenticeship-based instruction (as a more autonomy-oriented kind of instruction) as emotionally threatening, whereas intrinsically motivated students evaluated this kind of instruction positively (Jarvela, 1998; Jarvela, Lehtinen, & Salonen, 2000).

In sum, it was hypothesized that the quality of students' motivational orientations (intrinsic *vs.* extrinsic) moderates the impact of autonomy-supportive *vs.* directive parental instruction on students' emotions during homework. According to Muller, Judd, and Yzerbyt (2005), "moderational analyses attempt to identify individual difference [...] variables [i.e., quality of students' motivation] that strengthen and/or change the direction of the relationship between the treatment variable [i.e., quality of parental support] and the dependent variable [i.e., students' emotions]" (p. 852; see also Baron & Kenny, 1986).

To take into account that the bipolar conceptualisation of extrinsic *vs.* intrinsic motivation has been questioned in the last years (cf., Covington, 2000), the hypothesized disordinal interaction between students' dominant motivational orientation and the quality of parental support was only predicted for subgroups of students with extreme preferences for one of the two motivational orientations ("threshold interaction") rather than for the whole intrinsic *vs.* extrinsic continuum ("product interaction"; cf., Dusseldorp & Meulman, 2004). Therefore, the hypotheses were tested using extreme group designs (cf., Cronbach & Snow, 1977). First, a quasi-experimental study was designed to investigate the relationship between students' motivational orientations (measured at the trait level) and the emotions students had to report right after they read two vignettes describing hypothetical homework situations that differ in the degree they allow/afford for self-regulated learning. In the second study a "homework diary" was used to assess students' motivational orientations, their perceptions of the quality of parental support, and their emotions "on-line".

Different emotional reactions to autonomy-supportive *vs.* directive instruction might merely reflect the well-known finding that students who have a negative self-concept of their ability prefer structured learning environments, while students with positive self-concepts of their own ability prefer increased learning autonomy (cf., Cronbach & Snow, 1977; Konrad & Traub, 1999); therefore, students' self-concept was controlled for in both studies.

STUDY I

Method

Sample

The original sample consisted of N=181 sixth-graders (51% female; mean age: 11.80, SD=0.40) and their families, who took part in a more comprehensive longitudinal study on the development of motivation (Wild & Remy, 2002). The students and their families were randomly chosen from an urban population in western Germany; since the participation in the

study was on a voluntary basis, middle- and upper-class families were overrepresented (63%). Most of the students (57%) attended the "Gymnasium" (i.e., grammar school with A-levels, high educational level), 40% attended the "Realschule" and other moderate school tracks, and 2% attended a lower school track ("Hauptschule"). Students' average grade in mathematics was 2.60 (American grades A=1, B=2 ... F=6).

For the present analyses, two subgroups of students were selected by referring to student's scores in two scales measuring intrinsic and extrinsic motivational orientations at the trait level (see below). First, the scores were divided into quartiles, as they were not equally distributed across the sample. Group I (predominantly intrinsic orientation: n=27) consisted of students with scores in the upper quartile of the intrinsic motivation scale and scores in the lower quartile of the extrinsic motivation variable. Students in group II (predominantly extrinsic orientation: n=25) scored in the lower quartile of the intrinsic motivation scale and in the upper quartile of the extrinsic motivation scale.

Measures

Self-report questionnaires were administered during a one hour-visit at home in order to assess students' domain-specific intrinsic and extrinsic motivational orientations as well as their self-concept of ability (Likert-scales: 1=strong disagreement, 2=weak disagreement, 3=weak agreement, 4=strong agreement). The items of the scales for intrinsic (α=.76) and extrinsic (α=.88) motivation are listed in Table 1. The intrinsic score is derived from items tapping two dimensions of intrinsic motivational orientations towards mathematics lessons and homework (enjoying to do maths, striving for competence). The measure of extrinsic motivational orientations consists of items that represent four dimensions (meeting expectations of parents and teachers, being liked by others, avoiding looking incompetent, fear of punishment). Five items formed a domain-specific self-concept scale (α=.85; see Table 1).

Table 1

Means (M), standard deviations (SD), and corrected item-scale correlations (rit) of the items of the scales used in Study I

Scale	Items	*M/SD*	*rit*
Extrinsic motivation	I do maths in class because I want to please my teacher	2.04/0.59	.59
	I do maths in class because I'm expected to.	3.11/0.71	.53
	I do maths in class because I want my classmates to like me.	1.44/0.69	.59
	I do maths in class because I want my teacher to see me as a good student.	2.26/0.91	.66
	I do maths in class because I would be embarrassed if my teacher caught me "sleeping".	2.28/1.05	.56
	I do maths homework because I'm expected to.	3.39/0.74	.49
	I do maths homework because my parents praise me when I do.	2.05/0.87	.65
	I do maths homework because my parents would be angry if I don't.	2.46/1.03	.67
	I do maths homework because I don't want to take private lessons.	2.52/1.18	.60
	I do maths homework because my parents are happy when I do.	2.37/0.96	.66
Intrinsic motivation	I do maths in class because I want to understand the subject matter.	3.40/0.67	.38
	I do maths in class because it is important to me to be competent in maths.	3.16/0.72	.43
	I do maths in class because I want to know if my solutions are right.	2.67/0.88	.49
	I do maths in class because I want to gain more knowledge about it.	2.93/0.80	.44
	I do maths homework because I want to understand the subject matter.	3.49/0.62	.39
	I do maths homework because it is important to me to be competent in maths.	3.31/0.74	.54
	I do maths homework because I want to know if my solutions are right.	2.23/0.88	.44
	I do maths homework because I like to calculate.	2.63/1.02	.71
	I do maths homework because I'm interested in maths.	2.60/0.95	.69
Self-concept	I'm good at maths.	3.10/0.78	.69
	To me math is easy.	2.91/0.75	.78
	To understand maths in class is no problem for me.	3.01/0.69	.73
	Doing my maths homework good and fast is no problem for me.	2.90/0.73	.70
	Math is a hard school subject. (-)	2.97/0.88	.47

To assess students' emotions, participants were asked to read two short stories (see Appendix) and to imagine that they were in the situation described. Both vignettes describe a

regular math homework situation but differed in the type of maternal help. While the first situation is characterized by directive instruction, the second story describes an autonomy-supportive kind of maternal help. In order to obtain sufficient variance in emotions, the vignettes were formulated in an emotionally neutral fashion. After reading each story students had to report which emotion (anger, disappointment, anxiety, or joy) they would experience and how intense this emotion would be (1=weak, 2=average, 3=strong). In order to obtain sufficient cell numbers for the statistical analyses, a composite, bipolar variable indicating students' overall affect was formed by recoding the intensity values of each emotion: The values -3, -2, and -1 indicated strong, average and weak negative affect (students who reported anger, disappointment, or anxiety, respectively); the values 0, 1, and 2 represented weak, average, and strong positive affect (students who reported joy).

Results

Prior to the analysis of variance, correlations between the variables were computed. As can be seen in Table 2, neither extrinsic nor intrinsic motivation was associated with more or less positive affect in the directive instruction condition. In line with our expectations, however, in the autonomy supportive homework situation a positive correlation between positive affect and intrinsic motivation was observed, while the relation between emotions and extrinsic motivation was inverse. Thus, this pattern of correlations yielded first indications for possible moderating effects of motivational orientations on the relationship between parental instruction and students affect.

Table 2

Correlations among students' motivation, academic self-concept, and their overall affect under autonomy-supportive vs. directive instructional conditions (Study I; N= 52)

	Intrinsic motivation	Extrinsic motivation	Self-concept	Affect directive supp.	Affect autonomy supp.
Intrinsic motivation					
Extrinsic motivation	-.61**				
Self-concept	.38*	-.57**			
Affect directive supp.	-.25	.15	.02		
Affect autonomy supp.	.40**	-.46**	.26	-.04	

Note. *$p \leq .05$, **$p \leq .01$.

The hypotheses were tested using a two-way ANOVA with one repeated-measures factor (two conditions: autonomy-supportive *vs.* directive parental instruction), one between-subjects factor (two groups: predominantly extrinsic *vs.* predominantly intrinsic motivational orientation) and the composite measure of affect as the dependent variable. In order to control for possible effects of students' control-related beliefs, self-concept was included as a covariate.

The results (see Table 3) showed neither a significant main effect for group, $F(1,49)=.97$, $p>.05$, nor for condition, $F(1,49)=.28$, $p>.05$. The covariate self-concept had no significant influence on students' emotions, $F(1,49)=.52$, $p>.05$. Furthermore, no significant condition x self-concept, $F(1,49)=.003$, $p>.05$, or group x self-concept interactions, $F(1,48)=.43$, $p>.05$ (adjusted model) emerged. In sum, students' affect did not differ due to motivational orientations, self-concept, type of maternal instruction, or interactions between type of instruction and self-concept. However, the analysis indicated a significant group x condition interaction, $F(1,49)=8.78$, $p=.005$, $\eta^2=.15$. In line with the hypotheses, the emotional experience in the two conditions differed between the two groups.

Table 3

Adjusted and unadjusted means and standard deviations of students' reported affect in autonomy-supportive vs. directive conditions (Study I; N=52)

	Extrinsic motivational orientation		Intrinsic motivational orientation		Total
Conditions	*M* (*SD*)	*Madj* (*SD*)	*M* (*SD*)	*Madj* (*SD*)	*M* (*SD*)
Autonomy	-0.50 (1.41)	-0.44 (1.45)	0.85 (1.20)	0.80 (1.19)	0.20 (1.46)
Directive	-0.32 (1.31)	-0.25 (1.32)	-0.78 (1.65)	-0.84 (1.64)	-0.56 (1.50)

In order to assess the interaction effect with regard to the hypotheses, planned comparisons were conducted for the adjusted means. First, for each condition an independent-sample *t*-test was computed to test for mean differences between the two groups. Contrary to predictions, predominantly extrinsic motivated students did not report significantly more positive/less negative affect in the directive-instruction condition than the predominantly intrinsically motivated group, $t(50)=1.41$, $p>.05$. For the autonomy-support condition, however, the assumed difference was obtained: Extrinsically motivated students reported significantly less positive/more negative affect than their intrinsically motivated counterparts, $t(50)=-3.36$, $p=.002$.

In order to test for differences between the two treatment conditions for each separate group, dependent-sample *t*-tests were conducted. Contrary to the hypotheses, predominantly extrinsic motivated students did not experience significantly less positive/more negative affect in the autonomy-support condition than in the directive-instruction condition, $t(23)=-.25$, $p>.05$ (see Table 3). The predominantly intrinsic motivated group, however, reported significantly more positive/less negative affect in the autonomy-support condition than in the directive-instruction condition, $t(26)=4.29$, $p<.001$, which is in line with the hypotheses.

Although the interaction was only assumed for students with extreme preferences for either intrinsic or extrinsic motivation, a repeated measures-ANOVA for the whole sample ($N=181$; five groups as between subjects factor: moderate/strong preference for extrinsic motivation, no preference, moderate/strong preference for intrinsic motivation) was conducted post hoc. The results showed a significant linear interaction [$F(4,177)=2.32$, $p=.05$, $\eta^2=.06$]: The more dominant intrinsic motivation was, the more positive/less negative affect was reported in the autonomy-supportive (*vs.* directive) condition. When the groups were compared, the only disordinal interaction was obtained for the two extreme groups, thus supporting the assumption that this effect only holds when students with extreme preferences for one motivational orientation over the other are compared.

STUDY II

Method

Sample and procedure

For the second study, a stratified (3 groups: students with high [grades A,B], moderate [grade C] and low [grades D, E ,F] achievement in mathematics) random sample of 38 students (21 female) from the original sample of $N=181$ students (see study I) was drawn at an earlier time of measurement (mean age: 8.7, $SD=0.37$). During a time period of 21 days, these students were asked to complete a questionnaire ("homework diary", see below) immediately after finishing their math homework, resulting in a total of 462 homework episodes ($M=12.16$ episodes per student, $SD=3.51$). From this sample, all episodes *with* parental help were selected ($N=121$ episodes from 31 students, $M=3.90$ episodes per student, range: 1-8 episodes,

SD=2.65). In order to determine the dominance of intrinsic *vs.* extrinsic motivation in each episode, tertiles were computed for each of the two items that measured intrinsic and extrinsic motivation (see below). Then, a dichotomous variable indicating motivational dominance was formed: Episodes which scored in the upper tertile of intrinsic motivation and in the lower tertile of extrinsic motivation were labelled as predominantly intrinsically motivated (n=32); episodes with scores in the lower tertile of intrinsic motivation and in the upper tertile of extrinsic motivation were labelled as predominantly extrinsically motivated (n=32). These 64 episodes were used for further analysis.

Measures

Students' self-concept as well as their intrinsic and extrinsic motivation were measured with one item each (intrinsic: "Today I did my homework because I like to do math"; extrinsic: "Today I did my homework because I was expected to"; self-concept: "Today doing math homework was easy for me"; Likert-scale: 1=strong disagreement, 2=weak disagreement, 3=weak agreement, 4=strong agreement). The participants were also asked to rate the amount and quality of support they received from their parents (ordinal scale: 4="my parents told me the results of the task", 3="my parents explained the task, and then we solved it together", 2="my parents explained the task", 1="I only received one piece of advice on how to do the task"). In order to obtain sufficient cell numbers for ANOVA, this variable was transformed using a median split (median=2; new variable: 1=autonomy-oriented support *vs.* 2=directive support). Five items measured students' emotional experiences during homework (one item each for: anger, anxiety, boredom, joy, and pride; Likert-scale, see above).

Results

Table 4 depicts the correlations between motivation, self-concept, and students' emotions for the homework episodes. Intrinsic motivation was positively correlated with joy and pride but not with anger and anxiety. For extrinsic motivation, negative correlations were found with pride and joy but not with anger and anxiety.

Table 4

Correlations among students' motivation, self-concept, and emotions (Study II; N=64)

	Intrinsic motivation	Extrinsic motivation	Self-Concept	Joy	Pride	Anger	Boredom
Intrinsic motivation							
Extrinsic motivation	-.78**						
Self-concept	.37**	-.24					
Joy	.35**	-.32**	.15				
Pride	.26*	-.41**	.17	.22			
Anger	-.22	.16	-.26*	-.01	-.13		
Boredom	-.05	.06	-.22	-.23	-.08	.35**	
Anxiety	-.19	.21	-.07	.18	-.09	.14	-.06

Note. *$p \leq .05$, **$p \leq .01$

For each of the five emotions as dependent variables, a two-way ANOVA was conducted with the dominant type of motivation (intrinsic *vs.* extrinsic) and quality of instructions (autonomy-supportive *vs.* directive) as between-subjects factors, and students' self-concept as a covariate.

Contrary to predictions, the analyses for the positive emotions joy and pride showed no interactions between motivational orientations and support (see Table 5 for means and Table 6 for *F*-values). For pride, a significant main effect for motivational dominance was obtained: In episodes with predominantly intrinsic motivation, more pride was reported than in predominantly extrinsically motivated episodes, $F(1,59)=5.98$, $p=.02$, $\eta^2=.09$; no significant effect found for type of instruction was obtained, $F(1,59)=2.18$, $p>.05$. For joy, neither motivational dominance nor support showed significant main effects.

Table 5

Adjusted and unadjusted means and standard deviations of emotions in episodes with autonomy-supportive vs. directive parental instruction and dominant intrinsic vs. extrinsic motivation (Study II; N=64; $n_{much\ support}=22$; $n_{little\ support}=42$; $n_{intrinsic}=32$; $n_{extrinsic}=32$)

		Intrinsic mot. orientation		Extrinsic mot. orientation		Total (mot. orientation)	
Parental support	Emotions	*M* (*SD*)	*Madj* (*SD*)	*M* (*SD*)	*Madj* (*SD*)	*M* (*SD*)	*Madj* (*SD*)
Much support	Joy	2.43 (1.13)	2.44 (1.14)	1.93 (1.22)	1.99 (1.22)	2.09 (1.19)	2.13 (1.19)
	Pride	3.43 (0.54)	3.43 (0.53)	2.73 (1.34)	2.73 (1.33)	2.95 (1.17)	2.95 (1.17)
	Anger	1.14 (0.38)	1.12 (0.34)	1.40 (0.63)	1.29 (0.63)	1.32 (0.57)	1.24 (0.55)
	Boredom	1.71 (0.76)	1.70 (0.76)	1.93 (1.10)	1.85 (1.06)	1.86 (0.99)	1.80 (0.96)
	Anxiety	1.14 (0.38)	1.13 (0.35)	1.07 (0.26)	1.03 (0.27)	1.09 (0.29)	1.05 (0.29)
Little support	Joy	2.64 (1.08)	2.61 (1.06)	2.12 (1.22)	2.11 (1.22)	2.43 (1.15)	2.41 (1.14)
	Pride	3.79 (0.42)	3.79 (0.42)	3.18 (0.42)	3.18 (1.13)	3.54 (0.84)	3.54 (0.84)
	Anger	1.16 (0.47)	1.23 (0.47)	1.41 (0.87)	1.42 (0.84)	1.26 (0.67)	1.30 (0.64)
	Boredom	1.48 (0.77)	1.53 (0.79)	1.18 (0.39)	1.18 (0.38)	1.36 (0.66)	1.39 (0.67)
	Anxiety	1.04 (0.20)	1.06 (0.20)	1.59 (1.00)	1.59 (1.00)	1.26 (0.70)	1.28 (0.69)
Total (support)	Joy	2.59 (1.07)	2.57 (1.06)	2.03 (1.20)	2.06 (1.21)	2.31 (1.17)	
	Pride	3.71 (0.46)	3.71 (0.46)	2.97 (1.23)	2.97 (1.23)	3.33 (1.00)	
	Anger	1.16 (0.45)	1.20 (0.44)	1.41 (0.76)	1.36 (0.74)	1.28 (0.63)	
	Boredom	1.53 (0.76)	1.57 (0.77)	1.53 (0.88)	1.50 (0.84)	1.53 (0.82)	
	Anxiety	1.06 (0.25)	1.09 (0.23)	1.34 (0.79)	1.32 (0.80)	1.20 (0.60)	

Table 6

Results of the ANOVAs for Joy, pride, anger, boredom, and anxiety (Study II; between-subjects factors: Dominant motivation, support; covariate: Self-concept)

Dependent variable	Source of variance	*df*	*F*	*p*	η^2
Joy	Self-concept	1.59	0.24	.63	.00
	Dominant mot. (DM)	1.59	2.00	.16	.03
	Support (S)	1.59	0.18	.67	.00
	DM x S	1.59	0.01	.95	.00
Pride	Self-concept	1.59	0.00	.97	.00
	Dominant mot (DM)	1.59	5.98	.02	.09
	Support (S)	1.59	2.18	.15	.04
	DM x S	1.59	0.02	.88	.00
Anger	Self-concept	1.59	3.08	.08	.05
	Dominant mot. (DM)	1.59	1.03	.31	.02
	Support (S)	1.59	0.40	.53	.01
	DG x S	1.59	0.01	.94	.00
Boredom	Self-concept	1.59	1.06	.31	.02
	Dominant mot. (DM)	1.59	0.19	.67	.00
	Support (S)	1.59	3.35	.07	.05
	DM x S	1.59	1.30	.26	.02
Anxiety	Self-concept	1.59	0.45	.51	.01
	Dominant mot. (DM)	1.59	1.71	.20	.03
	Support (S)	1.59	2.19	.14	.04
	DM x S	1.59	4.12	.05	.07

With respect to negative emotions, none of the assumed interactions between the two factors were found for anger and boredom. For anger, no main effects for support or motivational dominance emerged. In the case of boredom, the effect of support showed a trend towards significance: When parents displayed a directive (*vs.* autonomy-oriented) kind of instruction, students tended to report more boredom, $F(1,59)=3.35$, $p>.05$, $\eta^2=.05$. No significant differences in boredom were found between predominantly intrinsic *vs.* extrinsic motivated episodes.

The only significant interaction between motivational dominance and support was obtained for anxiety, $F(1,59)=4.11$, $p=.05$, $\eta^2=.07$. Motivational dominance [$F(1,59)=1.71$, $p>.05$] and support [$F(1,59)=2.19$, $p>.05$] had no significant main effects. Furthermore, students' self-concept had no significant influence on students' anxiety, $F(1,59)=.45$, $p>.05$, and did not interact with the between-subjects factors when the model was adjusted accordingly. Again, the interaction was assessed by independent-sample *t*-tests for the adjusted means at each level of the two factors. Contrary to predictions, no significant differences in anxiety between episodes with predominantly intrinsic *vs.* extrinsic motivation were obtained, $t(20)=.91$ $p>.05$. For episodes with autonomy-supportive instruction, the results yielded the expected difference: Students reported significantly more anxiety in extrinsically than in intrinsically motivated episodes, $t(40)=2.53$, $p=.02$.

Separate analyses of the predominantly intrinsic *vs.* extrinsic episodes indicated that – contrary to assumptions – the increase of anxiety in the intrinsically motivated episodes when directive (*vs.* autonomy-supportive) instruction was present (see Table 5) was not significant, $t(30)=.60$, $p>.05$. For predominantly extrinsic motivated episodes, however, the *t*-test revealed the predicted difference: Significantly higher levels of anxiety were present when parents provided autonomy supportive (*vs.* directive) instruction, $t(30)=2.17$, $p=.04$.

In order to test if the assumed disordinal interactions can be observed along the whole intrinsic *vs.* extrinsic-continuum, stepwise regression analyses with the five emotions as dependent variables were conducted for the whole sample of episodes ($N=121$) post hoc. After inclusion of the independent variables "autonomy support" and "intrinsic *vs.* extrinsic motivation", U-shaped interaction terms (motivation x support) were entered into the regressions. Again, the only significant interaction emerged for anxiety as dependent variable ($\beta=-.30$, $p=.01$): The better the fit between motivational orientation and parental instruction was (i.e., extrinsic-directive and intrinsic-autonomy supportive), the less anxiety was experienced. However, a close examination of the interaction revealed that it mainly resulted from episodes with high scores on either end of the intrinsic *vs.* extrinsic-continuum, which again supported the idea of a treshold interaction rather than a product interaction (cf., Dusseldorp & Meulman, 2004).

Discussion

Based on theoretical considerations regarding the influence of motivational orientations on the genesis of emotions in learning contexts, two studies were conducted to explore if the impact of parental support on students' emotions during homework is moderated by the quality of students' motivational orientations. It was assumed that highly intrinsic motivated students would appraise autonomy supportive parental instruction as congruent and therefore experience positive emotions; highly extrinsic motivated students, conversely, were expected to appraise at least some aspects of these environments as incongruent to their motivation, which was expected to lead to negative emotions. For directive parental support, the reverse pattern of findings was predicted.

In the first study two groups with extreme preferences for one of the two motivational orientations were compared with regard to their overall affect (positive *vs.* negative) in two hypothetical situations. Although the effect sizes are quite small, the results supported the idea of a disordinal interaction between dominance of motivational orientation and quality of

instruction. Planned comparisons of the means only revealed significantly more positive emotions in the predominantly intrinsic motivated group in the autonomy supportive condition along with significant differences in the predicted direction between the two groups in this condition. However, the results for the extrinsically motivated group suggest that not all students may benefit from autonomy supportive learning environments in terms of positive learning emotions. Rather, students with extrinsic motivation seem to feel better when parents provide a strictly organized learning environment, thus ensuring that their extrinsic intentions (e.g., avoiding failure) are met. Overall, the results suggest that "self-determination and control are not beneficial in general. What seems more important is the congruence between environmental characteristics and one's motivational orientation" (O'Connor & Vallerand, 1994, p. 193).

Of course, several limitations of the first study have to be mentioned. First, vignettes with hypothetical situations were used; thus, it is unclear whether these results can be extended to real homework situations. Furthermore, it can be questioned if the two vignettes are equivalent because one refers to homework assignments and the other to test preparation at home; for some students the latter might be associated with more negative feelings than regular homework.

For statistical purposes in study I a global, bipolar affect measure was formed by summing up forced-choice items. Although pragmatic in nature, this procedure implies that positive and negative emotions can be placed on a bipolar continuum – an assumption that has been put into question by the work of Cacioppo and colleagues (e.g., Larsen, McGraw, & Cacioppo, 2001), who found that mixed feelings of sadness and happiness can co-occur. Another methodological limitation of study I pertains the order of vignettes, which was not counterbalanced. Furthermore, due to the study's design (extreme-group comparisons), no baseline group could be incorporated; thus, a more straightforward test of the causal assumptions regarding autonomous *vs.* directive parental instruction was not possible.

To overcome some of these shortcomings, the second study provided an insight into the genesis of emotions in real homework settings. A homework diary was administered to obtain information about the interplay between students' motivations for doing homework, their perceptions of parental support, and their emotions during learning. Homework episodes in which a strong preference for either intrinsic or extrinsic motivation was present were compared. With regard to the hypotheses, the results showed no interactions between dominant motivational orientation and parental support for joy, pride, anger, and boredom during homework. For anxiety, however, the assumed interaction emerged; although the effect size again was quite small, planned comparisons revealed that in episodes with predominantly extrinsic motivation, anxiety increased in autonomy-supportive contexts, which led to significantly more anxiety in extrinsically than in intrinsically motivated episodes under these support conditions. No interactions or main effects have been found for self-concept; however, it can be assumed that it plays a vital role for anxiety during learning (cf., Pekrun et al., 2002). Therefore, research with more refined measures of self-concept is needed, especially to clarify possible three-way interactions between self-concept, instruction, and motivation in the genesis of anxiety and other control-related emotions.

The lack of the expected interaction effects for joy, pride, anger, and boredom may have several reasons: First of all, the assumed moderation may not hold true for all learning-related emotions. Quality of instruction may have special importance for social learning emotions such as anger, whereas task-related emotions such as boredom and joy may depend primarily on task characteristics (cf., Pekrun et al., 2002). Alternatively, it may be assumed that the appraisal of qualitative aspects of the homework assignments (e.g., repetitive *vs.* novel tasks, perceived usefulness; cf., Trautwein & Koeller, 2003) dominated most of students' emotions and suppressed or concealed the influence of parental support. Thus, to obtain a more differentiated insight into students' emotional appraisals during homework, future studies should measure the appraisal of parental support as well as the appraisal of task characteristics. Another explanation for the mixed results of study II might be the fact that within-subjects variance (i.e., many students contributed more than one episode to the sample of homework

episodes) has not been accounted for: Due to the study's design (extreme group comparisons) and the well-known problems of quasi-experimental field research (differing frequencies of homework assignments and presence of parental support), the obtained sample of episodes was too small to analyse the data using hierarchical linear modelling. Thus, treating all variance as between-subjects variance may have led to biased results.

Further limitations of study II concern the measurement of students' motivation and the perceived quality of parental support. Apart from problems related to reliability (one-item scales) and validity (e.g., no relations between anxiety and self-concept) of the variables that arise in many studies using diaries or experience sampling methods, analyses were restricted to only one dimension of parental instruction. Moreover, the item indicating directive and autonomy-oriented parental support only captured one aspect of this construct (more or less support of self-regulated learning). Future research should incorporate more exhaustive measures of autonomy-supportive and directive parental instruction as well as further characteristics of parental support (e.g., process-oriented *vs.* product-oriented feedback and emotional support) to investigate both their independent and combined effects on the emotions of students with different motivational orientations. Moreover, as the measures used in study I represent a rather broad conceptualization of intrinsic and extrinsic motivation, future studies should analyse different dimensions of students' motivation separately to obtain a more accurate picture of the interplay between motivational and situational characteristics in the genesis of emotions in learning contexts.

Research along this line should be especially fruitful with regard to the improvement of parental homework involvement, because dyadic homework situations offer a natural opportunity to adapt instruction to students' individual characteristics. Highly capable, but extrinsically motivated learners might experience less negative affect when their parents provide structured and directive learning support. However, the person-environment fit model of motivation and instruction presented here does not imply that these students will never prefer more autonomous forms of learning. Rather, it can be used to specify when and how contextual factors such as autonomy-supportive instruction can foster a change from extrinsic to more intrinsic forms of motivation. When parents adapt their support style to their child's extrinsic motivation, positive emotions are evoked. In turn, these emotions foster the development of intrinsic motivation (cf., Pekrun, 1992). Thus, for students who have developed a preference for extrinsic motivation in the course of their learning careers, the optimal starting point for the transition to intrinsic motivation (cf., Deci & Ryan, 1985) might be directive parental instruction during homework; with increasing levels of intrinsic motivation, parental support should then be stepwise adjusted to become more autonomy-supportive. However, this kind of "motivational scaffolding" can only succeed if parents have the diagnostic skills necessary to detect their child's current motivation as well as the proximal zone of motivational development (cf., Brophy, 1999); therefore, homework interventions should enable parents to diagnose their children's motivation to do homework and to adjust their support accordingly.

Appendix

Vignettes

Vignette I (directive instruction):

Imagine you and your mother are doing homework. The tasks are new to you, your teacher introduced them in class a day ago. Your mother tells you how long you will work on the task and explains the task. She tells you how to solve the task and tells you where to pay special attention. She writes down every step that is necessary to accomplish the tasks and tells you to do them in the way she wrote down.

Vignette II (autonomy-supportive instruction):

Imagine you and your mother are practicing for the next math test. The tasks that you practice today are new, they were part of the math lesson in school a day ago. Your mother says: "Go ahead and try solving the tasks on your own. If you have any questions, you can ask me for help. You decide on your own how long you need to practice."

References

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Brophy, J. (1999). Toward a model of the value aspects of motivation in education: Developing appreciation for particular learning domains and activities. *Educational Psychologist, 34,* 75-86.

Bryan, T., Nelson, C., & Mathur, S. (1995). Homework: A survey of primary students in regular, resource, and self-contained special education classrooms. *Learning Disabilities Research and Practice, 10,* 85-90.

Chen, C., & Stevenson, H.W. (1989). Homework: A cross-cultural examination. *Child Development, 60,* 551-561.

Covington, M. (2000). Intrinsic versus extrinsic motivation in schools: A reconciliation. *Current Directions in Psychological Science, 9,* 22-25.

Cronbach, L.J., & Snow, R.E. (1977). *Aptitudes and instructional methods: A handbook for research on interactions.* New York: Irvington.

Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York, NY: Plenum Press.

Dirks, S., Klein-Haeβling, J., & Lohaus, A. (1994). Entwicklung und Evaluation eines Streβbewaeltigungsprogrammes fuer das Grundschulalter [Development and evaluation of a stress-coping intervention for elementary school]. *Psychologie in Erziehung und Unterricht, 41,* 180-192.

Dusseldorp, E., & Meulman, J.J. (2004). The regression trunk approach to discover treatment covariate interaction. *Psychometrika, 69,* 355-374.

Glaeser-Zirkuda, M., & Fuss, S. (2004). Wohlbefinden von Schuelerinnen und Schuelern im Unterricht [Well-being of students in school]. In T. Hascher (Ed.), *Schule positiv erleben* (pp. 27-48). Bern: Haupt.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology, 17,* 300-312.

Hidi, S., & Harackiewicz, J.M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research, 70,* 151-179.

Hock, M., & Krohne, H.W. (1989). Muetterliches Erziehungsverhalten waehrend einer Hausaufgabenanfertigung und Aengstlichkeit beim Kind [Maternal behaviour and children's anxiety during homework]. *Zeitschrift fuer Paedagogische Psychologie, 3,* 169-180.

Hoover-Dempsey, K.V., Battiato, A.C., Walker, J.M.T., Reed, R.P., DeJong, J.M., & Jones, K.P. (2001). Parental involvement in homework. *Educational Psychologist, 36,* 195-209.

Jarvela, S. (1998). Socioemotional aspects of students' learning in a cognitive-apprenticeship environment. *Instructional Science, 26,* 439-472.

Jarvela, S., Lethinen, E., & Salonen, P. (2000). Socio-emotional orientation as a mediating variable in the teaching-learning interaction: Implications for instructional design. *Scandinavian Journal of Educational Research, 44,* 3, 293-306.

Konrad, K., & Traub, S. (1999). *Selbstgesteuertes Lernen in Theorie und Praxis* [Self-regulatesd learning in theory and practice]. Munich: Oldenbourg.

Larsen, J.T., McGraw, A.P., & Cacioppo, J.T. (2001). Can people feel happy and sad at the same time? *Journal of Personality and Social Psychology, 81*, 684-696.

Lazarus, R. (1991). *Emotion and adaption*. New York: Oxford University Press.

Leone, C.M., & Richards, M.H. (1989). Classwork and homework in early adolescence: The ecology of achievement. *Journal of Youth and Adolescence, 18*, 531-548.

Mayring, P., & von Rhoeneck, C. (Eds.). (2003). *Learning emotions. The influence of affective factors on classroom learning*. Frankfurt am Main: Peter Lang.

Muller, D., Judd, C.M., & Yzerbyt, V.Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology, 89*, 852-863.

O'Connor, B.P., & Vallerand, R.J. (1994). Motivation, self-determination, and person-environment fit as predictors of psychological adjustment among nursing home residents. *Psychology and Aging, 9*, 189-194.

Patrick, B.C., Skinner, E.A., & Connell, J.P. (1993). What motivates children's behavior and emotion? Joint effects of perceived control and autonomy in the academic domain. *Journal of Personality and Social Psychology, 65*(4), 781-791.

Pekrun, R. (1992). The impact of emotions on learning and achievement: Towards a theory of cognitive/motivational mediators. *Applied Psychology: An International Review, 41*, 359-376.

Pekrun, R. Goetz, T., Titz, W., & Perry, R.P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist, 37*, 91-105.

Pintrich, P.R. (2000). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25*, 92-104.

Rheinberg, F. (2002). *Motivation*. Stuttgart: Kohlhammer.

Schutz, P.A., & DeCuir, J.T. (2002). Inquiry on emotions in education. *Educational Psychologist, 37*, 125-134.

Shumow, L. (1998). Promoting parental attunement to children's mathematical reasoning through parent education. *Journal of Applied Developmental Psychology, 19*(1), 109-127.

Spirito, A., Stark, L.J., Grace, N., & Stamoulis, D. (1991). Common problems and coping strategies reported in childhood and early adolescence. *Journal of Youth and Adolescence, 20*, 531-544.

Trautwein, U., & Koeller, O. (2003). Time investment does not always pay off: The role of self-regulatory strategies in homework execution. *German Journal of Educational Psychology, 17*, 199-209.

Warton, P.M. (2001). The forgotten voices in homework: Views of students. *Educational Psychologist, 36*, 155-165.

Wild, E., & Remy, K. (2002). Affektive und motivationale Folgen der Lernhilfen und lernbezogenen Einstellungen von Eltern [Affective and motivational consequences of parental learning support and parental attitudes towards learning]. *Unterrichtswissenschaft, 30*(1), 27-51.

Deux études exploraient les relations entre la qualité de l'engagement parental pendant des devoirs, la motivation des élèves d'apprendre et leurs émotions pendant les devoirs. On supposait que les élèves avec une motivation intrinsèque éprouvent des émotions positives si le support parental pendant les devoirs est caractérisé par l'encouragement à l'autonomie tandis que les élèves avec une motivation extrinsèque se sentent mieux si leurs parents les aident par une style autoritaire. Dans la première étude, des élèves (N= 181) racontaient leurs émotions après avoir lu deux historiques fictives (style parental caractérisé par l'encouragement à l'autonomie vs. style parental autoritaire pendant les devoirs). Dans la deuxième étude, 38 élèves racontaient leurs émotions et comment ils ont aperçu la qualité de l'engagement parental après chacune des épisodes de devoirs. Des comparaisons entre deux groupes extrêmes supportaient partiellement ces hypothèses: même si le concept de soi académique des élèves

fussent contrôlé, les élèves extrinsèquement motivés montraient tendancieusement plus d'émotions négatives si leurs parents les aidaient pendant les devoirs par l'encouragement à l'autonomie que ceux qui étaient motivés intrinsèquement. Les résultats du style parental autoritaire étaient contraires.

Key words: Aptitude-treatment-interaction, Learning emotions, Motivational orientations, Parental homework involvement.

Received: November 2005

Revision received: August 2006

Martin Knollmann. Universitaet Bielefeld, Fakultaet fuer Psychologie, Universitaetsstr. 25, 33615 Bielefeld, Geermany. E-mail: martin.knollmann@uni-bielefeld.de

Current theme of research:

Emotion and emotion regulation in learning contexts. Self-regulated learning. Multiple goals and learning.

Most relevant publications in the field of Psychology of Education:

Knollmann, M. (in press). Kontextspezifische Emotionsregulationsstile von Schülerinnen und Schülern: Entwicklung des Fragebogens zur Emotionsregulation im Lernkontext Mathematik [Context-specific emotion regulation styles of students: Development of a questionnaire measuring emotion regulation during math learning]. *German Journal of Educational Psychology.*

Elke Wild. Universitaet Bielefeld, Fakultaet fuer Psychologie, Universitaetsstr. 25, 33615 Bielefeld, Germany. E-mail: elke.wild@uni-bielefeld.de; Web site: www.uni-bielefeld.de/psychologie/personen/ae09/wild.xml

Current theme of research:

Parental involvement. Family psychology. Motivation.

Most relevant publications in the field of Psychology of Education:

Wild, E. (2004). Häusliches Lernen. Forschungsdesiderate und Forschungsperspektiven [Homework – state of the art and perspectives for future research]. *Zeitschrift für Erziehungswissenschaft, 3*, 37-64.

Exeler, J., & Wild, E. (2003). Die Rolle des Elternhauses für die Förderung selbstbestimmten Lernens [The role of parents in fostering self-regulated learning]. *Unterrichtswissenschaft, 1*, 6-22.

Klein-Allermann, E., Kracke, B., Noack, P., & Hofer, M. (1995). Micro- and macro-social conditions of adolescents' aggressiveness and anti-foreigner attitudes. *New Directions for Child Development, 70*, 71-84.

Noack, P., Kracke, B., Wild, E., & Hofer, M. (2001). Subjective experiences of social change in East and West Germany: Analyses of the perceptions of adolescents and their parents. *American Behavioral Scientist, 44*, 1798-1817.

Wild, E., & Remy, K. (2002). Affektive und motivationale Folgen der Lernhilfen und lernbezogenen Einstellungen der Eltern [Emotional and motivational consequences of school-related strategies and attitudes of parents]. *Unterrichtswissenschaft, 30*, 27-51.