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Self-determination, Self-efficacy and Self-regulation in School: A Longitudinal Intervention Study With Primary School Pupils

Daniela Martinek^a, Ulrike Kipman^a

Abstract

The study documents an intervention programme based on the Self-determination Theory of Deci and Ryan (2000) with school beginners in an Austrian primary school with the aim to improve perceived self-determination and academic self-regulation of school beginners. For two years, teachers were guided by a team of educational scientists to design challenging autonomous learning settings and to foster self-determined academic regulation. Before and after the intervention, about 100 pupils were questioned concerning their well-being in school, perceived autonomy support, their academic self-regulation, and school-related self-efficacy. Teachers' autonomy support decreased during the first year but remained stable from then on. Pupils' intrinsic regulation, as well as their introjected and external regulation and their self-efficacy, decreased throughout the intervention but identified regulation remained stable. The results indicate that perceived self-determination, self-determined academic regulation, and self-efficacy contribute to school-related well-being and offer interesting recommendations for improving the climate in schools for pupils and teachers.

Keywords

Self-determined learning, academic self-regulation, self-efficacy, early education

Numerous studies stress the relevance of academic intrinsic motivation for learning processes right from the beginning of education in schools (cf. Boggiano 1998; Miserandino 1996; Bouffard et al. 2003; Lepper, Corpus, and Iyengar 2005; Spinath and Steinmayr 2008), yet extrinsic types of motivation seem inevitable elements of education (Reeve 2009). Building on the multidimensional approach of the Self-Determination Theory (SDT) by Deci and Ryan (2012) and on empirical studies focusing on the academic motivation of primary school children (Gottfried 1990; Skinner et al. 2009; Dresel et al. 2010; Corpus and Wormington 2014), the authors developed an intervention programme for school beginners and guided teachers and pupils for a period of two years.

In so doing, the authors were able to collect data concerning perceived autonomy, academic self-regulation, subjective well-being, and school-related self-efficacy of a target group that is rarely analysed—the six to 10 years old primary pupils in grades one to three.

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SELF-DETERMINATION AND SUBJECTIVE WELL-BEING IN SCHOOL

Self-determination plays an important role for successful learning (Ryan and Deci 2013) and being able to act self-determinedly is conducive for academic achievement, for positive classroom functioning and pupils' psychological well-being (Deci and Ryan 2000; Jang et al. 2009). The way teachers interact with their pupils and how they initiate and organise learning processes has an essential impact on perceived autonomy (Deci and Ryan 2008) and educators can actively use autonomy supportive strategies in class to foster self-determined involvement (Chatzisarantis and Hagger 2009; Tessier, Sarrazin, and Ntoumanis 2010). Educational research provides empirically well-tested methods that are effective to promote self-determination (Su and Reeve 2011). In addition to concentrating on individual interests, the provision of significant choices, making structures and arrangements clear, providing meaningful rationales and a considerate way of interacting with pupils, including the use of non-controlling language and openness toward students' perceptions and attitudes, are fundamental strategies to support self-determination in class (Reeve and Cheon 2014). According to intervention studies, teachers can be trained to use these methods effectively (Reeve, Deci, and Ryan 2004; Chatzisarantis and Hagger 2009; Tessier et al. 2010; Cheon and Reeve 2013) and research indicates that an autonomy supportive teaching style contributes to well-being (Vansteenkiste et al. 2004) and to developing autonomous forms of academic self-regulation (Sierens et al. 2009; Vansteenkiste et al. 2009; Jang, Reeve, and Deci 2010; Soenens et al. 2012).

ACADEMIC SELF-REGULATION AND AUTONOMY SUPPORT

According to SDT, pupils have an evolved tendency

to grow and learn (Reeve, Deci, and Ryan 2004). The prototype of autonomous behaviour is intrinsic motivation, when pupils engage in activities because they are spontaneously interesting and enjoyable without the requirements of separable consequences. When confronted with external demands, learners are inherently motivated to integrate the regulation of extrinsically motivated activities within themselves (Ryan 1993). In this proactive process, external regulations are transformed into regulations by the self, and supportive as well as nurturing social conditions in class can contribute to this internalisation (Deci et al. 1994).

With respect to extrinsic motivation, the multidimensional SDT approach distinguishes different types: external, introjected, identified, and integrated regulation (Deci et al. 1994). Behaviour regulated through external means such as constraints, punishment, or rewards corresponds with external regulation. Introjected regulation occurs when a pupil accepts a regulation or contingency without accepting it as his or her own and refers to behaviour that is driven by internal pressure, e.g. anxiety or emotions of self-esteem (Ryan and Connell 1989). Pupils understanding the value of uninteresting behaviours and being willing to accept responsibility for their behaviours experience identified regulation and, if learners are able to fully endorse the requested behaviours with their self-concept, the behavioural regulation is integrated (Deci and Ryan 2016).

Learning environments that support autonomy contribute to maintaining and developing intrinsic, integrated, and identified regulations, which are considered to be (rather) self-determined types of motivation, whereas pressure-inducing and controlling teachers foster introjected and external regulations, which are (rather) controlled types of motivation (Deci and Ryan 1987; Ryan and Stiller 1991; Vallerand, Fortier, and Guay 1997; Deci, Koestner, and Ryan 1999). A convincing line of educational

research documents that self-determined regulation corresponds with positive consequences, such as: engagement (Jang et al. 2010); conceptual learning (Grolnick and Ryan 1987); achievement and mastery orientation (Gurland and Grolnick, 2005; Pelletier et al. 2013); perceived competence and better performance (Grolnick, Ryan, and Deci 1991; Fortier, Vallerand, and Guay 1995; Miserando 1996; De Naeghel et al. 2012); well-being (Kasser and Ryan 1996) and higher self-efficacy (Thøgersen-Ntoumani and Ntoumanis 2006).

PUPILS' ACADEMIC SELF-EFFICACY AND SELF-DETERMINED REGULATION

According to Bandura's Social Cognitive Theory (1997), academic self-efficacy beliefs refer to pupils' judgments concerning their capability of accomplishing a task or succeeding in an activity. Self-efficacy beliefs determine pupils' choices, their efforts, their persistence, and their perseverance when facing difficult challenges, and these beliefs are nurtured by interpreting information from four primary sources: mastery experience, vicarious experience, social persuasions, and physiological and emotional states (Bandura 1986). Research has determined that self-efficacy influences academic achievement across academic areas and levels (Pajares and Urdan 2006) and it is associated with motivational constructs such as causal attributions, self-concept, optimism, achievement goal orientation, academic help-seeking, anxiety, and value (Usher and Pajares 2008). Moreover, pupils who are confident in their academic capabilities engage in more self-regulatory strategies that promote success in school (Schunk and Pajares 2005). The self-beliefs of school beginners are likely to be most malleable and to have an impact on the structure of subsequent efficacy beliefs (Bandura 1997).

From a conceptual standpoint, the basic psychological need for competence, defined within SDT, can be related to self-efficacy, although

self-efficacy beliefs represent domain-specific perceptions of competence and are instrumental for goal attainment (Bandura 1997), whereas the basic psychological need for competence, as defined within SDT, rather refers to feeling effective in interactions with the social environment and being able to explore one's capacities (Ryan and Deci 2002). Relating these two concepts to each other, it seems feasible that if supporting autonomy fosters the satisfaction of the basic psychological needs (Deci and Ryan 2000), then experiencing self-determination—with respect to individual academic self-regulation or teachers' support—should consequently contribute to higher self-efficacy.

THE PRESENT STUDY

In the present research, a team of primary school teachers and educational scientists cooperated in order to design and establish an innovative educational concept with a special emphasis on self-determined learning (SE³W—self-determination, self-regulation, self-efficacy, and well-being). The authors collected longitudinal data concerning perceived self-determination, academic self-regulation, self-efficacy, and subjective well-being from 131 pupils from grades one to three in an Austrian primary school. In line with the main intervention objective, the authors hoped to achieve constant results concerning the perception of autonomy support (Reeve 2011) and positive development of the academic self-regulation of the participating pupils (Bandura 1997; Vallerand et al. 1997; Deci et al. 1999; Schunk and Pajares 2005). Based on prior findings (Thøgersen-Ntoumani and Ntoumanis 2006; Sierens et al. 2009; Vansteenkiste et al. 2009; Jang et al. 2010; Soenens et al. 2012), the authors assumed that perceived autonomy, self-determined types of academic regulation, and self-efficacy contribute to subjective well-being. In addition to monitoring the individual development of learners, they also analysed

differences and transformations at class level in order to gain further insights concerning the impact of teaching styles on pupils' motivational development (Hattie 2009).

METHOD

Sample and Procedure

One hundred and forty-eight (148) pupils aged between six and nine years old in the pre-test ($M = 6.96$, $SD = .728$) and aged between six and 10 years old ($M = 7.90$, $SD = 1.04$) in the post-test from one primary school in Austria participated in this study called SE³W. Seventy-five pupils participated in the pre-test and the post-test sessions. Pupils answered questions concerning perceptions of autonomy, academic self-regulation, subjective well-being, and self-efficacy in both sessions. Due to the elementary school basic reading competencies of the students, test sessions were guided by trained interviewers.

Instruments

Self-determination. Students' self-determination was assessed by applying the 6-item scale adapted from the Learning Climate Questionnaire (Black and Deci 2000). Cronbach's α in the original 15-item instrument ranges between .93 and .96 (Black and Deci 2000; Williams and Deci 1996). Answers were provided on a 5-point Likert scale ranging from "not at all true" (1) to "very true" (5). Mean scores were calculated over all items to measure self-determination.

Academic self-regulation. Students' academic self-regulation was assessed using 12 items adapted from Müller, Hanfstingl, and Andreitz (2007) based on the Academic Self-regulation Questionnaire according to Ryan and Connell (1989). Cronbach's α ranges from .75 for extrinsic regulation to .92 for intrinsic regulation (Müller et al. 2007). Answers were given on a 5-point Likert scale ranging from "not at all

true" (1) to "very true" (5). The authors calculated mean representing the four different types of academic self-regulation: intrinsic regulation, identified regulation, introjected regulation, and external regulation (Müller et al. 2007).

Self-efficacy. Students' self-efficacy was assessed with a 6-item scale adapted from a 7-item instrument developed from Jerusalem and Satow (1999). Cronbach's α in the original 7-item instrument ranges between .70 and .73 (Jerusalem and Satow 1999). Answers were given on a 5-point Likert scale ranging from "not at all true" (1) to "very true" (5). Mean scores were calculated over all items to measure self-efficacy.

Well-being. Students' well-being was assessed with 3 items on a 5-point scale. Students were asked how they enjoy school, whether they feel well at school, and whether they often feel lonely at school (in the style of Eder 2007). Answers were given on a 5-point Likert scale ranging from "I don't enjoy school" (1) to "I enjoy school very much" (5) respectively from "not at all true" (1) to "very true" (5). Cronbach's α in the sample is .6. Mean scores were calculated over all items (item 3 was recoded) to measure well-being.

Analyses

As pupils were clustered in classes, the authors checked whether variables significantly differed between classes. The authors conducted a multivariate analysis of variance with class as fixed factor and differences between pre-test and post-test sessions as dependent variables. The authors did not find significant differences between groups in intrinsic regulation, in introjected regulation, and in well-being (all $F < 1.36$, $p > .05$) but they found significant differences between groups in self-determination ($F = 7.83$, $p = .000$), in identified regulation ($F = 3.61$, $p = .018$), in external regulation ($F = 2.96$, $p = .039$) and in self-efficacy ($F = 3.69$, $p = .017$). Thus, the authors conducted all analyses split for pupils

changing from first grade to second grade and for children changing from second grade to third grade and additionally controlled for gender-related effects.

The authors firstly analysed changes in self-determination, academic self-regulation, self-efficacy, and well-being calculating repeated measures ANOVAs. Secondly, the authors analysed correlations among self-determination, academic self-regulation, well-being, and self-efficacy. Thirdly, the authors conducted a path model to examine the impact of perceived self-determination, academic self-regulation, and school-related self-efficacy on subjective well-being.

RESULTS

Self-determination decreased significantly from first grade to second grade [$F(128) = 9.86, p = .004$], but not from second grade to third grade [$F(135) = .55, p = .816$].

With respect to academic self-regulation, the authors were able to identify a decrease in intrinsic regulation from first to second grade [$F(128) = 4.32, p = .047$] as well as for the children changing from second to third grade [$F(135) = 12.35, p = .001$]. The same phenomenon was observed in introjected regulation from first to second grade and from second to third grade [$F(128) = 5.19, p = .037$; $F(135) = 8.73, p = .006$]. For external regulation, scores decreased from second to third grade [$F(135) = 13.45, p = .001$]. Identified regulation did not change significantly. Well-being did not change between first and second grade [$F(128) = 2.04, p = .164$] but decreased between second grade and third grade [$F(135) = 10.71, p = .002$]. Self-efficacy decreased both from first to second grade [$F(128) = 6.99, p = .013$] and from second to third grade [$F(135) = 44.39, p = .000$].

Between classes, the authors found significant differences for self-determination, introjected regulation, intrinsic regulation, identified regulation, and self-efficacy [$t(27) > 2.27, p < .031$]. In order to

analyse possible gender differences, the authors included gender as a between subjects factor. The authors did not identify significant gender differences in self-determination [$F(1) < .895, p > .352$], intrinsic regulation [$F(1) = 2.15, p > .151$], introjected regulation [$F(1) = 2.71, p = .109$], identified regulation [$F(1) = 1.05, p > .314$], external regulation [$F(1) = 2.95, p > .095$], well-being [$F(1) < 2.82, p > .104$] and self-efficacy [$F(1) < .923, p > .345$].

Self-determination was significantly correlated to intrinsic regulation ($r = .400, p = .000$) and academic self-regulation strategies were correlated to each other: Intrinsic regulation was correlated significantly with introjected regulation ($r = .229, p = .039$) and identified regulation ($r = .264, p = .017$). Introjected regulation was significantly correlated with identified regulation ($r = .404, p = .000$) and external regulation ($r = .453, p = .000$). Identified regulation and external regulation were also significantly correlated ($r = .385, p = .000$). Well-being was correlated with intrinsic regulation ($r = .345, p = .002$), identified regulation ($r = .245, p = .026$), and self-efficacy ($r = .324, p = .003$) (cp. Table 1: Coefficients from pre-test session, the post-test results are comparable).

As can be seen in Figure 1, perceived self-determination had a weak but significant impact on subjective well-being in the post-test session ($\beta = .17, p < .05$) but not in the pre-test session. Academic self-regulation (a summary of self-regulation strategies defined by Müller et al. 2007) and school-related self-efficacy had a significant impact on subjective well-being in pre-test and post-test sessions ($\beta > .23, p < .05$).

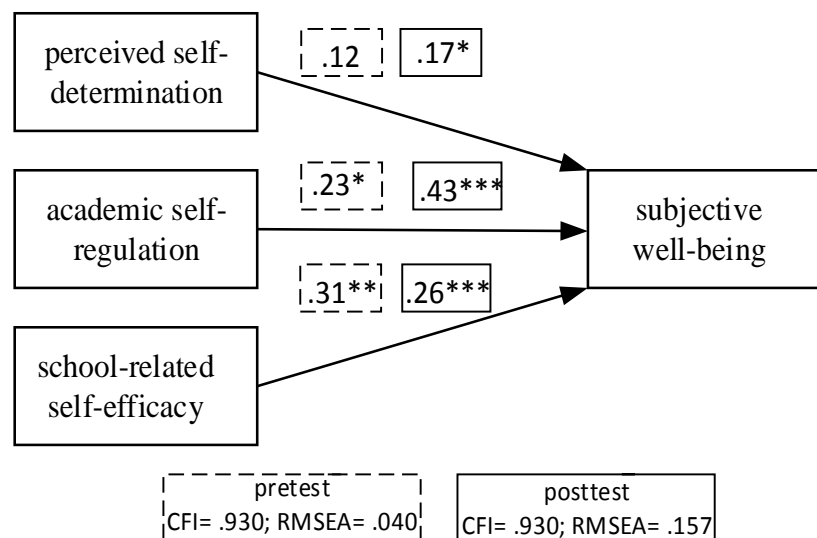
DISCUSSIONS

The study demonstrates that intervention programmes in primary schools can contribute to fostering teachers' autonomy support and to improving pupils' well-being in schools by considering motivational aspects, like their academic self-regulation and self-efficacy.

Table 1. Correlations Between Variables in the Pre-test Session

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Self-determination (1)	1	.400**	.223*	.137	.004	.077	.184
Intrinsic reg. (2)	.400**	1	.229*	.264*	-.067	.092	.345**
Introjected reg. (3)	.223*	.229*	1	.404**	.453**	-.056	-.078
Identified reg. (4)	.137	.264*	.404**	1	.385**	.169	.245*
External reg. (5)	.004	-.067	.453**	.385**	1	.007	-.059
Self-efficacy (6)	.077	.092	-.056	.169	.007	1	.324**
Well-being (7)	.184	.345**	-.078	.245*	-.059	.324**	1

Notes: ** correlation significant with $p < .01$; * correlation significant with $p > .05$.

**Figure 1.** The Impact of Self-determination, Self-regulation, and Self-efficacy on Well-Being.

Especially in times when comparative assessments and achievement-related pressure have a serious impact on teaching and learning in schools (Ryan and Weinstein 2009), it seems essential to dedicate research to aspects like motivation and well-being as well.

The data reflect that the intervention could not stop a decrease in perceived self-determination from first grade to second grade in primary school whereas autonomy support remained stable in the other classes. An autonomy supportive teaching style avoids controlling strategies and is built around the inner motivational resources of the pupils (Reeve 2009). Learners experience autonomy in school, if they can

pursue their interests and act in line with their intrinsic motivation. It is possible to foster self-determined forms of extrinsic motivation, although the impulse to act derives from another person—e.g., an authority as the teacher (Deci and Ryan 2012). When designing autonomy supportive contexts in schools, it is important to avoid excessive external control and pressure (Reeve, Deci, and Ryan 2004; Bartholomew et al. 2011; Reeve and Assor 2011). Although the main aim of the intervention was to help teachers to create opportunities for self-determined learning, some pupils reported that they perceived less autonomy support. One reason might be that these teachers felt under pressure by the intervention itself,

an assumption that is stressed by research documenting that perceived pressure increases controlling teacher behaviour (Pelletier, Séguin-Lévesque, and Legault 2002; Pelletier and Sharp 2009). The authors' programme included daily learning sessions outside the class context organised by the school team. It is possible that especially the educators of school beginners, who might yet not be able to trust in the learning abilities of their pupils, experienced a "loss of control" because they felt responsible for the progress of their pupils but had little influence on the actual work of their pupils during these autonomous learning phases. Teachers act in controlling ways, if they coerce their pupils to act, think, and feel in a desired way without acknowledging their individual perspective (Deci and Ryan 2012). Sanctions and gratifications as well as predetermined goals and rigid procedures are often perceived as controlling (Assor et al. 2005), but even without relying on these obviously pressure-inducing methods, teachers can use a certain style of communication and interaction with their pupils to coerce them into compliance (Reeve 2009; Reeve 2011). Concerning the authors' study, they specifically picked up the worries of these teachers in relation to the progress of their pupils to assist them in building self-determined settings.

According to the results, perceived autonomy did correlate with academic intrinsic regulation but against the intention, the intervention did not completely stop the decrease of intrinsic regulation and self-efficacy. Considering that the school beginners' intrinsic motivation in the sample is rather high, it seems feasible that maintaining this level can be difficult but further research is required to find out, if and to what extent a reduction of intrinsic academic motivation is inevitable (cf. Dresel et al. 2010). A positive result of the study was that identified regulation remained stable across the first years in primary school. Integrated types of motivation, like identified regulation, are only possible, if students

have access to their motives, emotions, and meanings underpinning these actions, and therefore integrated regulation requires awareness, autonomy, and non-defensive processing (Weinstein, Przybylski, and Ryan 2013). Supporting pupils in this respect was one of the main aims of the intervention (Reeve et al. 2004). The reassuring conclusion for educators is that they can support their pupils' self-regulation and self-determination even when the focal activity is not interesting and by fostering their students' autonomy and motivation, teachers actively contribute to the well-being of their learners.

LIMITATIONS AND FUTURE RESEARCH

The present research requires the consideration of certain limits. The longitudinal design only focused on the development within two years in primary school and future studies are needed to document the trend throughout the time in primary school and to analyse the development of perceived autonomy, academic self-regulation, self-efficacy, and subjective well-being in transition phases as well. Moreover, the selectivity of the sample and the fact that the results relied on self-report measures of very young pupils, need to be considered, when interpreting the results. Future research integrating the perspective of teachers and using objective measures, like observers' reports, are essential to further analyse the impact of self-determination in schools (Ryan and Deci 2002).

CONCLUSIONS

The study demonstrates that perceived autonomy, academic self-regulation, and self-efficacy have an impact on school-related well-being right from the beginning of primary school, and therefore it seems important to dedicate further research to developing successful intervention programmes for teachers to foster these aspects and to make schools an even more pleasant experience for learners right from the start.

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