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Beliefs of Czech teachers as a prerequisite for effective teaching

BELIEFS OF CZECH TEACHERS AS A PREREQUISITE FOR EFFECTIVE TEACHING[1]

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Abstract

Educational effectiveness research has shown a relationship between teacher beliefs and attitudes and student outcomes. This paper studies the extent to which the academic optimism of Czech teachers has proved to be meaningful in explaining student outcomes, and how different components of academic optimism relate to the cognitive and non-cognitive outcomes of Czech primary school students. Academic optimism is studied with reference to the TIMSS 2011 data using multilevel modelling. The results show that Czech teachers demonstrate relatively low levels of academic optimism. Multilevel modelling showed that in the Czech Republic, cognitive outcomes are related to teachers' career contentment, and non-cognitive outcomes are related to trust and self-efficacy. The operationalization of academic optimism in TIMSS is discussed, along with the implications of the findings that are presented for education policy.

Keywords

Czech Republic, teachers, academic optimism, TIMSS 2011

Introduction

Educational effectiveness research has proved the importance of teacher beliefs and attitudes for student learning. Beliefs strongly determine teacher thoughts and actions. A change of beliefs is a necessary prerequisite for changing practices and behaviors (e.g. Reynolds et al., 2015; Woolfolk Hoy, Hoy, & Kurz, 2008).

Teacher beliefs and attitudes were confirmed as the key factors in educational effectiveness with respect to disadvantaged students. Only some disadvantaged students are resilient – they are able to develop well even under conditions of hardship and manifest competence to succeed in the context of significant challenges to adaptation or development (Masten & Coatsworth, 1998). Since researchers noticed this phenomenon, they have been trying to find out what makes children resilient and enables them to overcome adversity. According to Benard (2004), the strategies for developing resilience in young people include the quality of the environment, the presence of caring relationships, high expectations, participation, and meaningful contributions within the child's environment. Apparently, only teachers who believe that those factors really matter can demonstrate them in their daily routines through their relationships with students in school.

A large multidisciplinary body of research has clearly established that student-teacher relationships are strongly associated with important academic and social development outcomes (Nicoll, 2014). Benard (2004) emphasized that "one of the most important and consistent findings in resilience research is the power of schools, especially of teachers, to turn a child's life from risk to resilience." A teacher's interpersonal relationship styles, supportiveness, and mindset with regard to student abilities to succeed are found to be predictive of student engagement in school, learning motivation, and academic achievement, as well as positive social development.

Beliefs that influence teachers' relationships with students can be conceptualized in many ways. We chose the concept of academic optimism, which seems to be meaningful in explaining teachers' attitudes towards disadvantaged students. The topic is highly relevant, among other reasons because the Czech Republic is not able to provide good-quality education for its Roma minority (e.g. *Must Try Harder*, 2015). We believe that one of the important reasons for this failure is teacher beliefs related to student motivation, learning capabilities, and trustfulness. The aim of the paper is to introduce research evidence on the academic optimism of Czech teachers and on the relationship between teacher beliefs and student outcomes that could serve as a basis for education policy measures in this area.

Academic optimism

Academic optimism emphasizes the potential of schools to overcome the power of socioeconomic factors that impair student achievement. Academic optimism focuses on potential, rather than on pathology, which emphasizes weakness and helplessness (Hoy, Tarter, & Woolfolk Hoy, 2006). This optimism has proved to have a positive impact on student outcomes. The concept of academic optimism stems from positive psychology (Pajares, 2001) and consists of teachers' sense of efficacy, trust, and academic emphasis. It encompasses teacher beliefs about themselves, their students, and their instruction. Academic optimism is a latent construct comprised of three closely related concepts: teachers' sense of efficacy, teachers' trust in students and parents, and teachers' focus on creating a positive and challenging academic environment for their students (e.g. Hoy, Tarter, & Woolfolk Hoy, 2006; McGuigan & Hoy, 2006; Woolfolk Hoy, Hoy, & Kurz, 2008).

A teacher's sense of efficacy is regarded as a cognitive characteristic and is defined as the teacher's evaluation of "his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Woolfolk Hoy, Hoy, & Kurz, 2008). It includes not only a sense of one's own capabilities, demonstrating that a person has mastered the teaching profession, but also trust in school education as a powerful institution that can make an important difference to student lives. If teachers believe that they are able to affect student learning they set higher expectations, exert greater effort, and persist in the face of difficulties.

The second component is regarded as an affective response and demonstrates that effective teachers must also be able to form trusting relationships with their students and parents. A trusting relationship includes feelings of benevolence, reliability, competence, honesty, and openness. In general, teachers must trust that their students possess an openness to learning, the ability to grasp concepts, and honesty. They must also believe in cooperation with students' parents. Like the teachers' sense of efficacy, teachers set higher expectations for students they trust and rely on the students' parents for support (Woolfolk Hoy, Hoy, & Kurz, 2008).

Academic emphasis refers to teacher beliefs about academic success and their focus on academic tasks. It includes setting high (achievable) goals and insisting on conscientious work.

All the elements of academic optimism described above are in a relationship with each other and interact to create an individual sense of academic optimism in a classroom. Teacher trust in parents and students encourages a sense of teacher efficacy, and a sense of teacher efficacy reinforces and

enhances the trust. When the teacher trusts the parents, the teacher can set high academic standards with confidence that they will not be undermined by the parents, and high academic standards in turn reinforce the teacher's trust. Finally, a teacher's belief that the teacher can positively affect student achievement emphasizes academic achievement, and academic emphasis in turn reinforces the sense of the teacher's efficacy (Hoy, Tarter, & Woolfolk Hoy, 2006).

Teachers' academic optimism has repeatedly been measured at the school level as a collective characteristic of the school staff (e.g. Hoy, Tarter, & Woolfolk Hoy, 2006; McGuigan & Hoy, 2006) and also at the individual level as a characteristic of individual teachers (Woolfolk Hoy, Hoy, & Kurz, 2008). A modified index of academic optimism was used in the TIMSS 2011 survey under the heading *school emphasis on academic success (SEAS)*. The positive impact of SEAS on student achievement has been proven in various studies (e.g. Martin et al., 2013; Nilsen & Gustafsson, 2014).

To understand the fundamentals of academic optimism, we can also study the teachers' mindsets. The term *mindset* refers to a set of cognitive assumptions held by an individual or group of people. Such assumptions are so firmly established and embedded that they create a predisposing bias to adopt or accept only what is consistent with prior behaviors, methods, beliefs, and techniques when seeking to achieve goals or solve problems. A teacher's mindset refers to the unquestioned assumptions that teacher holds with regard to the teaching process, the role of a teacher, student learning, and what criteria constitute quality education and effective school practice. As noted by Benard (2004), shifting the life trajectories of young people to resilience and success begins with changing the beliefs and behaviors of the significant entourage of adults surrounding the lives of children and adolescents, i.e. changing the mindsets of parents and teachers.

Dweck (2000) differentiates between two primary types of mindsets, a *fixed mindset* and a *growth mindset*. A *fixed mindset* adheres to the notion that qualities such as intelligence, talents, motivation, and so forth are determined by and contained within the individual child. Students who perform well in class are assumed to be smart or gifted. Students of such teachers are found to become consumed with the goal of proving themselves to be smart as their route to being accepted and valued. However, if instant success appears doubtful, such students will tend to protect their self-concept by avoiding being exposed as a failure and thereby devalued, which means that they tend to avoid challenges.

The same attitudes could be observed in teachers. *Fixed mindset-oriented* educators are found to be primarily concerned with protecting their professional self-esteem, i.e. as an innately good teacher. Consequently, such educators will tend to neither acknowledge nor correct deficiencies or failures when problems arise. Rather, the fixed-mindset educator will become defensive when criticism or problems in school performance or student progress are raised. They will seek to protect the status quo by blaming the problematic student(s) or their families.

The *growth mindset* educator, on the other hand, starts with the assumption that basic qualities such as intelligence, talent, motivation, and creativity are things that can be cultivated and developed through effort. Though we may all differ in our initial talents, aptitudes, interests, or personal temperaments, we can all change, grow, and develop further through effort, training, and experience within supportive, optimistic environments. Our limitations are not known; thus we must constantly strive toward further growth and improvement.

Findings on academic optimism and the teacher mindsets of Czech teachers

Academic optimism and the teacher mindsets of Czech teachers have not yet been directly studied. Unique information about the beliefs of Czech ISCED 2 teachers was provided by OECD TALIS (*Talis 2013 Results*, 2014; *Talis 2013 Technical Report*, 2014).

The TALIS teacher questionnaire included a battery on teacher self-efficacy. The self-efficacy scale was defined from three subscales: efficacy in classroom management (SECLSS), efficacy in instruction (SEINSS), and efficacy in student engagement (SEENGS). All the items in the scales were measured on a four-point scale. The response categories were 1 for "not at all", 2 for "to some extent", 3 for "quite a bit", and 4 for "a lot". The indices were constructed by confirmatory factor analysis.

Table 1 shows the statements related to individual scales and the frequencies of Czech teachers that gave the answers *a lot* and *quite a bit*. International averages are also given to show the self-efficacy of Czech teachers in an international context. The table also gives the reliabilities of the Czech scales. The parameters of the scales show that the scales function well in the Czech Republic.

Table 1

Self-efficacy of Czech teachers in international comparison (TALIS 2012)

Self-efficacy scales		CR		int. average	
	Item wording	%	%SE	%	%SE
Efficacy in classroom management	Control disruptive behavior in the classroom	77.1	0.9	87.0	0.1
(reliability CR 0.832)	Make my expectations about student behavior clear	71.9	0.9	91.3	0.1
	Get students to follow classroom rules	76.4	1.0	89.4	0.1
	Calm a student who is disruptive or noisy	77.1	1.0	84.8	0.1
Efficacy in instruction	Craft good questions for my students	70.9	1.0	87.4	0.1
(reliability CR 0.721)	Use a variety of assessment strategies	72.0	1.1	81.9	0.2
	Provide an alternative explanation for example when students are confused	85.2	0.8	92.0	0.1
	Implement alternative instructional strategies in my classroom	52.2	1.1	77.4	0.2
Efficacy in student engagement	Get students to believe they can do well in school work	50.5	0.9	85.8	0.1
(reliability CR 0.766)	Help my students value learning	39.0	1.0	80.7	0.2
	Motivate students who show low interest in school work	30.0	1.0	70.0	0.2
	Help students think critically	51.8	1.2	80.3	0.2

CR stands for Czech Republic

Table 1 shows that the self-efficacy of Czech teachers is significantly below the international average on all three scales; the most distinctive differences are in the engagement scale.

The teachers participating in TALIS were selected from two lower secondary tracks: basic school and the long academic track, the latter being attended by motivated students from families with high socio-economic status. There were no significant differences between the sense of efficacy of the teachers in both tracks. This contradicts the findings of Woolfolk Hoy, Hoy and Kurz (2008), who showed that academic optimism was correlated with class composition. However, the self-efficacy scale is only a part of the academic optimism construct and therefore it gives only partial information.

The TALIS results revealed a remarkably great difference between the beliefs of Czech teachers and teachers in other countries and thus raised the need to confirm its findings by other studies. Data from TIMSS 2011 offer this opportunity.[2] The TIMSS 2011 analyses of educational effectiveness (Martin et al., 2013) use the above-mentioned construct called *school emphasis on academic success* (SEAS), which stems from academic optimism, but its

operationalization is somewhat different. The Czech Republic exhibits one of the lowest values of this index both in fourth-grade teachers and primary school principals among the participating countries[3] (Martin et al., 2013). At the same time, this index does not explain the variations among schools in student achievement in the Czech Republic, although in most of the other participating countries it does (Martin et al., 2013; Reynolds et al., 2015).

Research questions, data, and methods

The TIMSS 2011 analyses showed that the SEAS index did not work in the Czech Republic. The TIMSS 2011 teacher questionnaires, however, included many variables related to teacher beliefs that were not used in SEAS. We tried to operationalize academic optimism on the basis of other TIMSS 2011 variables and find: a) *how the answers of the Czech teachers differ from the answers of teachers in other countries*, and b) *whether the defined components of academic optimism explain differences in student outcomes*. The analysis was carried out on the Czech fourth grade mathematics data. The data file contained data on 4578 students from 236 classes from 177 schools.

The following constructs were used as indices of academic optimism: *self-efficacy*, *career contentment,[4] trust*, and *academic pressure*. The first three indices were constructed by means of confirmatory factor analysis. Below, the main characteristics of the constructs are listed. The exact wording of the individual questions is given in the following section; the descriptive statistics are given in the appendix.

Self-efficacy (SELF_EFFiCACY) characterizes the teacher's evaluation of his/her capabilities to accomplish five different tasks in mathematics classes. Cronbach's Alpha of the scale was 0.74; the first factor explained 49.6% of the total variance.

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[2]   In the Czech Republic, compulsory education is provided by basic schools, which consist of primary and lower secondary education levels. Although most of the teachers (approximately 60%) teach either at the primary or at the secondary level, they are members of the same staff and have the same principal. It is thus possible to compare the data from both studies.

[3]   In the TIMSS survey, questionnaires were administered to fourth grade teachers of mathematics and science and to school principals. Both the teacher and principal questionnaires contained the same set of questions, which constituted the SEAS index.

[4]   *Career contentment* was used to complement the self-efficacy component as the self-efficacy scale available in TIMSS 2011 was too narrowly focused on mathematics education. The *career contentment* index shows both the teacher's satisfaction with his/her job and the perception of the importance of the teacher's role in general.

Career contentment (CAREER_CONT) characterizes the belief in school education, including satisfaction with having an opportunity to work as a teacher in the particular school. It consists of four variables. Cronbach's Alpha of the scale was 0.72; the first factor explained 54.8% of the total variance.

Trust (TRUST) characterizes the teacher's evaluation of the level of parental cooperation with the school, and student motivation in the particular school. It consisted of four variables. Cronbach's Alpha of the scale was 0.74; the first factor explained 56.9% of the total variance.

Academic pressure (ACAD_PRESS) characterizes the teacher's evaluation of the requirements imposed by teachers on students on a five-point scale (high – very low).[5]

Finally, the aggregate index of academic optimism was constructed from all four components by a confirmatory factor analysis. Cronbach's Alpha of the aggregated scale was 0.575; the first factor explained 45.5% of the total variance.

The indices described above were related to three student outcomes: *achievement in mathematics* (characterized by five plausible values), *student motivation for learning mathematics*[6] (Cronbach's Alpha 0.78; the first factor explained 60.8% of the total variance), and *the student's liking for school*[7] (Cronbach's Alpha 0.61; the first factor explained 56.7% of the total variance).

Student outcomes were explained by two level models (student and class levels). The models were computed in HLM 6.02. The software allows for correct handling of student weights and plausible values and takes into consideration the fact that the sample was drawn by two-stage sampling.[8] At the student level, only student socio-economic status (*ses*) was included in all the models. It was constructed by a confirmatory factor analysis from the following variables gained from a parental questionnaire: number of books at

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[5]   The expectations were translated into the Czech language as requirements.

[6]   How much do you agree with these statements about learning mathematics? (agree a lot, agree a little, disagree a lot, disagree a little): a) I enjoy learning mathematics; b) I learn many interesting things in mathematics; c) I like mathematics; d) It is important to do well in mathematics.

[7]   What do you think about your school? Tell how much you agree with these statements (agree a lot, agree a little, disagree a lot, disagree a little): a) I like being in school; b) I feel safe when I am at school; c) I feel as if I belong at this school.

[8]   The TIMSS respondents were sampled by two-stage sampling in the Czech Republic. In the first stage, schools were selected proportionally to size (number of students in the fourth grade) from the database of all primary schools with fourth-grade students. In the second stage, one or two classes were randomly selected from all the fourth-grade classes in each school that was sampled. In the classes that were selected, all the students were tested.

home, father's education, mother's education, and highest parental occupation (the first factor explained 60.9% of the variance).[9] Socio-economic status was also included at the class level, together with the indices characterizing academic optimism, as a characteristic of the composition of students in the class (*SES*).

Results

Components of academic optimism and their relation to student outcomes – findings from TIMSS 2011

Table 2
Beliefs of Czech teachers in international comparison (TIMSS 2011)

Academic optimism indices	Wording	CR	int. average
Self-efficacy	In teaching mathematics to this class, how confident do you feel about the following? (very confident, somewhat confident; not confident)	very confident %	very confident %
	Answer student questions about mathematics	74.1	83.8
	Show students a variety of problem solving strategies	71.1	75.4
	Provide challenging tasks for capable students	52.4	59.3
	Adapt my teaching to engage student interest	41.7	65.3
	Help students appreciate the value of learning mathematics	58.2	69.3
Collective efficacy	How much do you agree with the following statements? (Agree a lot, agree a little, disagree a lot, disagree a little)	agree a lot %	agree a lot %
	I am content with my profession as a teacher	48.0	69.2
	I am satisfied with being a teacher at this school	74.1	65.9
	I do important work as a teacher	72.2	86.5
	I plan to continue as a teacher for as long as I can	48.5	62.2
Trust	How would you characterize each of the following within your school? (Very high, high, medium, low, very low)	very high/ high %	very high/ high %
	Parental support for student achievement	1.3/26.1	6.1/27.7
	Parental involvement in school activities	1.7/12.0	6.3/25.9
	Student regard for school property	1.5/18.4	8.5/37.3
	Student desire to do well in school	0.7/24.7	11.4/44.7
Academic pressure	Teacher requirements for student achievement	6.5/50.5	15.4/54.2

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9   *Socio-economic status* included 12.8% of missing cases.

Table 2 shows that the answers of the Czech teachers were below the international average in all cases, with the exception of satisfaction with *being a teacher in this particular school*. Considerable differences (more than 20%) were identified with respect to being able to adapt teaching to engage student interest, being content with the teaching profession, and trust in student regard for school property and student desire to do well in school.

As in the case of TALIS, in TIMSS there was also no correlation between teacher beliefs and the socio-economic composition of the student body. The only exception was TRUST, which correlated significantly with *SES* at the class level (Pearson's correlation coefficient 0.29). This may, however, be caused by the wording of the question. The TIMSS teacher questionnaire did not ask for the teacher's own beliefs but for their evaluation of the situation within their school. This automatically encompasses the characteristics of the student body.

Tables 3 to 5 show the coefficients of multilevel models that estimate the impact of components of teachers' academic optimism on student outcomes: mathematical achievement, motivation for learning mathematics, and liking for school.[10] Null models showed that with respect to mathematical achievement, 15% of the differences between students lay between schools, while in the case of motivation for learning mathematics it was 5.2% and for liking for school 11.2%.

At the student level, the only explanatory variable is *socio-economic status*. At the class level, the *aggregated socio-economic status* was included as the indicator of class composition, and then all four components of academic success: *self-efficacy*, *career contentment*, *trust*, and *academic pressure*. The second model included the *aggregated index of academic optimism* instead of the four components. For each model, the variation explained at the class level is included.

Table 3 shows that with respect to mathematical achievement, the strongest predictors are class composition and the socio-economic status of the student. *Career contentment*, the notion of the importance of the teaching profession and satisfaction with the particular school, also proved to be a significant predictor of mathematical achievement. The aggregated index of academic optimism does not work as a predictor of mathematical achievement.

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[10]   When the indices were being constructed, the questions were recoded in such a way that higher values correspond to more positive beliefs.

Table 3

Two-level model explaining mathematical achievement

	coeff	s.e.	p-value	coeff	s.e.	p-value
intercept	528.8	13.28	0.000	520.7	2.02	0.000
ses	19.8	1.97	0.000	19.8	2.00	0.000
SES	27.0	4.47	0.000	26.2	4.69	0.000
SELF_EFFiCACY	1.0	2.10	0.634			
CAREER_CONT	5.8	2.45	0.019			
TRUST	−2.4	2.38	0.315			
ACAD_PRESS	−2.2	3.60	0.539			
ACAD_OPTIMISM				2.1	2.20	0.337
explained variance at the class level (%)			64.0			60.3

Table 4 shows that motivation for learning mathematics could be explained only by teacher self-efficacy. All the other variables proved to be insignificant. The aggregated index of academic optimism appears to be a significant predictor of motivation.

Table 4

Two-level model explaining motivation for learning mathematics

	coeff	s.e.	p-value	coeff	s.e.	p-value
intercept	1.10	0.190	0.584	0.03	0.030	0.278
ses	−0.02	0.027	0.414	−0.02	0.028	0.414
SES	−0.00	0.075	0.956	0.01	0.073	0.949
SELF_EFFiCACY	0.05	0.026	0.046			
CAREER_CONT	0.04	0.034	0.222			
TRUST	0.04	0.032	0.193			
ACAD_PRESS	-0.02	0.050	0.693			
ACAD_OPTIMISM				0.066	0.027	0.017
explained variance at the class level (%)			5.2			4.5

According to the model shown in Table 5, student liking for school could be explained by trust and teacher self-efficacy. In this case too, the aggregated index serves as a significant predictor.

Table 5
Two-level model explaining liking for school

	coeff	s.e.	p-value	coeff	s.e.	p-value
intercept	1.14	0.255	0.581	0.01	0.036	0.775
ses	0.05	0.027	0.068	0.05	0.027	0.068
SES	−0.06	0.091	0.548	−0.01	0.088	0.890
SELF_EFFiCACY	0.08	0.038	0.049			
CAREER_CONT	0.01	0.034	0.734			
TRUST	0.13	0.039	0.001			
ACAD_PRESS	−0.04	0.069	0.584			
ACAD_OPTIMISM				0.114	0.032	0.001
explained variance at the class level (%)		15.7				9.5

The results presented above confirm the TALIS findings concerning big differences between the beliefs of the teachers in Czech compulsory education and their colleagues from other countries. Czech teachers trust their students or their abilities to motivate them to learn to a lesser extent than their foreign colleagues. The findings from TIMSS also confirmed that teachers' sense of efficacy in the Czech Republic does not relate to the composition of the student body. It means that teachers do not believe in their capabilities to teach students, no matter which students they have. Although the trust indicator was correlated with the socio-economic status, the wording of the questions does not allow the conclusion to be drawn that teachers trust more students from high-*ses* families. The components of academic optimism proved to have potential to explain at least partially the differences in student outcomes in different classes.

The results also show that all the components constitute one index of academic optimism. This index, however, does not work as a predictor of mathematical achievement. However, it proved to be a significant predictor of non-cognitive outcomes.

Discussion and conclusions

The TIMSS 2011 data confirmed the findings from TALIS showing that teacher self-efficacy is relatively low, as is trust in students and parents, and this is especially true with regard to high expectations and support for student motivation. We may explain the difference with the fact that Czech teachers have traditionally felt great responsibility for instruction – their primary task was the transfer of knowledge. Motivation and support have, however,

been regarded rather as a family responsibility. We argue that the low scores of Czech teachers on the self-efficacy items mirror the fact that they do not believe that it is their task to convey high expectations, give hope to the children who struggle, or motivate all students to learn.

Another important finding is that teacher self-efficacy does not exhibit systematic differences between schools educating students with different socio-economic status. As the schools differ significantly with respect to their student intake, this indicates that teacher beliefs and the attitudes that were demonstrated are not influenced by the students taught but that they are rather universal characteristics of the Czech teaching body.

The findings presented in this paper indicate that Czech teachers tend to exhibit a fixed mindset rather than a growth mindset. This could also be documented by the data from the teacher survey in 2011 (Strakova et al., 2014), where the most frequent answers (given by more than 50% of the teachers) to the question *What should change in Czech education* dealt with external conditions: the role of the teacher (= the teaching profession should have higher prestige) and the relationships between schools and families (= the parents should respect the teachers more). Only 17% of the teachers mentioned the need to improve the relationships between students and teachers.

The notion that Czech teachers have a fixed mindset is also supported by the data on professional development from the TALIS study. It shows that although Czech teachers perceive their capacities to teach and motivate students with special educational needs as being very low, they do not feel a need for improvement. The TALIS survey showed that Czech teachers' participation in professional development activities aimed at providing a supportive environment is significantly lower than the TALIS average – for instance, only 23.8% reported having participated in professional development aimed at teaching students with special needs (the TALIS average was 31.7%), and even more varied results were obtained for individualized approaches to learning – 23.2% vs. 40.7% (Kašparová et al., 2015; *Talis 2013 Results*, 2014).

Moreover, teachers' perceived need for professional development in those areas is also relatively low. Teaching students with special needs was the most desirable area of professional development internationally, while in the Czech Republic it was only considered the fifth most desirable area (8%) – teachers showed more interest in education in ICT skills for teaching (14.8%), student behavior and classroom management (13.6%), new technologies in the workplace (10.2%), and knowledge and understanding of the subject field (8.5%). Czech teachers' perceived needs for professional development in areas related to supporting students are less than half of the international average (Kašparová et al., 2015; *Talis 2013 Results*, 2014).

Teacher participation in professional development activities and their need to participate in such activities may be noticeably lower than in other participating countries for two reasons: Czech teachers may feel that they have sufficient professional skills, or these areas of professional competency are not seen as an essential and expected part of their professional portfolio. We argue that the first option is not the case because of teachers' low self-efficacy in supporting student engagement.

The low level of willingness to participate in activities aimed at supporting students is a consequence of the lack of a declaration of public interest in education that would require not only teaching, but also creating a caring environment and setting high expectations for every child. Such an environment is very important because perceived caring on the part of teachers predicts motivational outcomes, even when students' current levels of psychological distress and beliefs about personal control, as well as previous motivation and performance, are taken into account (Wentzel, 1997). Teacher expectations are vital for student learning and teacher beliefs may lead to variation in the instructional and socio-emotional climate of the classroom (Rubbie-Davies, 2010).

The fixed mindset of Czech teachers was also indicated by previous studies that dealt with teacher attitudes towards tracking. A survey carried out in 2009 on a representative sample of Czech teachers showed that 80% of the teachers supported the existence of practical basic schools and also "schools for talented children".[11] In 2011, the majority of teachers agreed that *assigning students to different schools or classrooms according to their abilities is a necessary precondition for their effective education* and that *education in practical schools provides students with better care; it is impossible for a teacher to give them proper care in normal classrooms and their educational achievement would be worse* (Straková et al., 2014). Dvořák, Urbánek and Starý (2014) showed a low level of willingness of schools to provide low-performing students with systematic support because they do not believe that such activities are worthwhile: students cannot overcome their disadvantages. Some indication about the expectations of Czech teachers was also provided by the high degree of agreement (one of the highest among the participating countries) of Czech teachers with the statement that some students *have a talent for mathematics/science and others do not* (Martin et al., 2000; Mullis et al., 2000). At the same time, the TIMSS 2011 data showed that the Czech teachers do not believe in their students.

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[11]   In the Czech system of public education there are many schools or classes for talented children, schools with extended curricula of foreign languages or other subjects, and bilingual Czech-English classes. At the age of 11, children can apply for a long academic track leading directly to tertiary education.

Foreign studies show that teacher perceptions of students' hard work and potential to succeed are often not distributed evenly between language-minority students. In the U.S., immigrant language-minority students are perceived as hard workers, while language-minority students born in the U.S. are more likely to be perceived negatively (Blanchard & Muller, 2015). An uneven distribution of beliefs was also confirmed in the Czech Republic, with 60% of teachers teaching Roma children and 25% of teachers teaching immigrant children believing that they should be educated separately, because it is advantageous for them as well as for the majority children, and that they cannot achieve better results (Jarkovská et al., 2015). Although the correlation between trust and socio-economic status may indicate a similar trend, this finding could not be fully confirmed by the TIMSS data because of the wording of the questions related to trust.

The research showed that teachers could be very important agents in changing the life prospects of disadvantaged children. To do so, they need to possess a growth mindset that allows them to search for strengths and talents in each individual child and nurture them systematically. However, Czech teachers' attitudes show more of a fixed mindset than a growth mindset. They were not tasked by policymakers with setting high expectations for every student and creating a caring and supportive environment. Czech teachers are supposed to teach much more than care and they believe that students should be educated in groups according to their abilities, which are prevalently stable. Changing their mindset is a big challenge which is an essential condition for all students achieving better.

To propose policy measures in this area (e.g. a change in the enrolment procedure for faculties of education, or a new curriculum for teacher candidates), a better understanding of teacher beliefs and their impact on the Czech education system is needed. We should especially learn more about the relationship between teacher beliefs and the educational outcomes of their students in general, and between beliefs and the educational outcomes of students coming from different socio-economic backgrounds in particular. Analyses of the TIMSS 2011 data indicated that this direction could be fruitful, as some of the components of academic optimism operationalized using variables from the TIMSS 2011 questionnaire related to student outcomes. Their relation to cognitive outcomes was, however, rather weak.

The operationalization of academic optimism based on the TIMSS 2011 data has several weaknesses. The questionnaire does not ask teachers directly whether they trust students and parents; the questions concern their opinion of the school as a whole. It also does not contain questions about expectations, and the variables concerning pressure to succeed academically are insufficient. As a cross-sectional study, TIMSS does not allow causal

inferences to be drawn. The best source of relevant information in the field would be a longitudinal study that would allow cognitive and non-cognitive student outcomes to be related to carefully operationalized teacher beliefs.

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Appendix

Table A1.
Class variables

variable	N	mean	SD	Description
SELF_EFFiCACY	267	− 0.0018	1.0046	teacher's evaluation of his/her abilities to accomplish five different tasks in mathematics classes
CAREER_CONT	275	− 0.0044	0.9010	belief in school education, including satisfaction with having an opportunity to work as a teacher in the particular school
TRUST	282	− 0.0001	0.9180	teacher's evaluation of the level of parental cooperation with the school, and student motivation in the particular school
ACAD_PRESS	281	3.6655	0.5608	teacher's evaluation of the requirements imposed by teachers on students
SES	271	− 0.0741	0.5376	aggregated socio-economic status of students in the particular class

Table A2.
Student variables

variable	N	mean	SD	Description
motivation	4471	0.000	1.0000	student motivation for learning mathematics
liking	4422	0.0000	1.0000	student's liking for school
Ses	3993	0.0000	1.0000	socio-economic status
asmmat01	4578	514.8005	70.4372	1st plausible value mathematics
asmmat02	4578	515.3556	69.6132	2nd plausible value mathematics
asmmat03	4578	515.4251	69.6001	3rd plausible value mathematics
asmmat04	4578	514.9547	70.0630	4th plausible value mathematics
asmmat05	4578	514.7762	70.4008	5th plausible value mathematics

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