Longitudinal study of individual, environmental and contextual factors predicting adaptation to the transition to lower secondary education

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Abstract

Transitions into higher educational levels are normative life events that challenge students' academic and socio-emotional development. This longitudinal study aims to examine outcomes of and determinants of students' adaptation to the transition from classroom (4th grade) to subject teaching (5th grade). The outcomes of adaptation were assessed by changes in students' GPA and learning self-efficacy from 4th to 5th grade as well as by the self-perceived adaptation. In addition, a number of individual, environmental and contextual determinants of the three adaptation outcomes were examined. Participants were 860 students aged 10-11 years from Zagreb, Croatia. They participated in data collection at the end of 4th grade, at the mid-term of 5th grade and at the end of 5th grade. The results showed that students' GPA and learning self-efficacy declined following transition, although they generally perceived their academic adaptation as successful. Several individual, environmental and contextual variables explained academic adaptation to transition operationalized as self-perceived adaptation, learning self-efficacy and GPA in 5th grade. The stage-environment fit model of educational transition was supported even when transition takes place within the same school building and class.

Key words: school transition, adaptation, longitudinal study

1. Introduction

Transitions into formal schooling and, further on, into higher educational levels are major life changes for both students and their families, deserving considerable attention from educational research, policy and practice. These shifts represent challenges related to both academic outcomes and socio-emotional development. A significant body of research across different educational contexts, predominantly from UK and US, addressed the issues of adaptation to school transitions (Symonds & Galton, 2014). International evidence suggests that school transitions are related to various children's concerns and expectations as well as to a variety of psychological outcomes, from the fulfillment of developmental needs to changes in school-related perceptions and mental health across transition (Anderson, Jacobs, Schramm, & Splittgerber, 2000; Symonds & Galton, 2014). This paper aims to examine outcomes of transition from primary to lower secondary school in a single-structure elementary school system as reflected in subjective experience of adaptation, post-transition self-efficacy and school achievement. In addition, the study aims to identify a number of individual, environmental and contextual determinants of students' adaptation following transition.

1.1. Theoretical framework

Regardless of many school transition studies, there is no universal theoretical approach to guide research in this field. Research on transition from primary to secondary school has taken different theoretical perspectives, e.g., Bronfenbrenner's ecological model (O'Toole, Hayes & Mhathúna, 2014), Elder's life course theory (Elder, 1998), and even cognitive-transactional stress theory (Sirsch 2003). A substantial number of studies on school transition employ stage-environment fit model proposed by Eccles and colleagues (Eccles et al., 1993; Eccles & Wigfield, 2000). The model views school transition as an age normative event that happens at time and in environment that does not support developmental needs of children. The proposed environmental influences of the transition are related to classroom level, school level and the level of school district (Eccles & Roeser, 2009). Children from elementary school often transit to larger school buildings and attend classes with the new classmates in junior high school. They replace their elementary school teacher with multiple subject specialists who spend less time in each class. Relationships with teachers are thus becoming more formal, characterized by competitiveness, teacher control and discipline, with fewer opportunities for students to make their own learning choices and decisions. Changes in

learning environments are often in discrepancy with adolescents' needs for safety, autonomy, competence, enjoyment and relatedness, which is reflected in their school engagement, self-perceptions and mental health (Symonds & Galton, 2014). This often leads to a decline in students' intrinsic motivation, interest in school and school disengagement (Anderson et al., 2000; Eccles & Wigfield, 2000). School district influences are also important since they include the policy of school placement during transitional periods (Eccles & Roeser, 2009).

1.2. Students' experiences of transition

Educational transition often generates stress and concerns related to anticipated changes in academic expectations and demands, assessment criteria and relationships with teachers and peers (Coelho & Romao, 2016; Duchesne, Ratelle, Poitras & Drouin, 2009). However, students' emotions and cognitions regarding transition are not uniformly negative, but rather represent a mix of social and academic challenges and threats (Mackenzie, McMaugh & O'Sullivan, 2012), leading to both pleasant and unpleasant feelings about their post-transition school experiences and engagement (Symonds & Hargreaves, 2016). Evidence also suggests that students' perceptions of school context and academic progress may even improve after transition to high school (Murdock, Anderman & Hodge, 2000). However, majority of children adjust successfully, experiencing only short-term unpleasant emotions and effects as they progress through transition (Graham & Hill, 2003; Grills-Taquechel, Norton & Ollendick, 2010).

1.3. Outcomes of school transition

Changes in post-transition learning environment play a key role in students' school enjoyment, motivation, learning self-efficacy, academic success and attitudes towards core subjects (Anderman, Maehr & Midgley, 1999). Several indicators show the outcomes of the post-transition adaptation: academic achievement, emotional well-being and social integration (Evans, Borriello & Field, 2018). A decline in academic achievement following transition to junior high school is well documented (Urdan & Midgley, 2003), often accompanied by a decline in perceived academic ability (Anderman & Midgley, 1997). Changes in academic self-concept and self-esteem do not show a consistent pattern. While some studies report a decline in these self-perceptions (e.g. Evans, Borriello & Field, 2018), others show mixed evidence for both an increase and decline, underlining the importance of the specific school context at which transition occurs (Symonds & Galton 2014). This period is also characterized by more frequent disciplinary problems, putting children at risk for the

development of maladaptive academic behaviors (Theriot & Dupper, 2010). Intense worries concerning organizational and social aspects of the transition in some students lead to poor adjustment and emotional problems, predominantly to symptoms of anxiety and depression (West, Sweeting & Young, 2010).

1.4. Factors related to successful educational transition

Research shows that many factors may mitigate negative effects of school transition. In their review of the impact of transition to secondary education Evans, Borriello & Field (2018) offered a framework for the organization of variables that contribute to successful adaptation. They organize the relevant variables into two groups: environment-level (school and home environment) and individual-level variables (academic self-concept, learning schema and social schema). In addition, authors postulate contextual variables such as pre-transition school attainment and home environment, emotional health, gender and SES as potential moderators of the relationships between different levels of factors and the adaptation outcomes. At the level of school environment, accessible and supportive teachers can play an important protective role for students' adaptation during school transition (Anderson et al., 2000; Reddy, Rhodes & Mulhall, 2003). Students' perceptions of their parental and peer support also play a significant role in successful adaptation, preserving students' academic and social self-concept and emotional adjustment (Virtanen, Vasalampi, Kiuru, Lerkkanen & Poikkeus, 2019). Perceiving parents as supportive, responsive and available reduces feelings of stress and helplessness and help support academic and emotional well-being of their children when facing the demands of school transition. (Maltais, Duchesne, Ratelle & Feng, 2017). Parental higher expectations about their children's future educational attainment are also positively related to children's higher achievements (Davis-Kean, 2005; Long & Pang, 2016). School transition experiences and outcomes are related to sociodemographic factors such as family structure, family socio-economic status and gender. Living in a family with two parents positively relates to the perceived security in relationships with parents and negatively to the development of worries about school transition (Duchesne, Ratelle, Poitras, & Drouin, 2009). On the contrary, single parenthood may be associated with more school problems due to parental stress and lack of social support, difficult life circumstances, and even poverty (Kotchick, Dorsey & Heller, 2005). A well-documented relation between parental socio-economic status and school attainment of their children indicates that students of different socio-economic background (SES) could differentially experience school transition (Evans, Borriello & Field, 2018). Indeed, students from families with higher socio-

economic status, mostly operationalized by higher parental education, experience fewer school transition problems (Carvalho & Novo, 2012), probably due to better parental support provided to children in their successful adaptation during transition (Symonds & Galton, 2014). The observed relationship between higher parental SES and achievement is at least partially mediated by parental high educational expectations for their children (Elliott, Destin, & Friedline, 2011). Transitional outcomes tend to be gender-specific, with boys making less academic progress, being less motivated and more disengaged from school across transition, while girls experience more decline in self-esteem. However, these gender-specific transitional outcomes are inconsistent and seem to be dependent of the age at which transition occurs (Symonds, Galton & Hargreaves, 2014).

1.5. Transition to lower secondary education in Croatia

Croatia has a single-structure eight-year elementary education with primary school lasting from 1st to 4th grade and lower secondary school lasting from 5th to 8th grade. The transition from primary to lower secondary education is characterized by a change from class teaching (with single teacher who teaches almost all subjects and students using one classroom) to subject teaching (different teacher for each subject, changing classroom on hourly basis). This period coincides with pubescent changes since it takes place around 10-11 year of age and is characterized by intense physical and psychological changes. While transitioning from single to multiple teachers and to a curriculum with increased number of subjects, Croatian students remain with their peers in the same class and school building. Their transition structurally differs from transitions in the US and many other countries that are marked by significant contextual changes, predominantly related to the formation of new peer relations in new school buildings and classes. Compared to these school systems, Croatian transition retains more continuity between pre-and post-transition school context, a feature that could facilitate student adjustment (Benner, 2011).

1.6. The current study

Existing theoretical approaches and empirical evidence on school transition predominantly refer to transitions in school systems where children change both physical and social environments, moving to new school buildings with new classmates. It is reasonable to expect different adaptation trajectories in school systems where transition from elementary to lower secondary school involves discontinuities in classroom composition and physical environment compared to systems with integrated primary and lower secondary schools

where students remain in the same building with the same classmates (Nielsen et al., 2017, Virtanen et al., 2019). Substantial differences in structural transitions between educational systems underline contextual sensitivity of the existing empirical evidence, demanding context-specific research that may shed light on the interplay of different factors shaping students' adaptation during transitional periods.

The goal of the present research was to understand the factors that contribute to self-perceived adaptation, school achievement and learning self-efficacy of children who transit from 4th grade class teaching to 5th grade subject teaching in Croatian elementary school. This study focuses on transition in a single-structure elementary school that provides more transitional continuity, involving change of teachers and organization of teaching in the same physical and social environment. In addition, students' post-transition adaptation has so far been measured mainly through educational and well-being outcomes while children are rarely asked to evaluate their own experience of success in the post-transition adaptation. Our research introduces a measure of self-perceived adaptation in addition to learning self-efficacy and academic attainment as transition outcomes. More specifically, the aims of this longitudinal study were twofold. Our first aim was to assess the outcomes of the academic adaptation by investigating whether transition from elementary to lower secondary school results in changes of students' achievement and academic self-efficacy. Based on previous empirical findings we expected decline in achievement and self-efficacy following transition to 5th grade. Second, we aimed to identify determinants of students' adaptation to the educational transition from different sources and levels (individual, environmental and contextual) as well as from different stages of the transitional process (before and after the transition). Individual-level variables were gender, learning self-efficacy and school attainment before transition as well as perceptions of the forthcoming transition as a challenge or threat. Environmental-level variables were teacher's support and parental expectations both before and after the transition. Finally, contextual variables studied were children's family structure and parental education. The outcome of adaptation was measured as self-perceived level of adaptation, post-transition learning self-efficacy and school achievement. It was hypothesized that parental education and parental expectations, teacher support and better school adaptation before the transition, in addition to positive view of the transition as a challenge will predict better self-perceived adaptation as well as in higher self-efficacy and school achievement following transition.

2. Method

2.1. Participants

The sample consisted of 860 students from 23 elementary schools from Zagreb, major urban area in Croatia. Schools were selected to form a random sample of schools stratified by district location for the purpose of a larger longitudinal study of educational aspirations of students at transitional periods of Croatian elementary education. Sampled schools represented 18% of all schools in Zagreb and varied in size from 202 to 940 students per school (M = 649.6, SD = 180.39). At least two randomly selected classes from each school participated in the study, with the number of participating classes depending on school size. Number of participants at three points of data collection was 951, 933 and 1079, respectively. The sample for this study consisted of students who participated at all three data collection points. At the first point of data collection participants were 4th grade students having between 10-11 years of age, out of which 47.7% were girls. Majority of students lived with both parents (87.1%). Single-parent families were predominantly single-mother families (88.2%). Most of the students had one or two siblings (52.7% vs. 24.1%), while 13% were single children, predominantly from the families where both parents have full-time employment (94% fathers and 89% mothers). Majority of mothers (70.5%) and fathers (63.2%) had higher education.

2.2. Procedure

Data were collected from one cohort at three equidistant time points during two school years: at the end of 4th grade (T1), at the mid-point of 5th grade (T2), and at the end of 5th grade (T3). The periods between data collection sessions were approximately six months. Informed written consents for the participation in the study were gathered from students' parents and students themselves. Researchers or trained research assistants administered the surveys during regular classes in school which took approximately 30 to 40 minutes to complete.

Prior to data collection, study was approved by Ethics Committee of the (*name of the institution*), Croatia. Written informed consent was obtained from all participants' parents and oral consent from students in accordance with the Code of Ethics for Research with Children established by Croatian Council for Children. To ensure anonymity the surveys were matched by unique code produced by students.

Data collection time points for variables under study are presented in Table 1. Students receive final grades at the end of each school year in Croatian elementary school, so data related to school achievement were collected at the end of 4th and 5th grade (T1 and T3). Perceived academic challenges and threats were assessed prior to transition to 5th grade, while perceptions of post-transitional adaptation were collected at the first measurement point following transition (T2). Learning self-efficacy and teacher supportive classroom practices were assessed both prior to and after the transition (T1 and T2). Perceptions of expectations parents hold for their children were assessed at the end of 4th grade. Fixed background variables of parental education and family structure were collected at T1 and T3.

Table 1. Data collection time points for the selected variables

T1 End of 4th grade	T2 Mid-point 5th grade	T3 End of 5th grade
GPA 4th grade		GPA 5th grade
Perceived academic challenges and threats related to transition	Self-perceived adaptation to 5th grade	
Learning self-efficacy in 4th grade	Learning self-efficacy in 5th grade	
Teacher supportive classroom practices in 4th grade	Teachers' supportive classroom practices in 5th grade	
Perceived parental expectations for their children in 4th grade		
Parental education		Family structure

2.3. Instruments

The self-report questionnaire was composed of items collecting socio-economic data, data about school achievement and scales assessing self-perceptions and perceived teacher and parental influence related to transition. Due to the ample number of variables, the scales were relatively short in order to ensure acceptable administration within one school hour.

2.3.1. Socio-economic data. The data on family structure as well as on parental education were collected from students. There were 87% of children from two-parent families. For children from two-parent families parental education was coded as following: 1 = both parents 8 years of education, 2 = at least one parent 12 years of education, 3 = both parents 12 years of education, 4 = at least one parent 14 or more years of education and 5 = both parents

14 and more years of education. For those who lived with one parent analog coding was 1 for 8 years, 3 for 12 years or 5 for 14 or more years of education, respectively.

2.3.2. Self-perceived adaptation to 5th grade scale. A scale consisting of six items with 5-point Likert scale (1 – poorly adapted to 5 – adapted excellently) was used to measure the perceived success in adaptation to 5th grade (Jokić et al., 2019). The scale includes specific aspects of adaptation to transition in Croatian educational context - new teachers, new school organization and new school demands (e.g. *"In my relationship with new teachers I adapted very well"*). Principal component analysis indicated one factor structure of the scale which the explained 42.4 % of the variance with sufficient scale reliability of $\alpha = .72$.

2.3.3. Self-reported grade point averages. Grade point averages (GPA) at the end of 4th and 5th grade (T1 and T3 time point) were computed from students' reports on final grades for major school subjects (Croatian language, mathematics, foreign language and science). Grades in Croatian schools vary from 1 (*insufficient*) to 5 (e*xcellent*). GPA was computed without grades in art, physical education and religious education as those grades tend to be very high, resulting in negatively skewed distribution of GPA. Self-reported final grades are considered a reliable measure of achievement in Croatian education, as students are regularly informed about grades they receive. Official student records are personal data with restricted access due to general data protection regulation and could not be used in this research where participants were granted anonymity. Students and their parents can access data about school grades at any point via e-record, while their report at the end of the school year reports final grades for all school subjects.

2.3.4. Perceived teachers' supportive classroom practices. Perceived teachers' supportive classroom practices were assessed by a 11-item scale covering teacher behaviors such as communicating expectations and academic demands, giving appropriate response and feedback, helping with learning and encouraging communication with learners (e.g. *"I can get help from my teacher(s) any time I want too"*). This scale was validated and used with the same-age pupils in Croatian schools (Jokić et al., 2019). In the 4th grade students assessed supportive practices of their classroom teacher, while at the mid-point of the 5th grade they assessed the practices of all the new subject teachers. Students indicated the frequency of teachers' behaviors on a 5-point Likert's scale (1 - *never* to 5 - *almost always*). Principal component analysis with Varimax rotation identified one-factor solution

explaining 30.9 percent of the variance. Reliability of the scale was α = .80 for 4th grade and α = .84 for 5th grade, so the total mean scores for both grades were calculated.

2.3.5. Perceived academic challenges and threats related to the transition. The questionnaire assessing transition-related expectations is a shortened version of The Impending Transition to Secondary School Perceived as a Challenge and Threat (ITCT, Sirsch, 2003). The ITCT originally consists of 16 items measuring challenges or threats in the domain of academic achievement and 12 items measuring challenges or threats in social domain. However, since Croatian children during the transition remain in the same school and class only the scale referring to academic domain was adapted for this study. Final scale consisted of four items for challenges (e.g.*"When I think of the fact that I will go to 5th grade next year I look forward to it because I am curious about new subjects"*) and four items for threats (e.g. *"When I think of the fact that I will go to 5th grade next year I worry since I may be not as good in school as I am now"*). Students assessed the perceived challenges and threats on a four-point Likert type scale (*1- I strongly agree to 4 – I strongly disagree*). Principal component analysis with Varimax rotation indicated two factor solution with first factor named *Transition perceived as challenge* explaining 32.4 percentage of the variance, and the second factor named *Transition perceived as threat* explaining 25.7 percentage of the variance. Internal consistency of the subscales for challenges and threats were α = .68 and α = .82, respectively.

2.3.6. Learning self-efficacy in 4th and 5th grade. A four-item scale was used for the assessment of students' learning self-efficacy, using a five-point Likert scale to assess item endorsement (*1 - not at all to 5 - completely*). Scale was validated and used with the same-age pupils in Croatian school context (Jokić et al., 2019). Principal component analysis of the scale obtained one factor explaining 52.7 percentage of the variance. The scale was administered at the end of 4th grade (T1) and at the beginning of 5th grade (T2). Reliabilities of the scale were α = .77 (T1) and α =.82 (T2).

2.3.7. Parental educational expectations for their children. Three-item scale was used to assess students' perception of their parental expectations regarding their current and future educational attainment (Jokić et al., 2019). Students assess on a five-point scale (*1- not agree at all 5 - agree completely*) whether parents have high expectations of them related to school achievement in general as well as related to the completion of high school and university (e.g. "*My parents expect me to graduate from university"*. In principal component

analysis, the items projected on one factor explaining 59.3 % of the variance. The reliability of the scale is α = .63.

2.4. Data analysis

Since the study was longitudinal, a substantial amount of data was missing on the key study variables at different data collection time points, ranging from 12.1% to 15.6%. The Little's MCAR test indicated that the data were not missing completely at random (χ^2 = 369.802, *df* = 237, *p* = .00). To test further the nature of the missing data, we examined whether students who participated in all three points of data collection (*N* = 860) differ from students who did not participate in all time points (*N* = 368) on 11 variables used in this study. The only difference found between the two groups is in 4th and 5th grade GPA (M_4 = 4.55 and 4.44 respectively, *r* = .08, *p* = .023, and M_5 = 4.29 and 4.03 respectively, *r* = .15, *p* = .000). Students who did not participate in all data collection points have slightly lower achievement in comparison to those who participated in all three waves of data collection. Garson (2015) states that there is no well-accepted remedy for data that are MNAR (missing not at random). We therefore decided to perform our analyses on the sample of students who participated in all three data collection points. The main reason for students' non-participation in some of the time points was their absence from classes at the time of data collection. Negative relationship between school absenteeism and students' GPA was found in Croatian students' population data as well (Ministry of Science and Education of Croatia, 2020).

The majority of students who participated in all three waves (93.6 %) had complete data for all variables. The missing rates for individual variables were relatively low (≤ 3.7 %). To address missing data, we created 50 multiply imputed datasets applying the fully conditional specification with linear regression model. All further analyses were performed on the imputed datasets.

In order to test the hypothesis whether transition from elementary to lower secondary school results in changes of students' achievement and academic self-efficacy, repeated measures ANOVA's were conducted. Furthermore, we used two-level linear regression with random intercept in order to examine the predictive power of the selected set of individual, environmental and contextual variables as well as of expectations concerning impending transition to 5th grade. In this analysis, students were the first level units and classes were the second level units. We tested separate models for each of the adaptation indicators (self-

perceived adaptation, GPA and learning self-efficacy). The assumption of multicollinearity was met as VIF scores for all three analyses were well below 10, and tolerance scores above 0.2. Two-level modelling was used in order to take into account the hierarchical nature of the sample and the fact that students were nested within classes (e.g. Hox, Moerbeek & Van de Schoot, 2017). The intraclass correlation coefficient (ICC) values for self-perceived adaptation, GPA and learning self-efficacy were .03, .10 and .02, respectively. The ICC values suggest that between-class variations in student-reported outcomes were small to negligible.

To test the fit of the models, we used Akaike information criterion (AIC) and Bayesian information criterion (BIC). Smaller values of AIC and BIC indicate better fit. As expected, full models had better fit (self-perceived adaptation: AIC=1967.7; BIC=1977.1; GPA: AIC=844.8; BIC=854.2; learning self-efficacy: AIC=1620.6; BIC=1630.0) than null models (self-perceived adaptation: AIC_0=2436.7, BIC_0= 2446.2; GPA: AIC_0=1702.3, BIC_0=1711.8; learning self-efficacy: AIC_0=2078.4, BIC_0=2087.9).

3. Results

3.1. Descriptive analyses and relations among variables

A first set of analysis was performed to obtain descriptive information about the study variables (Table 2) and their correlations (Table 3). Participants were mainly from two-parent families (87%) with both parents highly educated (56.5%). Students' school achievement in both 4th and 5th grade and their learning self-efficacy was generally high. Participants perceived very high educational expectations their parents hold for them and reported good support from their teachers both prior and after transition. The children perceived forthcoming transition to 5th grade more as an academic challenge than threat (M = 3.37, SD = .56, M = 2.12, SD = .851, t = 3.42, p < .01). On average, they report that they adapted very well following transition. There were no gender differences in the perception of impending transition as academic challenge, but girls perceived the transition as more threatening than boys did (M = 2.2, SD = .87 vs. M = 2.05, SD = .82, F (1, 858) = 7.21, p = .01).

Table 2. Descriptive statistics of all study variables (N = 860)

	M	*SD*	Mdn	Min	Max
Contextual					
Parental education	4.26	.962	5	1	5
Family structure	.87	.331	1	0	1
Pre- transition					
GPA in 4th grade	4.55	.533	4.75	2,25	5
Learning self-efficacy in 4th grade	4.25	.675	4.25	1	5
Teacher's support in 4th grade	4.37	.524	4.45	2,18	5
Parental expectations in 4th grade	4.71	.472	5	1	5
Expectations concerning the transition					
Transition perceived as academic challenge	3.37	.562	3.5	1	4
Transition perceived as academic threat	2.12	.852	2	1	4
Post-transition					
Teachers' support in 5th grade	3.94	.658	4.08	1,42	5
Adaptation indicators					
Self-perceived adaptation in 5th grade	4.34	.560	4.5	1	5
Learning self-efficacy in 5th grade	3.99	.826	4.0	1	5
GPA in 5th grade	4.29	.661	4.5	2	5

Notes. Theoretical range for all variables was 1 to 5 except for the perceptions of transition which varied from 1 to 4. Family education: 1 = both parents 8 years of education, 2 = at least one parent 12 years of education, 3 = both parents 12 years of education, 4 = at least one parent 14 or more years of education and 5 = both parents 14 and more years of education. Family structure: 1 = two-parent, 0 = single parent family.

As seen in Table 3, all the 5th grade adaptation indicators (GPA, learning self-efficacy and perceived adaptation) were significantly correlated with the variables used as predictors. The only exception was the lack of correlation between gender and learning self-efficacy. The inter-correlations of predictor variables were mainly weak or non-significant. Finally, three adaptation indicators following the transition showed moderate mutual correlations. Self-perceived adaptation had moderate correlation with GPA (r = .40, p < .01) and somewhat stronger correlation with learning self-efficacy (r = .54, p < .01), while correlation between learning self-efficacy and GPA was .46 (p < .01).

Table 3. Bivariate correlations for all study variables

		1	2	3	4	5	6	7	8	9	10	11	12
1	Gender	-											
2	Parental education	.02	-										
3	Family structure	.02	.12	-									
4	GPA in 4th grade	-.10	.26	.22	-								
5	Perceived teacher's support in 4th grade	-.07	.07	.05	.10	-							
6	Perceived parental expectations in 4th grade	.01	.08	.08	.12	.12	-						
7	Self-efficacy in 4th grade	.01	.14	.17	.38	.25	.37	-					
8	Impending transition perceived as challenge	.00	.05	.05	.09	.42	.20	.40	-				
9	Impending transition perceived as threat	-.09	-.13	-.10	-.28	-.18	-.10	-.38	-.28	-			
10	Perceived teachers' support in 5th grade	-.08	.00	.04	.01	.37	.10	.19	.32	-.19	-		
11	Self-perceived adaptation in 5th	-.12	.15	.11	.31	.24	.14	.36	.27	-.32	.50	-	
12	Self-efficacy in 5th grade	.02	.16	.15	.37	.18	.23	.53	.27	-.39	.34	.54	-
13	GPA in 5th grade	-.10	.27	.24	.76	.14	.12	.35	.11	-.25	.08	.40	.46

Notes. Gender: 1 – female students, 2 – male students. All correlations equal and greater than .09 are significant at the .01 level. All correlations equal and greater than .07 are significant at the .05 level.

3.2. Changes in GPA and learning-self efficacy following transition

We performed two ANOVA's in order to test the hypothesis that transition from elementary to lower secondary school results in changes of students' achievement and academic self-efficacy. In line with theoretical expectations, significant decline was found in both variables after transition. The first ANOVA revealed a significant effect of time of measurement (Wilks' Lambda = .733, F (1, 859) = 312.2, $p < .01$, $\eta^2 = .267$) on GPA, indicating that students' GPA showed significant decrease from 4th to 5th grade. The second ANOVA indicated that students' learning self-efficacy significantly decreased following transition from 4th to 5th grade. (Wilks' Lambda = .897, F (1, 859) = 96.74, p < .001, η^2 = .103).

3.3. Individual, environmental and contextual variables as predictors of the adaptation to transition

We performed two-level linear regression analysis with a set of individual, contextual and environmental variables as predictors for each of the adaptation indicators under study (self-perceived adaptation, GPA and learning self-efficacy). Results of the analysis for all three indicators are presented in Table 4. As a measure of effect size, we calculated the reductions in variance estimates (an indicator similar to R^2; Heck, Thomas & Tabata, 2014) for the within-class and between-class portions of the models (named pseudo R^2 in Table 4). These values indicate that our models explain substantial variance in outcome variables, both on student and class level.

Furthermore, we compared pseudo R^2 values of our models to models containing only demographics (gender, family structure and parental education) and autoregressors (GPA in 4th grade and learning self-efficacy in 4th grade). Pseudo R^2 values were higher for the full model of self-perceived adaptation than for the corresponding model containing only demographics and autoregressors (differences in favour of the full model were .204 and .314 for the within-class and between-class portions of the model, respectively). Values of pseudo R^2 of the full model predicting learning self-efficacy were also higher than those of the corresponding simpler model (differences were .008 and .153). The models predicting GPA did not differ in terms of variance reduction (.002 and .000).

Table 4. Standardized coefficients (β) of two-level linear regression predicting self-perceived adaptation, GPA and learning self-efficacy in 5th grade (N = 860)

Predictors	Self-perceived adaptation		GPA		Learning self-efficacy	
	β	sr^2_{unique}	β	sr^2_{unique}	β	sr^2_{unique}
Fixed effects						
Constant	.22		4.22**		3.86**	
Gender	-.16**	.01	-.03	.00	.05	.00
Family structure	.02	.00	.13**	.01	.07	.00
Parental education	.07*	.01	.03*	.01	.03	.00
GPA in 4th grade	.20**	.05	.47**	.47	.15**	.04
Perceived teacher's support in 4th grade	-.02	.00	.00	.00	-.05	.00
Perceived parental expectations in 4th grade	-.01	.00	.01	.00	.03	.00
Learning self-efficacy in 4th grade	.14**	.02	.05**	.01	.28**	.10
Impending transition perceived as challenge	.03	.00	-.01	.00	.01	.00
Impending transition perceived as threat	-.12**	.02	.01	.00	-.13**	.03
Perceived teachers' support in 5th grade	.44**	.20	.04**	.01	.22**	.09
Random effects						
Intercept	.02		.03**		.01	
Residual variance	.60**		.15**		.41**	
ICC	.03		.10		.02	
Pseudo $R^2_{student\ level}$	.38		.63		.40	
Pseudo $R^2_{class\ level}$	.46		.27		.62	
AIC	1967.7		844.8		1620.6	
BIC	1977.1		854.2		1630.0	

Notes. $^{**}p < .01$; $^{*}p < .05$; Gender: 1 – female students, 2 – male students; Family structure: 1 = two-parent, 0 = single parent family; sr^2_{unique} - squared semipartial correlation; Pseudo R^2 – reduction in variance between the null model and the full model; ICC - intraclass correlation coefficient; AIC - Akaike information criterion; BIC - Bayesian information criterion.

3.3.1 Predictors of self-perceived adaptation to the transition

Individual, contextual and environmental variables significantly contributed to the prediction of self-reported adaptation to 5th grade. Two-step linear regression analysis with random intercepts for self-perceived adaptation as criterion variable revealed that support students received from their teachers was the most important predictor of adaptation to 5th grade, followed by their GPA in 4th grade. Students' gender and parental education as contextual variables also contributed to the prediction of subjective adaptation, with girls and students of more educated parents reporting their adaptation to 5th grade was more successful compared to boys and students from families with less educated parents. Individual-level

variables of 4th grade self-efficacy and perception of transition as threat also contributed to subjective adaptation, however in the opposite direction. Self-efficacy had significant positive effect, while perception of transition as academic threat had significant negative effect on self-perceived adaptation. In conclusion, students who assessed themselves as better adapted to 5th grade were females and those with higher educated parents. Better adapted students also perceived more support from their new teachers and had better achievement in 5th grade. In addition, these students had higher learning self-efficacy prior to transition and perceived the transition as less threatening.

3.3.2 Predictors of achievement after the transition

The second indicator of the adaptation to transition was GPA at the end of 5th grade calculated from self-reported grades for the main school subjects. Two-step regression analysis with random intercepts revealed that contextual variables of family structure and parental education contributed significantly to the explanation of the variation in children's GPA in 5th grade. Again, environmental-level variable of teacher support in 5th grade as well as individual-level variables of 4th grade self-efficacy and particularly 4th grade GPA positively contributed to 5th grade GPA. To conclude, students' post-transition achievement was primarily predicted by their prior grades followed by parental variables, self-efficacy and teachers' support. Students with higher prior achievement and self-efficacy who receive more support from their 5th grade teachers were more academically successful in 5th grade. These students are more likely to come from two-parent families with higher parental education.

3.3.3 Predictors of learning self-efficacy after the transition

Finally, the selected set of variables was used to predict learning self-efficacy in 5th grade, with individual variables being the most important predictors of 5th grade self-efficacy. Both learning self-efficacy and academic achievement in 4th grade positively contributed to 5th grade self-efficacy, while contribution of the transition perceived as academic threat was negative. In addition, support of the teachers in 5th grade positively predicted 5th grade learning self-efficacy. In sum, students who had higher learning self-efficacy and better grades prior to transition, who considered forthcoming transition as less threatening and also perceived better support from their new teachers reported higher learning self-efficacy following transition to 5th grade. Contextual-level variables of parental education and family structure were not significant predictors of the learning self-efficacy after the transition.

4. Discussion

The current study was conducted to examine changes in school achievement, learning self-efficacy and school adaptation during the period of transition from primary to lower secondary school. The results of our study indicate a decline in students' learning self-efficacy and GPA following transition. This is in line with findings that the lack of "stage-environment fit" between adolescents' developmental needs and environmental characteristics of junior high educational context (e.g. social competition, higher teachers' expectations and demands, performance orientation) contribute to a decline in academic motivation, achievement and self-concept (Eccles et al., 1993). Individual, environmental and contextual variables examined in this study all contributed to the explanation of students' positive adaptation following transition from classroom teaching in 4th grade to subject teaching in 5th grade. The pattern of their contribution was somewhat different for the three indices of adaptation - self-perceived adaptation, academic performance and learning self-efficacy.

Teacher support in 5th grade appears to be the most important determinant of the degree of perceived adaptation following transition. Students who perceive that their 5th grade teachers provide them with better support feel more adapted, they have higher self-efficacy and are academically more successful following transition to the 5th grade. In Croatian school context the major transitional shift is from the single teacher prior to transition to multiple teachers who teach individual subjects. This change can be stressful for students, requiring adaptation to very different teacher demands and assessment criteria (Coelho & Romao, 2016). In this context, students who perceive they are supported by their teachers do feel better adapted and more self-efficacious in 5th grade, a finding that adds to the evidence of the protective role teachers may have in successful emotional adaptation post-transition (Symonds & Galton, 2014; Evans, Boriello & Field, 2018). Academic achievement and learning self-efficacy in 4th grade along with fewer worries related to the transition also enable students to adapt more successfully, underlining the role of prior achievement, positive self-perceptions and lower transition anxiety in the subjective experience of transitional success. Significant role of gender indicates that girls perceive somewhat better adaptation compared to boys, consistent with the findings that boys experience greater disengagement and decline in motivation following transition (Symonds, Galton & Hargreaves, 2014). In line with the existing evidence, prior GPA is significantly related to academic achievement following

transition to subject teaching in 5th grade (Williams, McMahones & Keyes, 2014). Students who were academically successful in the 4th grade will likely continue doing well after transition to subject teaching in junior high school. Socio-economic variables of family structure and parental education positively contributed to students' success in learning, however to a much lesser degree. Students from families with more educated two parents have higher grades following transition, in line with the literature indicating that parental characteristics play a role in students' achievement across the transition (van Rens, Harlemans, Groot & van den Brink, 2018). Finally, self-efficacy as an indicator of successful post-transitional adaptation is best predicted by a pre-transitional self-efficacy, followed by GPA and less pre-transitional worries. Teacher support also plays a significant role, showing that teachers who are available, care about their students and provide assistance in learning promote students' learning self-efficacy.

The obtained results indicate importance of student's perception of the transition. Students participating in this research experienced mixed expectations before the transition. Students preparing for the transition to lower secondary school perceived the transition as a set of changes that impose a number of challenges on them. This perception makes them both curious and happy about the transition but at the same time evokes concerns about their capability of mastering them. This finding is in line with the prior evidence about the mixed appraisals of transition as both stressful and challenging (Sirsch, 2003). In addition, self-efficacy research indicates that prior achievements are a major source of positive beliefs children hold about their capabilities to master academic tasks (Usher & Pajares, 2008). Research underlines the role of self-efficacy in academic outcomes such as academic performance and a number of adaptive academic behaviors ranging from achievement goal orientation and implicit theories of intelligence (Diseth, 2011; Huang, 2016; Komarraju & Nadler, 2013). The finding that less students' worries are related to better adaptation to transition is consistent with the recent theoretical advancements and empirical research on the substantial role of academic emotions in students' motivation, learning strategies, self-regulation and academic achievement (Pekrun, Frentzel, Goetz & Perry, 2007).

Teachers' supportive classroom practices are the prominent influence promoting successful transition to lower secondary school. Teachers have a substantial role in all three indices of successful adaptation to 5th grade, which is characterized by a transition from one class teacher to multiple subject teachers. The finding that availability, care and assistance

subject teachers provide to students facilitate their feelings of competence and mastery of the new learning environment is in line with the existing evidence on the protective role of teachers during transition (Anderson et al., 2000; Reddy, Rhodes & Mulhall, 2003). Parental education was marginally related to both self-assessed adaptation and GPA in 5th grade, while two-parent family structure was positively related to students' 5th grade achievement. Children from families with both parents who are better educated receive more support in coping with transitional demands, what is in line with research indicating the importance of family structure for the successful transition.

Present study indicates that students in our sample experience a decline in academic achievement and learning self-efficacy following the transition to lower secondary education where they have to cope with different demands and assessment criteria of multiple subject teachers. The results are in line with the observed post-transition changes in various countries, underlining that transition represent a major challenge for students universally. As indicated by a stage-environment fit theory, post-transition changes in learning environment are often in discord with the developmental needs of children (Eccles et al., 1993). Our results, obtained in a different educational context, indicate that this happens to be the case regardless of the different transitional demands in various educational systems. Furthermore, all three groups of transition-relevant variables proposed by Evans, Borriello & Field (2018), explained the aftermath of transition to lower secondary education in our research. Individual-level, environment-level and context-level variables all predicted post-transition outcomes, but to a somewhat different extent, depending on a specific criterion used. In sum, prior academic achievement and self-efficacy, perceived teacher support and parental educational level proved to be the most important predictors of post-transition adaptation and academic success. The findings of the present study thus have the implications for designing school transition programs for children and their parents in order to facilitate transition period and minimize negative effects on the child's self-efficacy and academic achievement. Raising teachers' awareness of their important role in the transitional periods of students' education should be a key ingredient of such programs.

4.1. Limitations of the study

Our study has several limitations that should be taken into consideration. First, the present study was based on a single source of data, i.e. on students' self-reports. Further research should collect data from multiple sources - parents and teachers, as well as other students.

Second, adaptation was assessed as self-perceived adaptation to different aspects of school environment and learning, while further studies might include more elaborate measures of adaptation in different domains, particularly academic, social, emotional, peer-related etc. Third, our sample of students was drawn from a large urban area, which is reflected in a relatively high percentage of students coming from families with higher socio-economic status, and thus is not representative for the entire Croatian population of elementary school students. Further, given the slight underrepresentation of students with lower GPA in our sample due to their absenteeism from school, caution is needed in drawing conclusions about the adaptation of students with lower achievement. Finally, specific transition process in Croatian elementary education that takes place within the same school building with well-known classmates, may result in less transitional stress compared to other countries' educational settings, and therefore might be culturally specific. However, since most of our results support previous findings it may be the case that similar factors operate, but on somewhat less intense level. This indicates that changes involving new teachers and learning demands can represent additional challenge even in the stable environment of the same class and school building.

5. Conclusion

Our study reveals that the outcomes of the transition can be reflected in various aspects of students' school functioning such as GPA, learning self-efficacy and self-perceived adaptation. A number of individual, environmental and contextual variables predict different aspects of post-transition adaptation. Finally, our study suggests that even when the educational transition does not require adaptation to new school and social adaptation to new peers, it is perceived as challenging and threatening and may result with decline in children's achievement and learning-self efficacy as it was postulated by the stage-environment fit model.

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Conflict of interest

The authors declare that they have no conflict of interest.

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