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# PREDICTING GENDER DIFFERENCES IN SCHOOL ACHIEVEMENT AND SOCIAL ACCEPTANCE: THE ROLE OF DELAY OF GRATIFICATION

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The study explored whether delay of gratification measured in 6-year old preschool children, incrementally predicts their subsequent academic achievement and social acceptance in elementary school above cognitive abilities. The role of gender in this relationship was also examined. The sample comprised 99 girls and 120 boys attending fourth, fifth and sixth grades. The study was longitudinal with two measurement points: measures of cognitive abilities and delay of gratification were taken at the age of 6, while measures of academic achievement (GPA, grade in Croatian language and math) and social acceptance, measured with the sociometric technique, were taken between the age of 10 and 12 years. It was confirmed that delay of gratification predicted both subsequent academic achievement and social acceptance in elementary school above cognitive abilities, but more strongly for boys than for girls. Also, delay of gratification mediated the relationship between gender and all four dependent variables. Gender differences in social acceptance, Croatian and math grades were partially explained and gender differences in GPA were fully explained by gender differences in delay of gratification measured at preschool age.

Keywords: academic achievement, delay of gratification, elementary school, self-regulation, social acceptance



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## **INTRODUCTION**

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Academic achievement and peer acceptance are two significant indicators of children's development and have important positive outcomes in various domains even in their adult age. Academic achievement as assessed by the high grade point average (GPA), is associated with increased well-being, high school graduation (e.g., Caspi, Elder, & Bem, 1987; Ensminger & Slusarcick, 1992), employment rates and employment success (Bowly & McMullen, 2002) and may even benefit future health (Lê-Scherban, Diez Roux, Li, & Morgenstern, 2014). In contrast, low GPA is correlated with various poor adult outcomes in general (Roisman, Masten, Coatsworth, & Tellegen, 2004). Peer acceptance and friendships were found to promote social inclusion in the classroom and foster interpersonal and academic success (Wood, 2007). On the other hand, classmate rejection predicted concurrent and later school problems (Zettergren, 2003), externalizing behaviors (Witvliet, van Lier, Cuijpers, & Koot, 2009), and antisocial behavior (for a review, see Dodge, Coie, & Lynam, 2006). Since both academic achievement and peer acceptance are so important for children's development, a substantial number of studies were done in order to find their predictors.

These studies found that cognitive abilities and noncognitive factors, especially self-regulation, are relevant predictors of both academic achievement (McClelland & Wanless, 2012; Spinath, Freudenthaler, & Neubauer, 2010) and social acceptance (Green, Forehand, Beck, & Vosk, 1980).

In addition, previous studies found gender differences in academic achievement (e.g., Duckworth & Seligman, 2006), self-regulation in the form of self-control (e.g., Silverman, 2003) and social acceptance (Crockett, Losoff, & Peterson, 1984; Lemerise, 1997), and it was proposed that lower self-regulation in boys may explain their lower achievement (Duckworth & Seligman, 2006; Weis, Heikamp, & Trommsdorff, 2013) and poorer peer relations (Bellanti & Bierman, 2000; Blair, Raver, & Finegood, 2016; Czeschlik & Rost, 1995). However, most of the studies were cross-sectional. In the present prospective longitudinal study, in a sample of Croatian children we investigated whether self-regulation measured at preschool age increments the role of cognitive abilities, and mediates the effects of gender on subsequent academic success and social acceptance in elementary school.

### **Cognitive factors as early predictors of academic achievement and social acceptance**

There is evidence that cognitive abilities predict grades as well as scores in school achievement tests fairly well (Deary, Strand, Smith, & Fernandes, 2007; Spinath et al., 2010). Cognitive factors are also important in the development of social compe-

tencies (Green et al., 1980). Developmental delays in cognitive abilities may impede the acquisition of positive social skills, leading to difficulties in social interactions as shown by briefer social interactions, higher rates of solitary play and unoccupied time, intrusive entry strategies and difficulties following rules in group play (Guralnick & Groom, 1987; Kopp, Baker, & Brown, 1992).

### **Self-regulation as early predictor of school achievement and social acceptance**

However, studies in the last two decades suggest that cognitive abilities may not be the only reliable predictor of academic achievement (Craggs, 2005), and that other noncognitive variables have emerged as factors that have as much importance as cognitive abilities. Among these factors, children's regulatory abilities (i.e., self-regulation or self-control) are one of the most important factors predicting academic achievement (Blair, 2002; Ponitz, McClelland, Matthews, & Morrison, 2009; McClelland et al., 2007; McClelland & Cameron, 2011; Neuenschwander, Röthlisberger, Cimeli, & Roebbers, 2012; Gaijliot, Mead, & Baumeister, 2008), long-term educational outcomes (Moffitt et al., 2011), as well as peer acceptance and social adaptation (Trentacosta & Shaw, 2009).

In the present study, we focused on the ability to effectively self-regulate for the sake of the desired long-term goal, i.e. delay of gratification (DoG). It is the act of resisting an impulse to take an immediately available reward (e.g., one marshmallow right now) in the hope of obtaining a more-valued reward in the future (e.g., two marshmallows later) (Mischel, Ebbesen, & Raskoff Zeiss, 1972). It includes both attentional control strategies (i.e., purposeful self-distractions) and cognitive reframing strategies, as well as emotional system activation (Mischel & Ayduk, 2004). The delay of gratification is extremely adaptive and enables people to engage in goal-directed behavior to bring about long-term desirable outcomes (Baumeister, 2005; Mischel, Shoda, & Rodrieguez, 1989). Thus, it has proven to predict various positive academic, social, and health outcomes later in life. A series of longitudinal studies (Ayduk et al., 2000; Mischel, Shoda, & Peake, 1988; Shoda, Mischel, & Peake, 1990) showed that children's ability to delay gratification was predictive for their social and academic competence as adolescents and young adults, as well as for parental ratings of their competencies, such as the ability to handle stress, self-control in frustrating situations, and the ability to concentrate without becoming distracted. Some studies suggested that developing the ability to inhibit attention to the treat and suppress the desire to eat it immediately underlies the improved performance observed with older children (Casey et al., 2011; Metcalfe & Mischel, 1999).

## **Gender differences in school achievement and social acceptance: the role of self-regulation**

Although studies usually show no gender differences in cognitive abilities (Halpern, 1992; Hyde, 1990), throughout all educational levels girls earn higher grades than boys in all major subjects (e.g., Pomerantz, Altermatt, & Saxon, 2002). More girls graduate from high school with higher GPAs than their male counterparts (Cole, 1997; Duckworth & Seligman, 2006; Perkins, Kleiner, Roey, & Brown, 2004). Studies in Croatia showed similar results (Babarović, Burušić, & Šakić, 2009; Šimić Šašić, Klarin, & Proroković, 2011).

If there are no gender differences in cognitive abilities, but girls earn higher grades than boys, can these differences in academic achievement be attributed to higher self-regulation in girls? As already mentioned, previous studies suggested that may be the case (Weis et al., 2013), but since these studies were mainly cross-sectional, it would be valuable to get evidence from longitudinal studies. In other words, it would be of interest to research whether self-regulation at preschool age mediates between gender and GPA and social acceptance later in elementary school. If that is the case, it would mean that boys are in need of more care from their teachers and parents regarding self-regulation.

### **THE PRESENT STUDY**

As mentioned above, there is a well-established association of cognitive abilities with both academic achievement and peer relations. Also, the role of early self-regulation in students' academic achievement and social acceptance is well documented. However, only a few studies have investigated the specific contribution of self-regulation in the form of DoG, above cognitive abilities for students' achievement. Duckworth, Tsukayama, and Kirby (2013) found that DoG at age 4 was positively related to both concurrent cognitive abilities and concurrent ratings of self-control by mothers and caregivers. DoG predicted report card grades in eighth and ninth grades and the predictive power of the DoG was explained by self-control and not intelligence, showing that self-control is a better predictor of report card grades than intelligence. On the other hand, intelligence was found to be a better predictor of standardized achievement test scores than self-control (Duckworth et al., 2013). However, no study investigated the role of self-regulation in the form of delay of gratification incrementally over cognitive abilities for both academic achievement and social acceptance in longitudinal design. In addition, studies in cultures other than the US are valuable for corroborating the previous findings. Thus, the first aim of this study was to

investigate whether self-regulation measured in 6-year old preschool children incrementally predicts their subsequent academic achievement and classmate acceptance in elementary school (i.e., 4-6 years later), above cognitive abilities. The second aim of the study was to test whether self-regulation measured at preschool age mediates the relationship between gender and subsequent school grades in elementary school.

Based on the abovementioned, several hypotheses were put forward:

Hypothesis 1. There are no gender differences in cognitive abilities measured at preschool age.

Hypothesis 2. Girls have higher level of self-regulation measured at preschool age.

Hypothesis 3. At school age, girls have higher academic achievement measured as GPA, and grades in Croatian language and mathematics.

Hypothesis 4. Self-regulation assessed at preschool age is related prospectively and incrementally over cognitive abilities, to both academic achievement and social acceptance in elementary school.

Hypothesis 5. Self-regulation mediates the relationship between gender and academic achievement (measured as GPA, grades in Croatian language and mathematics) as well as between gender and social acceptance.

## METHOD

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### Participants and Procedure

The convenience sample comprised 99 girls and 120 boys (mean age = 11.43,  $SD = 0.86$ ), out of which six classes of 4th graders (36 girls and 34 boys), four classes of 5th graders (31 girls and 41 boys) and five classes of 6th graders (32 girls and 45 boys). All children of each class participated in the study. All classes were from a single public school situated in a middle-sized city in North-West Croatia. Children came from diverse socio-economic backgrounds, with most of them from middle class families. 53 (24.2%) students were eligible for free lunch based on low household income.

The assessment of social acceptance was done during regular school hours (nonacademic period). Measures of academic achievement for the last educational period were obtained from school records. At the age of 6, measures of cognitive abilities and delay of gratification for each child were taken during the regular assessment of school readiness at one-on-one testing sessions. For all children, informed consent was obtained from their parents.

## Measures

### Cognitive abilities

School Readiness Test (SRT, Oštarčević, 2008) was used as a measure of cognitive abilities. It assesses cognitive abilities and skills which are necessary for successful learning during primary school: general knowledge, temporal orientation and basic communication skills, visual memory, logic reasoning, speech and language development, numbers and numerical operations, colors naming, perceptive ability, graphomotoric development and left-right orientation. The maximum score is 36.

### Delay of gratification

We used the delay of gratification paradigm (Mischel et al., 1972), with the dichotomous measure of DoG (Silverman, 2003). Prior to any assessment, each child was offered a choice to either take one candy before the assessment procedure, or to wait and take two candies after the assessment procedure. If the child takes two candies after the assessment procedure, the result is coded as 1 (delay of gratification) and if the child takes a candy before the assessment procedure, the result is coded as zero (no delay of gratification).

### Academic achievement

Academic achievement was assessed using GPA, grade in Croatian language and grade in math for the last educational period. These measures were selected based on their relevance to the Croatian school curriculum. In the Croatian educational system, both grades in all subjects and GPA range from 1 (the lowest) to 5 (the highest).

### Social acceptance

In fourth, fifth and sixth grades social acceptance was assessed by the Sociometric technique (Asher & Hymel, 1981; Coie, Dodge, & Coppotelli, 1982). Sociometric status was found to be largely related to cooperative behavior and being perceived as popular (de Bruyn & van den Boom, 2005). Participants were asked to name one student with whom they would like to a) learn for exam preparation; b) sit with in a bus on school trip; c) tell a secret. The total score for every student was obtained by summing up all nominations.

### Control variables

*Age.* Since age was found to be negatively correlated with GPA (Kuzman, Pavić Šimetin, & Pejnović Franelić, 2012), age was included as a control variable.

*Socioeconomic status.* Free lunch status was used as a proxy for assessing low socioeconomic status (SES). To obtain a free lunch status, a family must prove low socioeconomic status in accordance with Croatian law.

## Overview of data analysis

Pearson correlations were computed to investigate associations among study variables. One-way MANOVA was used to assess gender differences for all abovementioned measures. Four hierarchical regression analyses were performed in order to assess whether delay of gratification predicts academic achievement and social acceptance above general cognitive abilities. Control variables (age, SES) were entered in Step 1, cognitive abilities were entered in Step 2 and DoG was entered in Step 3 in order to assess the incremental role of DoG over cognitive abilities. Mediation models were tested by using the bootstrapping method since it avoids the assumption of a normal distribution of indirect effects. We used Mplus (Version 7.4) (Muthén & Muthén, 1998–2015), since it allows for dichotomous mediator variable (delay of gratification). Four mediation models were tested separately with dependent variables being GPA, Croatian language grade, math grade and social acceptance. For estimating point estimates, 5000 bootstrap samples were drawn and for the indirect effects, 95% confidence intervals were used.

## RESULTS

### Descriptive statistics

TABLE 1  
Means, standard deviations and correlations of study variables

Table 1 presents descriptive statistics, as well as the correlations among the variables. For all the variables, the values of skewness were < 1.008 and those of kurtosis < 1.102, which is considered acceptable in order to prove a normal univariate distribution (Tabachnick & Fidell, 2007).

	1	2	3	4	5	6	Age	SES
1 Delay of gratification	-	0.43**	0.46**	0.53**	0.51**	0.60**	-0.05	0.10
2 Cognitive abilities (SRT)		-	0.41**	0.45**	0.42**	0.25**	0.06	0.15*
3 GPA			-	0.80**	0.83**	0.30**	-0.30**	0.13
4 Croatian language				-	0.77**	0.30**	-0.12	0.20**
5 Math					-	0.34**	-0.25**	0.14*
6 Social acceptance						-	0.08	0.08
<i>M</i>	1.63	26.71	4.44	4.19	3.83	3.04	11.43	1.76
<i>SD</i>	0.49	3.40	0.68	0.89	1.06	2.54	0.86	0.43

Note. GPA, Croatian language grades and math grades can range from 1 to 5. *Time 1*: delay of gratification, cognitive abilities. *Time 2*: GPA, Croatian language grade, math grade, social acceptance; SRT may range from 0-36; \*\* $p < 0.01$

62.6% of children were successful in delaying gratification. All indicators of academic achievement were above aver-

age. At zero-order level, delay of gratification was moderately positively correlated with cognitive abilities measured at the same time ( $r = 0.43$ ), and with subsequent GPA, language and math grades ( $r = 0.46, 0.53, \text{ and } 0.51$ , respectively), and social acceptance ( $r = 0.60$ ). Measures of academic achievement correlated with social acceptance at low level ( $r$  ranged from 0.30 to 0.34).

## Gender differences

Gender differences in grades (GPA, Croatian language, math) and social acceptance are presented in Table 2.

	Girls		Boys		$t(df=217)$	$p$	Cohens $d$
	$M$	$SD$	$M$	$SD$			
Cognitive abilities	27.15	3.33	26.34	3.42	1.763	0.079	0.24
GPA	4.75	0.48	4.19	0.72	6.779	0.000	0.92
Croatian language	4.51	0.76	3.93	0.90	5.087	0.000	0.70
Math	4.17	0.89	3.54	1.11	4.663	0.000	0.63
Social acceptance	3.43	2.81	2.71	2.26	2.120	0.000	0.28

TABLE 2  
Comparison of girls  
( $N = 99$ ) and boys  
( $N = 120$ ) in cognitive  
abilities, GPA,  
Croatian language  
grade, math grade  
and social acceptance

Note.  $M$  – Mean;  $SD$  – Standard deviation;  $t$  – t-test value;  $df$  – Degrees of freedom;  $p$  – Significance value.

We used one-way MANOVA to assess gender differences for all measures. The combined DVs were significantly affected by gender (Wilks'  $\lambda = 0.010, F(5,213) = 4408.527, p < 0.001$ ). Independent samples tests showed that girls obtained significantly higher scores on GPA, Croatian language and math grades and social acceptance (all  $ps < 0.001$ ), but there were no gender differences in their cognitive abilities score ( $p > 0.05$ ). Thus, hypotheses 1 and 2 were confirmed. With regard to self-regulation, 70.7% of girls showed delayed gratification compared to 55.8% of boys ( $\chi^2 = 5.123; p = 0.024$ ). Thus, results were in line with Hypothesis 3.

## Predictive value of self-regulation above cognitive abilities

First we did a preliminary analysis in order to determine whether gender moderates the relationship of predictors (delay of gratification and cognitive abilities) and criteria (GPA, Croatian language grade, math grade, social acceptance). Four hierarchical linear regression analyses were performed with SES, age and gender entered at Step 1, cognitive abilities and delay of gratification entered at Step 2, and the two gender x cognitive abilities/delay of gratification interactions entered at Step 3. A significant increase in  $R^2(R^2\Delta)$  would indicate gender differences in the relationship between cognitive abilities/DoG and criteria. There was a significant increase in  $R^2(R^2\Delta)$  in



● TABLE 3  
Summary of hierarchical regression analyses for cognitive abilities and delay of gratification measured at preschool age predicting academic achievement, grades and social acceptance in elementary school – boys

the third step for GPA ( $F\Delta(2,211) = 3.052, p = 0.049$ ), marginal significant increase for social acceptance ( $F\Delta(2,211) = 2.857, p = 0.060$ ) and there was no significant increase in  $R^2(R^2\Delta)$  for the Croatian language grade ( $F\Delta(2,211) = 2.369, p = 0.096$ ) and math grades ( $F\Delta(2,211) = 0.330, p = 0.719$ ). Since interactions were found for GPA and were marginal for social acceptance, indicating that gender interacts with predictors in predicting these outcomes, we performed hierarchical regression analyses for boys and girls separately, with age and SES as control variables entered at Step 1 and cognitive abilities at Step 2. Delay of gratification was entered at Step 3, in order to assess the incremental role of DoG over and above cognitive abilities (Tables 3 and 4).

	GPA		Croatian language		Math		Social acceptance	
	$R^2$	$\beta$	$R^2$	$\beta$	$R^2$	$\beta$	$R^2$	$\beta$
Step 1	0.19**		0.08**		0.11**		0.00	
Age		-0.40**		-0.20*		-0.28**		0.02
SES		0.24**		0.23*		0.22*		-0.00
Step 2	0.10**		0.11**		0.11**		0.10**	
Age		-0.42**		-0.21*		-0.30**		0.01
SES		0.21**		0.20*		0.19*		-0.03
Cognitive abilities		0.32**		0.34**		0.34**		0.32**
Step 3	0.11**		0.17**		0.11**		0.29**	
Age		-0.38**		-0.16*		-0.26**		0.07
SES		0.20**		0.19*		0.18*		-0.04
Cognitive abilities		0.18*		0.17*		0.20*		0.09
Delay of gratification		0.36**		0.44**		0.37**		0.59**
R		0.63**		0.60**		0.58**		0.63**
Adj. $R^2$		0.38**		0.33**		0.31**		0.37**
$F(4/115)$		19.28**		15.72**		14.44**		18.58**

\* $p < 0.05$ ; \*\* $p < 0.01$

Cognitive abilities at age 6 were a significant predictor of academic achievement at age 10 to 12 for both boys and girls. In line with Hypothesis 4, in the boys' sample, delay of gratification at preschool age was related prospectively and incrementally over cognitive abilities, to both academic achievement and social acceptance. It explained 11% of unique variance of GPA, 17% of Croatian language grades, 11% of math grades, and 29% of unique variance of social acceptance. In the girls' sample, DoG explained 5% of incremental variance of Croatian language grades, 9% of math grades, and 32% of social acceptance, but had no incremental power for GPA (see Tables 3 and 4).

TABLE 4  
Summary of hierarchical regression analyses for cognitive abilities and delay of gratification measured at preschool age predicting academic achievement, grades and social acceptance in elementary school – girls

	GPA		Croatian language		Math		Social acceptance	
	R <sup>2</sup>	β	R <sup>2</sup>	β	R <sup>2</sup>	β	R <sup>2</sup>	β
Step 1	0.06		0.08*		0.08*		0.05	
Age		-0.19		-0.04		-0.24*		0.15
SES		0.20*		0.29**		0.19		0.14
Step 2	0.30**		0.30**		0.27**		0.02	
Age		-0.22*		-0.07		-0.27**		0.15
SES		0.09		0.17		0.08		0.12
Cognitive abilities		0.56**		0.56**		0.53**		0.13
Step 3	0.02		0.05**		0.09**		0.32**	
Age		-0.21*		-0.06		-0.26**		0.17*
SES		0.07		0.15		0.05		0.07
Cognitive abilities		0.49**		0.44**		0.37**		-0.17
Delay of gratification		0.16		0.25**		0.35**		0.65**
R		0.62**		0.65**		0.66**		0.63**
Adj. R <sup>2</sup>		0.35**		0.40**		0.41**		0.37**
F(4/94)		14.33**		17.26**		17.80**		15.21**

\* $p < 0.05$ ; \*\* $p < 0.01$

### Self-regulation as mediating variable between gender and academic achievement and social acceptance

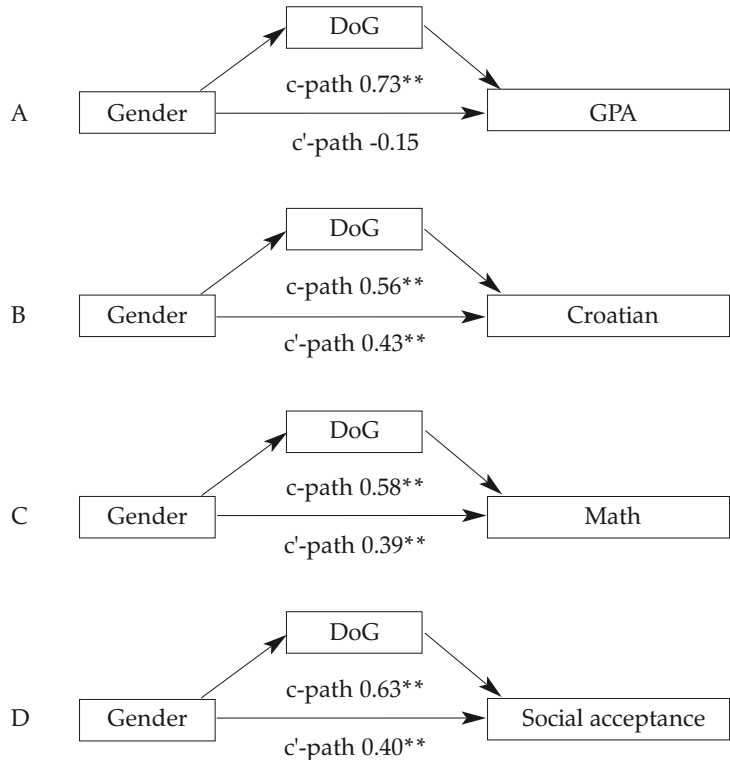
Further, we tested whether gender differences in children's elementary school achievement and social acceptance were mediated by the delay of gratification measured at preschool age. The mediation models depicting relations between gender, delay of gratification and indicators of school achievement and social acceptance are presented in Figure 1.

Figure 1 A shows the results of the mediation model with gender as an independent variable, delay of gratification as mediator and GPA as the dependent variable. Since 95% confidence interval did not contain zero, the results indicated that delay of gratification mediated the relation between gender and GPA (indirect effect = 0.871, SE = 0.393, 95% CI [0.043, 1.413]). Mediation was full since the direct effect was not significant (c'-path).

Figure 1 B shows the results of the mediation model with gender as an independent variable, delay of gratification as mediator and Croatian language grade as the dependent variable. Results indicated that delay of gratification significantly

partially mediated the relation between gender and Croatian language grade (indirect effect = 0.128, SE = 0.059, 95% CI [0.021, 0.253]). Similarly, DoG partially mediated the relation between gender and math grade (indirect effect = 0.195 SE = 0.089, 95% CI [0.359, 0.375]) (Figure 1 C) and also between gender and social acceptance (indirect effect = 0.230 SE = 0.104, 95% CI [0.034, 0.444]) (Figure 1 D).

➔ FIGURE 1  
Mediation tests of the relations of gender to Croatian and mathematics' grades and social acceptance (measured at grades 4-6) mediated by delay of gratification (DoG) measured at preschool age



## DISCUSSION

The present findings extend past research on the role of delay of gratification measured at preschool age as predictor of subsequent academic achievement and social acceptance in elementary school. As hypothesized, delay of gratification predicted subsequent academic achievement in elementary school above cognitive abilities and skills as assessed with SRT. DoG uniquely explained 11% to 17% of variance in academic achievement for boys and 5% to 9% for girls. These results are in line with previous studies that reported positive relationship between delay of gratification and academic achievement (e.g., Shoda et al., 1990; Duckworth et al., 2013). However, this study is the first outside the US to reveal that DoG, is related incrementally and prospectively to academic competence beyond cognitive abilities and skills.

Also, some gender differences in the prospective role of self-regulation in academic success were observed. In boys, self-regulation was incrementally and prospectively related both to GPA and grades in major subjects, i.e., Croatian language and mathematics, while in girls it was related only to grades in major subjects but not to GPA. These results suggest that although self-regulation is important for both genders, it has a stronger role in regard to the academic achievement of boys than girls. Namely, GPA reflects the grades of all subjects, both those more difficult to master (as maths and language) as well as those less difficult (such as music, art and physical education). It seems that self-regulation for girls makes a difference only in studying more difficult subjects, while self-regulation for boys is important for success in all subjects. It may well be that complying with school obligations in the early elementary school period is harder for boys than for girls and seeks more self-regulation than boys on average have. Namely, previous studies reported that boys have a lower level of DoG in comparison to girls (Matthews, Ponitz, & Morrison, 2009).

This study is also the first to reveal that delay of gratification is related incrementally and prospectively to social acceptance beyond cognitive competencies. DoG was found to be even more important for subsequent social acceptance than for academic achievement, for both boys and girls, explaining 29% and 32% of unique variance, respectively. Thus, this study showed that developed self-regulatory ability in a preschool period facilitates children's ability to manage social relationships subsequently in elementary school. This result is in line with the research (Mischel et al., 1988) finding that delay behavior at age 4 or 5 predicted a set of social competencies and stress tolerance in adolescence. However, the present study helps to disentangle the role of cognitive abilities vs. delay ability in social competencies. In the sample of boys, preschool cognitive abilities lost their predictive power after including DoG in the analysis, suggesting that higher preschool cognitive abilities are related to higher social competence only due to shared variance with DoG. For girls, only DoG was the relevant variable for social competence. This result may suggest the more important role of neurocognitive development in boys compared to girls in this developmental period. Since the essential components for effective delay are the ability to divert attention, mentally transform rewards, and purposefully distract oneself from the stress of the situation while maintaining the necessary goal-directed behavior (e.g., Mischel, 1983), it seems that some or all of these components are also essential for successful social acceptance.

It is also worth noting that examining the influence of childrens' preschool DoG on their academic and social success in the early elementary school period is especially relevant to children's ongoing social development. Having social skills that result in being accepted by peers is a valuable social competence needed to build a supportive social network which can motivate students to engage in learning activities (Wentzel & Watkins, 2002), and is a valuable precursor for the social skills children will use later in life.

As hypothesized and in line with previous studies (e.g., Halpern, 1992), this study revealed that girls and boys did not differ in their preschool cognitive abilities. Also in line with hypotheses and previous studies (e.g., Šimić Šašić et al., 2011), the study showed that later in elementary school, girls had higher grades in Croatian language and math, higher GPA and better social acceptance. Furthermore, as reported in previous research (Silverman, 2003), more girls than boys at preschool age were able to delay gratification. Extending previous research, the present study investigated gender differences in school achievement and social acceptance taking into account students' self-regulation at the preschool age of 6. The results revealed that gender differences in academic achievement and social acceptance in 4th to 6th grades were explained by gender differences in the delay of gratification measured at preschool age. Girls had higher delay ability at the preschool age, which resulted in higher overall academic success, better Croatian language and math grades and better social acceptance later in elementary school. Gender differences in GPA were fully explained, and gender differences in the Croatian grade, math grade and social acceptance partially explained by gender differences in delay of gratification measured at preschool age. Partial mediation suggests that there are some other gender related differences, i.e. other factors than higher DoG in girls due to which girls have higher social acceptance and better grades. Better social acceptance in girls may be also caused by several factors enabling better development of social competencies, such as better ability to recognize facial expressions, higher developmental/neurological maturation, better socialization, more tolerant and agreeable personality, etc. Research on gender differences has shown that in many situations women are somewhat better at recognizing emotions than men (e.g., Kret & De Gelder, 2012; McClure, 2000). Girls are found to have higher positive affect (Olino, Durbin, Klein, Hayden, & Dyson, 2013) and affiliative components of extraversion, such as warmth and sociability and are also found to have higher self-control (Duckworth et al., 2013).

Also in line with previous studies, this study found that girls have higher self-regulation at preschool age (Matthews et al., 2009). More studies are needed to conclude which fac-

tors contribute to the development of gender differences in self-regulation and consequently school achievement and social acceptance, including the roles of culture, family, and school.

The study also found moderate correlation between delay of gratification and cognitive competencies at age 6. This is in line with other recent literature showing both cross-sectional and longitudinal association between higher levels of intelligence and higher levels of self-control in children (e.g., Meldrum, Petkovsek, Boutwell, & Young, 2017), suggesting overlap between some cognitive competencies related to delay ability and cognitive abilities.

The study also revealed an association of low-to-moderate level ( $r$ s ranging from 0.30 to 0.34) between academic success and social acceptance by peers in elementary school. As suggested in literature, the association between social acceptance in the classroom and academic success is likely the result of reciprocal processes. Higher achieving students may be perceived by peers as more socially desirable and thus may have a better chance of being accepted (Hughes & Zhang, 2007). On the other hand, those who are more accepted by peers are more likely to have peer support in the classroom and in academic tasks, which may help them in academic achievement (Wentzel & Watkins, 2002; Steinberg, Dombusch, & Brown, 1992). In addition, it seems that high-achieving adolescent students are more likely to make friendship ties to other high-achieving students (Flashman, 2012), thus pointing to the tendency of responding to changes in academic achievement by changing friendship ties. This study supports the idea of the association between social acceptance and academic achievement as early as in the elementary school period.

It should also be noted that there are various aspects of self-regulation, and authors differ between temperamental effortful control and executive functions (Neuenschwander et al., 2012), with each having some specific relationship with adaptation to school. Delay of gratification seems to be related to temperamental effortful control and has an impact on school grades due to better learning-related behavior based on self-control, such as studying, completing homework and behaving positively in the classroom (Duckworth, Quinn, & Tsukayama, 2012).

## **STRENGTHS AND LIMITATIONS**

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This longitudinal study assessed the role of cognitive abilities and self-regulation at the preschool age for subsequent academic success and social acceptance in elementary school. Multiple outcomes were used as criteria, i.e. both academic success and social acceptance, while also taking into account variability in gender. This study revealed the predictive role of preschool self-regulation for both academic success and

social acceptance in elementary school, beyond the role of cognitive abilities. In addition, it revealed that gender differences in academic success and social competencies favoring girls, may be at least partially explained by gender differences in self-regulation.

However, we must take these results with caution. Although they suggest the possibility of causal effect of cognitive abilities and self-regulation on academic success and social acceptance in elementary school, it is possible that cognitive abilities at the preschool age cause the ability to delay gratification, which then correlates with academic achievement at a later age. Future studies should address this issue.

Another limitation of the study is that social acceptance was assessed with peers' preferences, and future studies would benefit from using parents' or teachers' reports on students' social acceptance. Also, in addition to grades, students' academic achievement should be assessed by standardized achievement tests. Also, future research should use more geographically and socioeconomically diverse samples in order to provide generalization of the findings of the present study to larger populations of students.

It should be also kept in mind that this study did not use an intelligence test with an IQ measure, but rather assessed cognitive abilities and skills necessary for later successful learning. Therefore, one should be cautious when comparing this study to studies that used IQ as a measure of cognitive abilities. In addition, we used free lunch status as a proxy measure of SES. Although this measure is valid for the purpose of our study since it distinguishes those with low SES from all others, it does not differentiate those with average and above average SES.

## **PRACTICAL IMPLICATIONS**

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More emphasis on prevention efforts to strengthen regulatory mechanisms during preschool age may be beneficial for both academic success and the social competence of children, and especially for boys. The delay of the gratification procedure can be used as a screening tool to measure students' aptitude in gratification delay and programs for young children could be created in order to help students (especially boys) to improve their self-regulation abilities.

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## Predviđanje rodnih razlika u školskom uspjehu i socijalnoj prihvaćenosti: uloga odgode zadovoljstva

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Cilj istraživanja bio je ispitati predviđa li odgođanje zadovoljstva mjereno u dobi od 6 godina kasniji školski uspjeh i socijalnu prihvaćenost u osnovnoj školi, povrh mentalnih sposobnosti. Ispitana je i uloga roda u ovom odnosu. U istraživanju je sudjelovalo 99 djevojčica i 120 dječaka četvrtog, petog i šestog razreda osnovne škole. Istraživanje je bilo longitudinalnoga tipa u dvije točke, pri čemu su kognitivne sposobnosti i odgoda zadovoljstva mjereni u dobi od šest godina, dok su mjere akademskoga postignuća (opći uspjeh, ocjena iz hrvatskoga jezika, ocjena iz matematike) i socijalna prihvaćenost mjerena sociometrijskim testom prikupljene u drugoj točki, u dobi između 10. i 12. godine. Potvrđeno je da odgoda zadovoljstva, osim kognitivne zrelosti, predviđa kasniji školski uspjeh i socijalnu prihvaćenost u osnovnoj školi, ali u većoj mjeri za dječake nego za djevojčice. Također, odgoda zadovoljstva bila je medijator u odnosu između roda i sve 4 zavisne varijable. Rodne razlike u socijalnoj prihvaćenosti, ocjenama iz hrvatskoga jezika i matematike bile su djelomično, a u općem uspjehu potpuno, posredovane rodnim razlikama u odgodi zadovoljstva mjerenoj u predškolskoj dobi.

Ključne riječi: akademsko postignuće, odgoda zadovoljstva, osnovna škola, samoregulacija, socijalna prihvaćenost



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