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**Protection and promotion
of the well-being of children,
youth, and families**

Selected Proceedings

**1st International Scientific Conference of the Department
of Psychology at the Catholic University of Croatia**



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Department of Psychology
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Foreword by the Editor

The 1st International Scientific Conference of the Department of Psychology at the Catholic University of Croatia took place in Zagreb, Croatia, on 7 and 8 December 2017 under the title Protection and promotion of the well-being of children, youth, and families. The conference was held for the first time with the intention of becoming a biannual conference recognised in academic and professional circles both at domestic and international level.

There was a great response of the researchers and practitioners from different fields with more than 500 registered participants at the conference, out of which there were 230 active participants. As for the quality of the programme, suffice it to say there were two invited lectures, a webinar, nine symposia, thirty-five oral presentations, ten workshops, two round tables, thirty poster presentations, and one student session.

The authors of fifty-six abstracts who presented their research were selected based on their excellence and invited to submit their full-length manuscripts. Fourteen papers were submitted and entered the two-round blind review process in which each manuscript was reviewed by at least two reviewers. After a positive review and the editorial process, eleven individual scientific papers were finally accepted for publication and are presented in this book. The topics of the presented manuscripts are from different fields of psychology and cover developmental stages from the preschool age, through a period of schooling to younger adult age, and the period of preparation to become a parent.

I would like to thank the authors for their excellent work, prompt revisions, and kind correspondence. Also, I would like to thank Prof Nansook Park for the foreword. She is one of the pioneers and prominent researchers in the field of positive psychology. As a keynote speaker at the Opening Ceremony of our conference, she set a high bar with her lecture Positive Youth Development: A strength-based approach. Further, my thanks go to our reviewers, without whom the level of quality could not be achieved. Due to the blind review process, their names are listed in alphabetical order at the end of the book as a thank note. I would like to thank the members of the Editorial Board who all invested effort and time for this book to be published. Finally, I would like to thank the Catholic University of Croatia, for recognising the importance of this book and for their decision to finance its publishing.

We hope this book will provide a good starting point for researchers and professionals in different fields of psychology, working with children, youth, and families in order to improve their well-being.

Sandra Nakić Radoš, Editor-in-Chief

Foreword by the Keynote Speaker

I had the honor to give the keynote lecture at the 1st International Scientific Conference hosted by the Department of Psychology at the Catholic University of Croatia. I was very impressed by the many passionate and dedicated educators, researchers, and practitioners whom I met during my visit. They are deeply committed to improving the well-being of young people and families through rigorous research and evidence-based practice. It is crucial that any services, programs, and policies for young people be grounded in careful scientific research. I am delighted to see that many such research efforts are well represented in this book.

Raising children who are happy, healthy, productive, resilient, and morally good is a concern for all of us. Positive youth development entails more than absence of problems. As important as it is to prevent and reduce problems among young people, it is equally as important to help them thrive and be contributing members of society. Throughout life, young people will face many challenges and setbacks. But to the degree that they can identify strengths and assets in themselves and others and utilize them more in life, they will be more resilient in the face of difficulties and have the greater chance of maximizing potential and living a thriving life.

This book is a collection of research projects that focus on various conditions and processes of well-being in young people and families in Croatia. Each chapter includes careful examinations of theory, research, and applications that are relevant to the well-being of young people and families. The topics covered in this book represents a wide range of psychological and social problems and assets such as mental health, creativity, flow, morality, teamwork and volunteer motive in diverse age groups from preschoolers to young adults.

There is no topic that is more important than understanding and promoting the positive life-long development of young people. The future of our society depends on it. Thus, there is potential for this book to have a broad-reaching societal impact as well as a scientific impact.

Prof Nansook Park, University of Michigan

Preschool children's temperament and their strengths and difficulties: Teachers' assessment of their relationship

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Abstract

Background and aims: Given the importance of studying risk and protective factors in child development, as well as the fact that there is a scarce number of similar research in our country, this research is focused on analyzing the strength and difficulties of preschool children and their temperament. Therefore, the goal of this study was: (1) to examine the basic descriptive analysis of the emotionality, activity, and sociability as temperament dimensions as well as strength and difficulties of preschool children, and (2) to determine their relationship and to predict the strengths and difficulties of children based on their temperament.

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Methods: The research was conducted in 6 kindergartens in one Croatian county, where 29 preschool teachers evaluated the strength, difficulties, and temperament of 461 preschool-aged children. Two instruments were applied: the Emotionality, Activity, Sociability (EAS) questionnaire for measuring the three dimensions of temperament (emotionality, activity and sociability) and the Strength and Difficulties Questionnaire (SDQ) for measuring the strength and difficulties (pro-social behavior, hyperactivity, emotional problems, behavioral problems, and peer problems) of preschool children.

Results: Descriptive analysis showed lower levels of emotionality and activity, and higher sociability of preschool children with high scores on the pro-social behavior subscale and low scores on the subscales of difficulties. The boys are evaluated as significantly more hyperactive and showing conduct problems, while the girls are evaluated as being significantly more pro-social. In addition, the level of difficulties and strength was correlated with older age. Finally, as can be inferred from the regression analysis, temperament represents a significant predictor of strength and difficulties in preschool-aged children.

Conclusion: Discussion of the findings is focused on creating concrete implications for work with children in the context of early and preschool education.

Keywords: early and preschool age, developmental psychopathology, positive psychology, strengths and difficulties, temperament

Introduction

A large number of individual scientific disciplines within psychology, as well as other related sciences, focus on research that seeks to contribute to the understanding of children's perception and behavior, especially in the domain of children's temperament. Contemporary science emphasizes that this is not only because of the fact that children's temperament is one of the most important aspects of their overall development, but also because temperament studies have revealed numerous inconsistent results (Tatalović Vorkapić, 2015, 2016, 2017). Namely, developmental psychology (Berk, 2015), developmental psychopathology (Wenar, 2003), and positive psychology (Rijavec, Miljković & Brdar, 2008) highlight three groups of findings related to children's temperament: the first refers to the individual aspects of children's temperament as internal risk factors for child development, the second refers to the aspects of temperament that act protectively and encourage the development of resilience in children, while the third refers to the neutral role of children's temperament in the development of children (research findings show that there are no significant correlations). In addition, the differences in the results regarding children's temperament contribute to different conceptualizations and definitions, to which different measurements of children's temperament

and different evaluators also contribute (Tatalović Vorkapić & Žagar, 2017; Zentner & Bates, 2008). Therefore, it is extremely important to implement as much systematic, objective, valid, and reliable research about children's temperaments as possible in order to be able to respond more clearly to questions related to the correlation between children's psychological health and their temperament.

Preschool children's temperament and their strengths and difficulties

Buss and Plomin (1984) found that children's temperament can be understood by analyzing three dimensions: emotionality, activity, and sociability (EAS model). Emotionality refers to children's response to stimuli from the environment and their level of excitement and negative response. This dimension is related to the differences in the nervous system of children, so a child with a high level of emotionality would wake up more easily if he/she heard a loud sound and would start crying. This means that such children experience greater excitement than others do. When we observe the child's pace and use of energy, we describe his/her *activity*. Children who achieve high results in this dimension are prone to exploring new places and seeking more dynamic activities. Ultimately, *sociability* determines to what extent a child will prefer to be with other people. If a child does not like to be alone, or more often encourages contact and interacts with other people, (s)he will have a high estimate in the dimension of *sociability*. This dimension describes how much children prefer unknown stimuli (objects, people) from the environment and not their affinity for them (Berk, 2015; Vasta, Haith & Miller, 1998).

In this work, the strengths and difficulties of preschool-aged children were operationalized based on the traditional diagnostic approach presented in the DSM-V Classification of Psychopathology in Children (Diagnostic and Statistical Manual of Mental Disorders; APA, 2013) and the ICD-10 Classification of Mental Disorders (World Health Organization, 1993). Starting from these two known classifications of mental disorders, and relying thereby on the nosological concepts and factor analyses, a short behavioral screening questionnaire was created by Goodman (1997; Strengths and Difficulties Questionnaire, SDQ) so as to investigate five types of children's behaviors in a valid, reliable, and objective manner: Conduct Problems, Inattention/Hyperactivity, Emotional Symptoms, Peer Problems and Pro-Social Behaviour. Given the starting traditional diagnostic approach, it is clear that most subscales, more precisely four, generate difficulty scores in children and the subscale of pro-social behavior is the level of strength in children. It is used for clinical needs as an initial assessment by parents, teachers, and youth, and for evaluation needs, to monitor children's behavior before and after specific interventions, since it has been

found that the SDQ is sensitive to the effects of treatment. Since this is a theoretical model, but also a measuring instrument that is empirically validated in foreign languages (Borg, Kaukonen, Salmelin, Jaukamaa & Tamminen, 2012; Doi, Ishikara & Uchiyama, 2014; Kim, Ahn & Min, 2015; Shibata, Okada, Fukumoto & Nomura, 2015; Stone, Otten, Engels, Vermult & Janssens, 2010) and in Croatian (Tatalović Vorkapić, Slaviček & Vlah, 2017), it is justified to use it in the research of children' temperament.

Research about preschool children's strengths and difficulties and their temperament

Stone and colleagues (2010) presented the review from forty-eight research studies on psychometric properties on the SDQ, which clearly demonstrated the satisfactory level of various psychometric indicators: internal consistency reliability level, test-retest reliability level, and the inter-rater agreement for the parent and teacher SDQ-versions. Review of validity showed that fifteen out of eighteen studies have confirmed the proposed five-factor structure of the SDQ. Regarding the comparison of the reliability of teachers' and parents' SDQ-versions, the reliability of the teachers' version is higher. As for the analysis of the constructive validity, the SDQ showed an expected correlation with other psychopathology measures same as sufficient screening ability.

Furthermore, regarding age and gender as correlates of the SDQ-subscales' results, Duth's study about the reliability of the SDQ questionnaire with regards to gender indicated that teachers assess a higher level of children's strength than difficulties in the sample of 4,516 5-6-year-old children. The analysis of the overall score in the four dimensions of difficulties indicates that teachers and parents evaluate a significantly higher level of difficulties in boys than in girls (Mieloo, Raat, Oort, Bevaart, Vogel, Donker & Jansen, 2012).

In addition, a study on 5-13-year-old Chinese children shows that the mean level of the strength-subscale showed a stronger positive correlation with age in boys than in girls. Nevertheless, the pro-social behavior has been evaluated as significantly higher in girls than in boys. With regard to children's difficulties, the highest level in the subscale children's difficulties was in the dimension of hyperactivity that was equal for boys and girls. As expected, regarding the developmental course, hyperactivity showed a negative correlation with age in girls and boys, between 5 and 13 years of age. Generally, the lowest mean values in the subscale of difficulties were the ones for the dimension of behavioral problems. Both in girls and boys, the lower level of behavioral problems was related to older age (Gao, Shi, Zhai, He & Shi, 2013).

Similar results were obtained by Cury and Golfeto (2003) on a sample of children between the ages of 6 and 11 in Brazil, whereby the boys showed significantly higher results in the subscale hyperactivity, behavioral problems, and peer problems, while the girls showed higher results in the dimensions of emotional problems and pro-social behavior. These authors argue that girls generally report less aggressive/impulsive symptoms, lower levels of behavioral problems, and high levels of mood swings and anxiety disorders that actually exist, which is diagnosed at a later age than in boys. The authors raise the question of whether this means that some behavior is more stereotypically attributed to boys than to girls.

When taking both variables into account, i.e., temperament and strength and difficulties, one of the few studies, conducted by Abulizi and colleagues (2017), suggests the relation between these characteristics in preschool children. The authors followed 1,184 pairs of mothers and children with temperament assessments from 12 months to 5,5 years when mothers evaluated children's behavior on the SDQ scale. It was found that a high level of emotionality, as a dimension of children's temperament, predicts emotional difficulties, behavioral problems, and hyperactivity in preschool-aged children. A high level of activity was significantly associated with later behavioral problems.

Even though there is a small number of studies which have studied the SDQ in relationship with children's temperament, much greater number of studies have examined the relationship between children's temperament and internalized/externalized problems (Brajša-Žganec, 2014; Greenberg et al., 1999; Vulić-Prtorić, 2002; Martinac Corčić, Smojver-Ažić & Mihac, 2014; Novak & Bašić, 2008; Oland & Shaw, 2005; Weiss, Susser & Catron, 1998). Those studies established a significant correlation between these variables and gender differences and the significant effect of the interaction with parent(s). Oland and Shaw (2005) determined that the rigidity of children's temperament is directly and strongly associated with internalized problems, and this was found in a greater level in girls. However, it is very important to emphasize the results from longitudinal studies which revealed that difficult temperament is not always related to psychological problems if parents had the ability to cope and adequately respond to a child's temperament (Vulić-Prtorić, 2002).

Our main research aim was to explore the relationship between teachers' assessment of children's temperament and their strengths and difficulties. Also, we wanted to test the predictive value of children's temperament for children's strengths and difficulties. Based on the presented theoretical background and empirical research, it was proposed that children's temperament would be significantly correlated with their strengths and difficulties. It was expected

that sociability will be positively related to pro-social behavior and negatively with all difficulties, while emotionality and activity will be negatively correlated with pro-social behavior and positively with all difficulties.

Method

Participants

The research was conducted in 6 kindergartens in Primorje-Gorski Kotar County, where 29 preschool teachers assessed the temperament and the strength and difficulties of 461 preschool-aged children. The average age of the evaluated children was $M = 5.00$ years ($SD = 1.17$), ranging from 1.5 to 7.5 years. Out of the total number of children, 241 were male (52.28%) and 220 female (47.72%). The sample of children was examined in four selected cities. Due to the anonymity of the participants, the names of the participating cities and kindergartens are left unmentioned.

Measures

The EAS questionnaire (Buss & Plomin, 1984, adapted and validated in Tatalović Vorkapić & Lončarić, 2015) contains 15 items in three subscale dimensions: emotionality (item example: "Cries easily"; $\alpha = 0.87$), activity $\alpha = 0.83$ (item example: "Is always on the go") and sociability $\alpha = 0.76$ (item example: "Is very sociable"). Evaluations were done on a 5-point scale (from 1 = "Not characteristic or typical of this child" to 5 = "Very characteristic or typical of this child").

The Strengths and Difficulties Questionnaire (Goodman, 1997; Tatalović Vorkapić, Slaviček & Vlah, 2017) is intended for assessing the behavioral and emotional strengths and difficulties of children and adolescents. In this study, the R 4-17 version of the SDQ, which was translated into Croatian by Hamilton and Momčilović, was applied (Goodman, 2005). The SDQ contains 25 items divided into 5 subscales: pro-social behavior ($\alpha = 0.63$, "Helpful if someone is hurt"), hyperactivity ($\alpha = 0.84$, "Restless, overactive"), emotional problems ($\alpha = 0.73$, "Many fears, easily scared"), conduct problems ($\alpha = 0.78$, "Often fights with other children"), and peer relationship problems ($\alpha = 0.78$, "Rather solitary, tends to play alone"). The validation study (Tatalović Vorkapić, Slaviček & Vlah, 2017) confirmed the assumed 5-factor structure of this scale. Higher results in the subscale hyperactivity, emotional problems, conduct problems, and peer problems indicate high difficulty levels, whereas higher results in the subscale of pro-social behavior indicate a higher level of positive behavior. In this

study, we used a version of the R 4-17 SDQ questionnaire in which the task of the preschool teacher was to evaluate a claim pertaining to a particular child on a scale of 1 to 3 (1 = "Not true", 2 = "Somewhat true", 3 = "Certainly true").

Procedure

The research was conducted as part of the research carried out at the Faculty of Teacher Education, University of Rijeka. The data were collected after obtaining formal permission to cooperate with the headmasters of preschools in the abovementioned cities. After the required permission had been obtained, those preschool teachers who had given their verbal informed consent participated in the research. It was emphasized that the behavior of children in certain situations was very important and preschool teachers were encouraged to provide objective answers. The preschool teachers assessed the children's behavior that was observed over six months. The research started after parental verbal informed consent forms were gathered. Data collection was anonymous and confidential given that children were evaluated by preschool teachers from their groups and a code was used to mark each child. The SPSS 20 statistical program was used for data analysis.

Results

EAS dimensions and SDQ

Table 1 shows the descriptive results of the estimated three dimensions of temperament and strength and difficulties of the children. The mean value determined in the subscale of children's strength, i.e., in the dimension of pro-social behavior is high, in the dimension of hyperactivity moderate, and in the dimensions of conduct problems, peer problems, and emotional problems the values are low.

With regard to the temperament estimates of children, a high level of sociability was determined in this study (Table 1). Furthermore, the mean level of activity was moderate, while the mean level of the emotionality was low. Concerning the analysis of the relationship between gender and age and the main variables and their interrelation, the correlation analysis results can be seen in Table 1. Emotionality was significantly positively related to all the difficulties and negatively with pro-social behavior. Activity was significantly positively related to hyperactivity and conduct problems, while it was significantly negatively related to pro-social behavior and emotional problems. Finally, Sociability showed rather different patterns of relationship with strength and difficul-

Table 1. Descriptive parameters for each subscale from the EAS and SDQ scales and their Spearman's correlation coefficients with gender and age.

	M (SD)	E	A	S	PB	HYP	EP	CP	PP	Gender	Age
E	2.40 (1.03)	-	.24**	-.38**	-.28**	.28**	.44**	.36**	.36**	-.03	-.17**
A	2.93 (0.97)		-	.23**	-.17**	.57**	-.16**	.46**	-.04	-.31**	-.03
S	4.03 (0.65)			-	.35**	-.25**	-.46**	-.12**	-.51**	.02	.26**
PB	2.52 (0.48)				-	-.51**	-.41**	-.52**	-.44**	.24**	.23**
HYP	1.68 (0.57)					-	.19**	.51**	.27**	-.29**	-.20**
EP	1.24 (0.36)						-	.30**	.43**	.08	-.14**
CP	1.42 (0.48)							-	.30**	-.14**	-.11*
PP	1.22 (0.31)								-	-.02	-.22**
Gender										-	.04
Age											-

Legend: * $p < .05$; ** $p < .01$; SDQ-subscales (PB-pro-social behavior, HYP-hyperactivity, EP-emotional problems, CB-conduct problems, PP-peer problems) and EAS-subscales (E-emotionality, A-activity and S-sociality); Gender: 1-male, 2-female.

ties contrary to the prior two temperament dimensions. It was significantly negatively related to all the difficulties and significantly positively related to the strength, i.e., pro-social behavior.

Temperament and SDQ relationship

It was found in this research that the greater emotionality of children was significantly associated with the lower pro-social behavior and significantly greater difficulties. Therefore, the higher the emotionality, the less pro-social behavior, and more hyperactivity and emotional, conduct, and peer problems a child shows. Regarding the temperament activity dimension, it was found that the more active a child was, the less pro-social behavior he/she exhibited, as well as fewer emotional problems, but significantly more hyperactivity and conduct problems. In addition, no significant correlation was found between activity and peer problems. Finally, higher levels of sociability were significantly correlated with higher levels of pro-social behavior and negatively with all the difficulties.

Regarding the prediction analysis, the hierarchical regression analysis (HRA) generally showed that all three dimensions of temperament are significant predictors of strength and difficulties in preschool children. All determined findings from the hierarchical regression analyses can be seen in Table 2. It is observable that the total contribution of temperament in the explained variance of strength and difficulties is as follows: for pro-social behavior 23%, for hyperactivity 42%, for emotional problems 36%, for conduct problems 30%, and for peer problems 35%. A higher level of emotionality was a significant positive predictor of higher levels of emotional and conduct problems and of problems in peer relations. Therefore, the greater emotionality in children the more significantly it predicts the greater emotional, conduct, and peer problems. A higher level of activity was a significant predictor of lower levels of pro-social behavior and emotional problems and, on the other hand, it was a significant predictor of higher levels of hyperactivity and conduct problems. It was established that sociability was a significant predictor of all the SDQ-dimensions; it was a predictor of higher levels of pro-social behavior and lower levels of all the difficulties in preschool children.

Regarding the regression analyses in Model 2, gender and age were put in the second step given that they showed a significant relationship with focused variables, although analyzing their effect was not within the main aim of the study. With regard to the findings from the HRA, gender showed to be a significant predictor only of pro-social behavior (in favor of girls) and hyperactivity (in favor of boys), while age was not a significant predictor of the five SDQ dimensions.

Table 2. Results of five hierarchical regression analyses with five SDQ dimensions as a criterion variable and with three EAS-dimensions and children's gender and age as predictors

SDQ	Predictors	β	R^2	F change	
PRO-SOCIAL BEHAVIOUR	Model 1	Constant Emotionality Activity Sociability	-.03 -.28** .45**	.23**	$F(3, 290)=29.21^{**}$
	Model 2	Constant Emotionality Activity Sociability Gender ^a Age	-.05 -.24** .43** .12* .03	.25	$F(2, 288)=2.69$
	Model 1	Constant Emotionality Activity Sociability	-.04 .66** -.29**	.42**	$F(3, 287)=68.65^{**}$
	Model 2	Constant Emotionality Activity Sociability Gender ^a Age	-.02 .60** -.26** -.15** -.05	.44**	$F(2, 285)=5.54^{**}$
	Model 1	Constant Emotionality Activity Sociability	.30** -.17** -.42**	.36**	$F(3, 286)=54.71^{**}$
	Model 2	Constant Emotionality Activity Sociability Gender ^a Age	.29** -.14* -.44** .08 .05	.37	$F(2, 284)=1.62$
CONDUCT PROBLEMS	Model 1	Constant Emotionality Activity Sociability	.14** .50** -.13*	.30**	$F(3, 290)=40.56^{**}$
	Model 2	Constant Emotionality Activity Sociability Gender ^a Age	.14* .52** -.14* .02 .03	.30	$F(2, 288)=0.21$
	Model 1	Constant Emotionality Activity Sociability	.14** .05 -.55**	.35**	$F(3, 287)=51.76^{**}$
	Model 2	Constant Emotionality Activity Sociability Gender ^a Age	.14** .04 -.54** .02 -.05	.35	$F(2, 285)=0.679$

Legend: * $p < .05$; ** $p < .01$; ^a Gender: 1-male, 2-female.

Gender and age relationships with SDQ- and EAS dimensions

A significant positive correlation was found between gender and pro-social behavior, and a negative correlation between gender and hyperactivity and conduct problems (Table 1). In other words, in this research, the girls were estimated to be more pro-social, while the boys were estimated to be more hyperactive and showing more conduct problems. Regarding temperament, gender was significantly negatively linked to activity, meaning that boys were evaluated as significantly more active than girls.

As far as age is concerned, a significant positive correlation was established between age and sociability. On the other side, a significant negative correlation was determined between age and emotionality. Age analyses regarding the SDQ-dimensions revealed that age was positively correlated with strength (pro-social behavior) and negatively with difficulties. In other words, the older children were rated as significantly less hyperactive and having significantly fewer emotional, conduct, and peer problems. Accordingly, age is significantly related to the strength in that the older children were rated as exhibiting more pro-social behavior.

Discussion

With the aim of analyzing the findings on the descriptives on the strength and difficulties in this sample of preschool children, it could be seen that the results are within the expected range of the results from previous research studies as followed. Therefore, similar results were obtained in previous research by Smits and colleagues (2008), on a sample of children between the ages of 7 and 13, Marryat and colleagues (2014) on a sample of children between the ages of 4 and 5, and Abulizi and colleagues (2017) on a sample of five-year-olds. These research findings (Abulizi, 2017; Marryat et al., 2014; Smits et al., 2008) demonstrated that pro-social behavior was rated as moderate to high, and children's difficulties were rated as moderate to low. These findings were expected, given that the majority of children demonstrate positive developmental pathways as described in their strengths, i.e., social skills development and active pro-social behavior, while there is a small number of children who show a different kind of difficulties (Mayr & Ulich, 2009).

Regarding the descriptive analyses results on temperament dimensions of the preschool children, it can be concluded that in this research children were on average estimated to be sociable and low on emotionality – meaning they are not “easily excited” and are not “irritable”. By comparing this data with the results of previously conducted research, at the national level (Sindik & Basta-

Frlić, 2008; Tatalović Vorkapić & Lončarić, 2015), as well as the international (Mathiesen & Tambs, 1999), it could be seen that there is an agreement regarding the higher level of sociability, a somewhat lower level of activity, and the lowest level of emotionality among preschool children.

The relationship between temperament, strength and difficulties, age, and gender among preschool children

The correlation results demonstrated expected relations between children's temperament characteristics and their strength and difficulties. A higher level of emotionality was significantly related to lower pro-social behavior and higher difficulties in preschool children. Such results were expected because developmental theories confirm that the emotionality of a child is manifested in the speed of his/her negative reactions to the environment (Berk, 2015). Consequently, this has a greater presence of the aforementioned difficulties. Therefore, emotionality as a temperament dimension has a significant negative effect regarding the development of children's strength and, on the other hand, it has a great effect related to early detection and intervention due to its relationship with emotional and conduct problems, problems with peers, and hyperactivity. A discussion of the relationship between activity and strength and difficulties in this sample revealed that conduct problems and hyperactivity were related to more activity in children, while pro-social behavior decreased with his/her greater activity. It is logical to expect that a child who is extremely active will be evaluated as significantly more restless and showing a greater frequency of those behaviors that do not meet the expectations and requirements of the environment. These results are in line with the theoretical characteristics of activity in a child who is estimated to be extremely excited and lively (Tatalović Vorkapić & Lončarić, 2015). The negative association between activity and emotional problems is interesting. A possible explanation might be that children that are more active have a greater ability to easily deal with negative emotions, due to their greater physical activity. Finally, a positive relationship between sociability and pro-social behavior was expected to be determined, and a negative relationship between sociability and all children's difficulties. The theoretical settings of sociability (Bus & Plomin, 1984) refer to a child's preference to often encourage contacts and interaction with others, which is the basis for the development and promotion of pro-social behavior and for significantly fewer emotional and conduct problems, lower hyperactivity, and fewer peer problems. The findings of this research are fully in line with the findings of Abulizi and associates (2017).

Furthermore, since numerous research studies clearly demonstrated a significant effect of gender and age while analyzing children's temperament

(Tatalović Vorkapić, & Lončarić, 2015), children's strength and difficulties (Kalsen et al., 2000), and internalized/externalized problems (Novak & Bašić, 2008; Martinac Dorčić, Smojver-Ažić & Mihac, 2014), their relationships with the SDQ-dimensions and EAS-dimensions were presented here. The girls were estimated to be significantly more pro-social, while the boys were estimated to be significantly more hyperactive and exhibit conduct problems. Compared to Kalsen et al. (2000), similar results show gender differences in the sample of children between the ages of 4 and 16 years. Namely, it was found that there were significantly more reported difficulties among boys than girls. Regarding temperament, gender was significantly negatively linked to activity, meaning that boys were evaluated as significantly more active than girls. This is in a line with the previous results of empirical research (Tatalović Vorkapić & Lončarić, 2015), and with the observed gender differences in psychomotor development (Wenar, 2003).

Focusing on the relationship between children's strength and difficulties and their age, it was established that pro-social behavior was positively related to age, while all the difficulties were negatively related to age. Just as earlier, these findings are in line with the previous research by Gao et al. (2013) on a sample of children between the ages of 5 and 13, in which it was found that difficulties decrease and strength of children increase with age. These age differences are presumably determined by the children's maturation and developmental characteristics during the early and preschool age. Similarly, the analyzed relationship between age and temperament dimensions revealed expected results: sociability was positively related to age and emotionality was negatively related with age. These findings are in line with the previous research and developmental characteristics related to the temperament of children (Tatalović Vorkapić & Lončarić, 2015).

The results from the regression analyses confirmed the previous findings from the review study of Stone and colleagues (2010), in which it could be seen that similar measures of children's behavior successfully predict children's strength and difficulties. Therefore, it was expected that higher emotionality in children would significantly predict higher levels of emotional and conduct problems, which consequently significantly predict a higher level of problems within the interaction with other children. The higher level of emotionality in children directly proposed a higher level of various problems within the children's socio-emotional development (Novak & Bašić, 2008), which should be recognized on time within the program of early intervention.

The temperament dimension activity showed a dual role in predicting the SDQ-dimensions. The findings from our study implicate that highly active children are significantly more prone to be less pro-social and have fewer emo-

tional problems. As it was previously explained, it is possible that highly active children, due to their higher level of activity, have a better way of reducing negative emotions and tensions than children who are less active. On the other hand, as expected and due to the higher level of activity, children were at a higher risk of being perceived as more hyperactive and as having more conduct problems, similarly as shown in Abulizi and colleagues' study (2017). This could be easily explained by the symptoms within hyperactivity disorder and conduct disorder according to DSM-V (2013).

Finally, the analysis of the predictive power of sociability as a temperament dimension reveals that, as expected, highly sociable children were significantly more pro-social and had significantly less hyperactivity, fewer emotional problems, conduct problems, and peer problems. This is the temperament dimension that is a highly protective factor in the children's early development and should be highly nurtured in the early and preschool years (Abulizi et al., 2017).

Regarding the regression analyses results about gender and age prediction power, gender showed a significant effect related to pro-social behavior and hyperactivity, as expected. These results are in line with prior studies (Kalsen et al., 2000). However, the question of the real gender differences remains open to discussion and new research studies.

There are several study limitations which should be considered while trying to generalize the results and make some conclusion. Firstly, the subscale for evaluating pro-social behavior showed a satisfactory but rather a small level of reliability, which should be taken into account while considering the results. Secondly, owing to the possibilities in the context of early and preschool care and education, the study used a relatively small, non-random sample. Also, the research is grounded on dependent data regarding the way of evaluating children by their preschool teachers instead of having one independent evaluator for all the children that participated in the study, which should be taken into account in future research.

Furthermore, all similar research studies (Stone et al., 2010) clearly demonstrated that longitudinal and multi-informed studies (those which use multiple sources about children's behavior) are preferable in attempting to reach the most valid and reliable findings. These two conditions were not met in this research study since only the evaluations from the preschool teachers have been collected at one time-point. The question of the evaluations that were prepared only by preschool teachers, which could be related with the previously open discussion on the real ground for gender differences. Is there a reason there are recognized differences in the ways of supporting resistance in boys and girls with regard to their different ways of growth and development (Turner, Norman & Zunz, 1995), or do these differences actually exist? There is still an open

question of whether or not we can ascribe such estimations to stereotypical views and understanding of the male and female gender. It would certainly be interesting to conduct a similar research with operationalization and temperament measurement in another way. Moreover, parents' rating should be used and children should be monitored longitudinally in these dimensions, which would provide a greater number of responses with a view to better understand the relationship being investigated. Nevertheless, this type of study, to the authors' knowledge, has been conducted in our country for the first time, so the contribution of this research is reflected in the confirmation of an earlier study that demonstrated the relationship between the temperament of children and their strength and difficulties. Therefore, this study could serve as a solid ground for similar research studies in the future.

Conclusion

This study aimed to examine the relationship between strengths and difficulties of preschool children and their temperament. The teachers' assessment of the behavior of the children showed higher pro-social behavior and sociability and a lower level of difficulties and emotionality. The correlation analysis resulted in the boys being evaluated as significantly more hyperactive and with a greater number of behavioral problems, while the girls were evaluated as significantly more pro-social. It was found that the difficulties and the increase in strength decrease with age, which could be expected from a developmental perspective. Children who are more emotional are more likely to experience all forms of difficulties. Pro-social behavior and emotional problems decrease significantly with an increase in activity, but hyperactivity and conduct problems increase. Pro-social behavior increases and children's difficulties decrease with increased sociability. Finally, all three dimensions of temperament represent significant predictors of strengths and difficulties in preschool-aged children.

References

- Abulizi, X., Pryor, L., Michel, G., Melchior, M., van der Waerden, J. (2017). Temperament in infancy and behavioral and emotional problems at age 5.5: The EDEN mother-child cohort. *PLoS ONE* 12(2), e0171971. doi:10.1371/journal.pone.0171971
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing.
- Berk L. E. (2015). *Dječja razvojna psihologija* [Child developmental psychology]. Jastrebarsko: Naklada Slap.

- Borg, A. M., Kaukonen, P. Salmelin, R., Joukamaa, M. & Tamminen, T. (2012). Reliability of the strengths and difficulties questionnaire among Finnish 4-9-year-old children. *Nordic Journal of Psychiatry*, 66(6), 403-413. doi: 10.3109/08039488.2012.660706
- Brajša-Žganec, A. (2014). Emotional life of the family: parental meta-emotions, children's temperament and internalising and externalising problems. *Društvena istraživanja*, 23(1), 25-45.
- Buss, A. H. & Plomin, R. (1984). *Temperament: Early Developing Personality Traits*. Hillsdale, NJ: Erlbaum.
- Cury, C. R. & Golfeto, J. H. (2003). Strengths And Difficulties Questionnaire (SDQ): A study of school children in Ribeirão Preto. *Revista Brasileira de Psiquiatria*, 25(3), 139-45.
- Doi, Y., Ishihara, K. & Uchiyama, M. (2014). Reliability of the Strengths and Difficulties Questionnaire in Japanese preschool children aged 4-6 years. *Journal of Epidemiology*, 24(6), 514-518. doi: 10.2188/jea.JE20140050
- Gao, X., Shi, W., Zhai, Y., He, L. & Shi, X. (2013). Results of the parent-rated strengths and difficulties questionnaire in 22,108 primary school students from 8 provinces of China. *Shanghai Archives of Psychiatry*, 25(6), 364-74.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of Child Psychology and Psychiatry*, 38, 581-586.
- Goodman, R. (2005). *Upitnik sposobnosti i poteškoća (SDQ-Cro)* [The Strengths and Difficulties Questionnaire]. Retrieved from <http://www.sdqinfo.com/py/sdqinfo/b3.py?language=Croatian>
- Greenberg, M., Domitrovich, C. & Bumbarger, B. (1999). *Preventing mental disorders in school-age children - A review of the effectiveness of prevention programs*. Pennsylvania: Prevention Research Center for the Promotion of Human Development, Pennsylvania State University.
- Kalsen, H., Woerner, W., Wolke, D., Meyer, R., Overmeyer, S., Kaschnitz, W., Rothenberger, A. & Goodman, R. (2000). Comparing the German Versions of the Strengths and Difficulties Questionnaire (SDQ-Deu) and the Child Behavior Checklist. *European Children and Adolescent Psychiatry*, 9(4), 271-276.
- Kim, M. H., Ahn, J. S. & Min, S. (2015). Psychometric properties of the self-report version of the Strengths and Difficulties Questionnaire in Korea. *Psychiatry Investigation*, 12(4), 491-499. doi: 10.4306/pi.2015.12.4.491
- Marryat, L., Thompson, L., Minnis, H. & Wilson, P. (2014). Associations between social isolation, pro-social behavior and emotional development in preschool aged children: a population based survey of kindergarten staff. *BMC Psychology*, 2(1), 44.
- Martinac Dorčić, T., Smojver-Ažić, S. & Mihac, M. (2014). Problemi u ponašanju kod male djece: Uloga temperamenta i roditeljskih reakcija [Behaviour problems in young children: The role of temperament and parental reactions]. In: Pavlin-Bernardić, N., Jokić, B., Lopižić, J., Putarek, V., Vlahović-Štetić, V. (Eds.). *22nd Annual Psychology Conference: How to colour the education?*. Zagreb: Croatian Psychological Association, p. 194.

- Mathiesen, K. S. & Tambs, K. (1999). The EAS Temperament Questionnaire: Factor structure, age trends, reliability, and stability in a Norwegian sample. *Journal of Psychology and Psychiatry and Applied Disciplines*, 40(3), 431–439.
- Mayr, T. & Ulich, M. (2009). Social-emotional well-being and resilience of children in early childhood settings - PERIK: an empirically based observation scale for practitioners. *Early Years: An International Journal of Research and Development*, 29(1), 45-57.
- Mieloo, C., Ratt, H., Oort, F., Bevaart, F., Vogel, I., Donker, M. & Jansen, W. (2012). Validity and reliability of the Strengths and Difficulties Questionnaire in 5-6 year olds: Differences by gender or by parental education? *PLoS One*, 7(5).
- Novak, M. & Bašić, J. (2008). Internalizirani problemi kod djece i adolescenata: Obilježja i mogućnosti prevencije [Internalized problems in children and adolescents: Characteristics and prevention possibilities]. *Ljetopis socijalnog rada*, 15(3), 473-498.
- Oland, A. & Shaw, D. (2005). Pure versus co-occurring Externalizing and internalizing symptoms in children: Potential role of socio-developmental milestones. *Clinical Child and Family Psychology Review*, 8(4), 247-270.
- Rijavec, M., Brdar, I. & Miljković, D. (2008). *Pozitivna psihologija* [Positive psychology]. IEP, Zagreb.
- Shibata, Y., Okada, K., Fukumoto, R. & K. Nomura (2015). Psychometric properties of the parent and teacher forms of the Japanese version of the Strengths and Difficulties Questionnaire. *Brain & Development*, 37(5), 501-507. doi: 10.1016/j.braindev.2014.08.001
- Sindik, J. & Basta-Frljić, R. (2008). Povezanost karakteristika temperamenta i spremnosti djece za školu. *Magistra Iadertina*, 3(6), 147-169.
- Smits, I. M., Theunissen, M. H. C., Reijneveld, S. A., Nauta, M. H. & Timmerman, M. E. (2008) The strengths and Difficulties Questionnaire (SDQ) in community and clinical populations. *The British Journal of Psychiatry*, 177(6), 534-539.
- Stone, L. L., Otten, R., Engels, R. C., Vermulst, A. A. & Janssens, J. M. (2010). Psychometric properties of the parent and teacher versions of the strengths and difficulties questionnaire for 4- to 12-year-olds: a review. *Clinical Child and Family Psychology Review*, 13(3), 254-274. doi: 10.1007/s10567-010-0071-2
- Tatalović Vorkapić, S. (2015). How much personality is important in educational context? In: M. Orel (Ed.) *International Conference EDUvision 2015: "Modern Approaches to Teaching Coming Generation"* (pp. 75-83). EDUvision, Stanislav Jurjevčič, Ljubljana, Slovenija. <http://eduvision.si/Content/Docs/Zbornik%20prispevkov%20EDUvision%202015.pdf>
- Tatalović Vorkapić, S. (2016). Assessing the child temperament: Contemporary challenges regarding the various raters. In: M. Orel (Ed.) *International Conference EDUvision 2016: "Modern Approaches to Teaching Coming Generation"* (pp. 274-285). EDUvision, Stanislav Jurjevčič, Ljubljana, Slovenija.
- Tatalović Vorkapić, S. (2017). Personality and Education: Contemporary issues in psychological science about personality in teacher education. In: C. Martin & D. Polly (Eds.), *Handbook of Research on Teacher Education and Professional*

Development Professional Development. A volume in the Advances in Higher Education and Professional Development (pp. 163-186). USA: IGI Global.

- Tatalović Vorkapić, S. & Lončarić D. (2015). Measuring Preeschool Children Temperament: Implications for Preeschool Care and Education Practice. *International Journal of Educational Psychology*, 4(3), 280-30.
- Tatalović Vorkapić, S. & Žagar, J. (2017). *Is the evaluation of children's temperament independent from pre-school teachers' personality?* In: Z. Bekirogullari, M. Y. Minas & R. X. Thambusamy (Eds.) *The European Proceedings of Social & Behavioural Sciences (EpSBS)*, XX, (pp. 84-96). 5th icCSBs 2017 The Annual International Conference on Cognitive-Social, and Behavioural Sciences, Future Academy Conferences, Brno, 9-11. January. doi:10.15405/epsbs.2017.01.02.10
- Tatalović Vorkapić, S., Slaviček, M. & Vlah, N. (2017). Strengths and difficulties in Croatian preschool children: Validation of the Strengths and Difficulties Questionnaire. *Hrvatska revija za rehabilitacijska istraživanja*, 53, Supplement, 226-238.
- Turner, S., Norman, E. & Zunz, S. (1995) Enhancing resilience in girls and boys: A case for gender specific adolescent prevention programming. *Journal of Primary Prevention*, 16(1), 25-38.
- Vasta, R., Haith, M. M., Miller, S. A. (1998). *Dječja psihologija* [Child psychology]. Jastrebarsko: Naklada Slap.
- Weiss, B., Susser, K. & Catron, T. (1998). Common and specific features of childhood psychopathology. *Journal of Abnormal Psychology*, 107(1), 118-127.
- Vulić-Prtorić, A. (2002). Obiteljske interakcije i psihopatološki simptomi u djece i adolescenata (Family interactions and psychopathological symptoms in children and adolescents). *Suvremena psihologija*, 5(1), 31-51.
- Wenar, C. (2003). *Razvojna psihologija i psihijatrija: Od dojenačke dobi do adolescencije*. [Developmental psychology and psychiatry: From infancy through adolescents]. Jastrebarsko: Naklada Slap.
- World Health Organization (1992). *International classification of diseases 10th edition: Classification of mental and behavioral disorders*. Geneva: WHO.
- Zentner, M. & Bates, J. E. (2008). Child temperament: An Integrative Review of Concepts, Research Programs, and Measures. *European Journal of Developmental Sciences*, 2(1/2), 7-37. doi: 10.3223/DEV-2008-21203

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Elements of creative therapy in education of primary school pupils on type 1 diabetes

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Abstract

Background and aims: The critical period for children with diabetes mellitus is early school age when they start their own care and control of the disease. These children are part of the school's social environment that can have a positive or negative impact on their social development. The aim of this study was to: (1) assess the knowledge and awareness of a healthy primary school population about type 1 diabetes and (2) implement and evaluate a creative-educational workshop for primary school lower grades pupils about type 1 diabetes.

Method: Participants were healthy primary school pupils ($n = 84$) aged 6 to 11 years. For this research, the Questionnaire for the Assessment of Knowl-

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edge and Awareness of Diabetes in Primary School Population was developed and applied before the workshop and one month after it. The workshop comprised an application of art techniques (storytelling, drama, movement) with the goal of elaborating the metaphorical content about the relationships between Rino, a little bear who has diabetes, and his animal friends, who show different reactions to his disease.

Results: In the initial assessment, the pupils showed low and moderate knowledge about the name, signs, and infectiousness of diabetes, the definition of insulin and glucose, and procedures in case of hypoglycemia. All evaluated items on the awareness of social issues of diabetes had a high percentage in the zone of positive attitudes. One month after the workshop, there was a significant increase in the reported knowledge and in the more positive perception of pupils with diabetes.

Conclusion: These results confirm the value of development of new educational and therapeutic methods with the goal of enhancing knowledge and awareness of type I diabetes among the healthy school population and thus improving the quality of life of their peers with diabetes.

Keywords: Type 1 diabetes, creative therapy, psychosocial support, evaluation

Introduction

Diabetes

Diabetes is fundamentally categorized into three groups: a) type 1 diabetes that causes destruction of β cells of the pancreas (islets of Langerhans), which are responsible for insulin production, thus leading to an absolute insulin deficiency, b) type 2 diabetes which can vary from insulin resistance (with relative insulin deficiency) to secretion disorders with or without insulin resistance, and c) gestational diabetes, which occurs during pregnancy. The most common clinical signs of diabetes are polyuria (frequent urination), polydipsia (increased thirst), polyphagia (increased appetite), weight loss, and weakness (Dumić, 2011). The most common symptoms of type I diabetes become apparent when for some reason there is an increased need for insulin and it cannot be compensated by increased insulin secretion (Pavlić Renar, 2009).

Type 1 diabetes is also called juvenile diabetes, but it is known that people of all ages can be affected by this type of disease (Dumić, 2011; Pavlić Renar, 2009). The number of male and female patients is approximately equal, usually with male gender predominance. The incidence of type I diabetes in Croatia is 7/100 000 (Severinski, Butorac Ahel, & Božinović, 2016). It is worrying that the results of most studies show an increase in the incidence of type I diabetes in the last decades, and this trend is most pronounced in the group of children up to age 5, and it has become one of the most common chronic diseases of childhood (Vorko-Jović et al., 2010).

The increased risk of type I diabetes is associated with many environmental factors such as various viruses, short duration of breastfeeding, low zinc intake, maternal age, etc. (Vorko-Jović, Strand, Rudan, 2010). Regardless of all known and potentially preventable risk factors, there is no practical primary prevention of the development of type I diabetes (Vorko-Jović et al., 2010). At present, it is possible to prevent only additional complications caused by improper treatment in order to preserve healthy beta cells with timely and accurate therapy (Batinica, Grugurić, Jadrijević-Cvrilje, 2013).

In addition to the medical treatment by using insulin (via injection or insulin pump), children with type I diabetes mellitus must comply with the prescribed diet plan, which refers to the regularity of meals, food composition, the number of daily required calories, and regular control of the sugar level in blood and urine. They must be educated about the signs of hypoglycemia and hyperglycemia, or have an active attitude towards their disease and act conscientiously and responsibly in accordance with the expert team's recommendations (Dumić, 2011). In order to have proper self-control at all times of a child's life, apart from the education of the child, it is necessary to ensure the education of family and friends, as well as the entire social network where the child is spending parts of his/her day (Kaličanin, 2009).

Studies have shown that people with type I diabetes can achieve an excellent level of self-control, but that it is necessary to develop coping mechanisms that include solving problems by seeking social support and gathering information to prevent acute and chronic complications (Karlsen & Bru, 2002; according to Petričić & Vulić-Prtorić, 2009).

There are several stages of development in childhood and adolescence, and there are constant physical, psychological, and social changes. Each phase is marked by the specifics that are reflected in the perception of the disease and relation to it (Dumić & Špehar Uroić, 2010). By the age of five, children are under the influence of their parents and experience the disease mostly in the way their parents experience it, and at this age parents' education is very important. What follows is a period of separation from parents and preparation for school. Children cease to be under the supervision of their parents and have to become more responsible for their disease.

Much research has concerned the adaptation of children to school obligations, social relations, and the new environment. Research also indicates the importance of a good model for adapting the child to school conditions, and the importance of school-child-family collaboration (Brizuela & Garzia-Sellers, 2008). It is important to consider physical needs, but also social and psychological needs, and implement them in a biopsychosocial model aimed not at the disease, but at the child. The benefits of the biopsychosocial model of diabetes

are demonstrated in many pieces of research, and the success of psychological education in preventing the occurrence of depression in people with diabetes, as well (Ajduković, 2013).

A professional team has a key role in educating children with diabetes, their parents, and peers. Timely and proper psychosocial intervention reduces the negative feelings towards the disease, and accordingly, the child is motivated to control the disease and prevent negative consequences in adolescence and older age (Dumić, 2011).

Art/Expressive and Creative Therapies

Psychoanalysis, social skills training, and stress control have an effect on improving metabolic control in children and adolescents of type I diabetes (McQuaid & Nassau, 1999). The results of the study showed the importance of child's participation in psychological treatment. There are various ways of providing psychosocial support to persons with chronic diseases, and recently, the influence of art/expressive and creative therapies on the various effects of chronic diseases have been very important.

Creative therapy is defined as a supportive method, focused on self-renewal, that is, the constant renewal of the body's components, and to outstretching or moving physical and mental boundaries through creativity, respectively, using art for psychotherapeutic purposes (Prstačić, 1996). The emphasis is on the creative process of releasing suppressed or any other emotions (Kudek Mirošević, 2011). Such therapy aims to revive those processes that can be the strongest stimulus for the child's imagination to accept the disease. In these imaginative new spaces, a child can experience a transformation into another being, thing, or appearance (Kudek Mirošević, 2011). All creative therapies range from the notion that every person, regardless of whether they are artistically educated or not, is able to visualize and creatively express their inner conflicts (Škrbina, 2013, according to Dubovicki 2014). Various media are used in creative and art/expressive therapies, such as painting, music, dance and movement, dramatic expression, literary expression, and bibliotherapy (Škrbina, 2013, according to Dubovicki, 2014). Along with the art media, techniques such as breathing exercises, guided imagination, clinical hypnosis, and similar techniques are also a significant part of therapy sessions, either as warm-ups for expression, relaxation, or closing of the session (Miholić et al., 2013). Thus, for example, drawing in research in the field of children's psychology has proven to be a reliable and predictive diagnostic tool and a therapeutic medium. It is a particularly valuable medium in children who, due to their intrapsychic processes and difficulties in verbal communication and expression, fail to express their experiences in their own social environment (Kojić, Zeba, & Markov, 2013). In

addition, drawing contains concrete and projective elements that can be analyzed, and based on that some conclusion can be drawn about the neurological, motoric, and emotional status of a person (Councill, 2003; Nainins et al, 2006; Prstačić, 1990; according to Miholić, Prstačić & Nikolić, 2013).

Music therapy is defined as a discipline that uses the language of sounds and music within the relationship between the client and the therapist, and it is a systematic process of intervention with preventative, rehabilitative, and therapeutic goals (Burić Sarapa and Katušić, 2012). Dance movement therapy is often used as a complementary, but also an independent method in the prevention and treatment of various psychophysical and psychosocial disorders. Using various techniques of this therapy, dance, and movements reflects the emotional state of an individual, and changes in movement patterns could cause a change in psychosocial experiences (Martinec, 2013). In drama/psychodrama, events from an individual's life or his/her emotional world are presented through role-playing in the way he/she experiences them. Emotions of anger, sadness, and happiness triggered by drama/psychodrama action are expressed and become integrated with physical, emotional, and mental experiences (Dayton, 2005, according to Kudek Mirošević, 2011). In bibliotherapy, clients, through the characters in their literary work, acquire insight into their own emotions and become capable of managing them. Awakening of imagination by reading fiction or poetry provokes emotional reactions and experiences of a child (Ayalon, 1995; according to Kudek Mirošević, 2011) and can be used as a procedure for the alleviation or treatment of negative psychic processes, i.e., the discovery and elaboration of conflicts and complexes. A literary work can thus represent one's own life drama of and bring about emotional relieving (Lecher-Švarc & Radovančević, 2015).

Creative therapies are increasingly used for therapeutic purposes in various chronic diseases, and most studies in Croatia have been done on children suffering from malignant diseases. For example, according to a research conducted by Kudek Mirošević (2011), a great influence of complementary supportive-therapeutic programmes (predominantly based on drama) has been proven during the treatment and rehabilitation of children suffering from malignant diseases. Furthermore, a research carried out by Miholić et al. (2013), as a case study of a boy diagnosed with osteosarcoma of the upper jaw, has demonstrated the value of analytical approach and complementary application of relaxation and art work (painting, sculpturing) for supporting positive coping processes (creativity, social support, emotional harmonization, etc.) within the complex psycho-oncology therapy and rehabilitation.

Effective coping with a disease through creative therapy methods depends on the child's psycho-physical adaptive capacities, cognitive and affective di-

mension, as well on the therapist's knowledge of how to counteract and deal with this disease. Symbolization, as a part of the process of creativity and imagination, can identify the links between separate and individual experiences, objects or people on the one side, and images that the patient experiences on the other (Kudek Mirošević, 2011).

It is important to note that the techniques and methods of creative therapies can be used not necessarily only for therapeutic purposes, but there are also possibilities for their wider application in education. Creativity is a powerful incentive to improve the quality of teaching, and makes teaching more effective than ordinary teaching, as it contains high intrinsic motivation to participate (Bognar, 2012).

The occurrence of any chronic illness can lead to pronounced emotional reactions and the difficulty of psychosocial adaptation to the newly emerging situation. The critical period for children with diabetes is early school age when they are somewhat separated from their parents and start their own caring for diabetes and control thereof. Also, children with an illness are part of the school's social environment that can respond to the ill child in various ways and can have a positive or negative impact on his/her social development. In line with the problem area, the aim of this study was to (1) assess the knowledge and awareness of a healthy primary school population about type 1 diabetes and (2) implement and evaluate a creative-educational workshop for primary school lower grades pupils about type 1 diabetes. The hypothesis of the research was that the implementation of creative-educational workshops for school peers of children with type 1 diabetes will improve the pupils' awareness of the disease and the implications of the disease on the affected pupils.

Method

Participants

A sample of participants included a group of healthy pupils ($n = 84$, 38 girls/46 boys) chronologically aged 6 to 11 years ($M=8.13$, $SD=1.55$). All participants were pupils of lower primary grades from 5 primary schools (PS) in the Republic of Croatia, in the area of Virovitica-Podravina County. The study included schools from two cities and three villages.

Not a single pupil in the included classes was a child with diabetes, but in every included school there was at least one pupil with the disease. Information about the previous participant's contact and experiences with persons with diabetes was discussed during the workshop and was not an item in the evaluation questionnaire.

Measures

For the purpose of the research, the Questionnaire for the Assessment of Knowledge and Awareness of Diabetes in Primary School Population was developed and applied before and one month after the creative-educational workshop. Items/variables of the Questionnaire were divided into two groups: (1) knowledge of a healthy primary school population on the implications of type 1 diabetes – general information about type 1 diabetes, and (2) awareness of a healthy primary school population of type 1 diabetes – social sensitivity for everyday problems which are related to type 1 diabetes.

The first group of items about knowledge - general information about type 1 diabetes, included 11 questions with 3 or 4 offered answers, among which only one was correct, and one of which was “I don’t know” (an example of a question and answers: “Insulin is: a. the hormone secreted by the pancreas; b. the name of the disease; c. the name of the bacterium; d. I don’t know”).

The second group of items about the awareness and social sensitivity for everyday problems related to type 1 diabetes included 9 statements and possibilities to agree or disagree with each statement (e.g., “It is not good to eat during a lesson because of disease”; “Children are guilty of being diabetic”).

The structure and content of the questionnaire were adjusted to the age of the participants and followed the idea of including the main terms and processes connected to diabetes as an introduction to the creative-educational workshop. In the analysis of results, there was no computation of the total questionnaire score, as each item was analyzed separately.

Procedures

The central part of the research was the implementation of a creative-educational workshop that lasted for 45 minutes, consisting of an application of the questionnaire (10 minutes) and a creative-educational session. The aim of this workshop was to familiarize healthy children with type 1 diabetes and its implications and to instruct them how to accept a person with type I diabetes in a positive way. The workshop was led by a graduate student of the Faculty of Education and Rehabilitation Sciences, University of Zagreb, where the application of different art/expressive methods in education and rehabilitation/therapy is part of the study programme and professional competence of an educational rehabilitator.

Every workshop started with warm-up activities for encouraging communication, spontaneity, and self-expression (e.g., name-games, movement games) and continued with the reading of the story “Teddy Bear Rino - sweet as a honey”, in which the main characters are teddy bear Rino, who has diabetes,

and his forest friends, who encounter his disease. Situations from the story were enacted and analyzed in a way of demonstrating characters' emotions and behavior through the application of drama techniques (role-play, "hot-chair" interview, discussion, sharing) and the modes of the transformation of negative emotions and behavior towards positive solutions were explored. The information about the disease was presented on an interactive poster. The final re-evaluation with the same questionnaire was done after a month.

In the implementation of the research, the Code of Education and Rehabilitation Profession and the Code of Scientific Research were followed. Special attention was devoted to the protection of the pupils who were contacted by teachers and school principals. Parents were introduced to the research through an informational leaflet and they signed the informed consent form for the participation of their child in the research.

Results

Table 1 shows the results for the group of items on the knowledge of the primary school population about type 1 diabetes. The percentages of correct answers to the questions in the questionnaire are presented in the initial (before

Table 1. *Knowledge about diabetes before and one month after the workshop*

Question	Initial (%)	Final (%)	χ^2	df	p
What is another name for diabetes?	48.0	65.0	6.92	1	.0085
What is a problem with diabetes?	69.0	67.9	0.03	1	.8675
What are the signs of diabetes?	23.8	58.3	19.28	1	.0001
What is insulin?	20.2	73.8	46.26	1	.0001
Can lifestyle affect diabetes?	72.6	83.3	2.22	1	.1364
Is diabetes infectious?	61.9	84.5	9.83	1	.0017
What is glucose?	41.7	58.3	4.02	1	.0449
How does more movement affect blood glucose levels?	54.8	51.2	0.10	1	.7572
What kind of diet is right for a person with diabetes?	96.4	98.8	0.26	1	.6128
What is a medical treatment of diabetes?	72.6	90.5	7.75	1	.0054
What should a person do when blood glucose falls?	38.1	81.0	30.27	1	.0001

Note: Percentage of correct answers is presented

the workshop) and final (1-month after the workshop) evaluation point. Statistical significance of the differences between these two results was analyzed by χ^2 test with p value set to .05.

The lowest level of initial knowledge was registered on items about the definition of insulin (20.2%), the signs of diabetes (23.8%), and the procedures in case of hypoglycemia (38.1%). Moderate initial knowledge was registered on items about another name for diabetes (48%), the definition of glucose (41.7%), the connection between blood glucose and movement (54.8%), and the infectiousness of diabetes (61.9%). The highest level of knowledge was registered on items about the main problem of diabetes (69.0%), the effect of lifestyle on diabetes (72.6%), diet and diabetes, and the medical treatment of diabetes (72.6%).

One month after the workshop, statistically significant differences in the level of knowledge were registered on items in which the results in the initial

Table 2. *Awareness of the social implications of diabetes before and one month after the workshop*

Question		Initial	Final	χ^2	df	p																																																																												
All friends are equally valuable.	Agreement (%)	83.3	94.0	3.80	1	.0513																																																																												
	Disagreement (%)	16.7	6.0				You do not have to socialize with children with diabetes.	Agreement (%)	17.9	11.9	0.75	1	.3859	Disagreement (%)	82.1	88.1	You do not have to socialize with children with chronic diseases.	Agreement (%)	33.3	11.9	9.83	1	.0017	Disagreement (%)	66.7	88.1	It's not polite to go out of the classroom because of difficulties.	Agreement (%)	28.6	11.9	6.23	1	.0125	Disagreement (%)	71.4	88.1	It is not good to eat during a lesson because of disease.	Agreement (%)	32.1	16.7	4.65	1	.0311	Disagreement (%)	67.9	83.3	Children with an insulin pump look ridiculous.	Agreement (%)	7.1	6.0	0.10	1	.7551	Disagreement (%)	92.9	94.0	It is normal to mock someone because of their difficulties or disease.	Agreement (%)	4.8	2.4	0.17	1	.6776	Disagreement (%)	95.2	97.6	Children are guilty of being diabetic.	Agreement (%)	15.5	6.0	3.05	1	.0808	Disagreement (%)	84.5	94.0	It is not right that the teacher pays more attention to the pupil with diabetes.	Agreement (%)	28.6	26.2	0.03	1
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evaluation point were low and moderate (another name for diabetes, the signs of diabetes, the definition of insulin, the infectiousness of diabetes, the definition of glucose, and the procedures in case of hypoglycemia). Also, a statistically significant difference was registered on the item about the medical treatment of diabetes, which had had high results in the initial point of evaluation.

Table 2 shows the results for the group of items on awareness and social sensitivity for everyday problems related to type 1 diabetes. The percentages of agreement and disagreement with the statements are presented in the initial (before the workshop) and final (one month after the workshop) evaluation points. Also, the statistical significance of the differences between these two results was analyzed using χ^2 test.

Based on the presented results, it is evident that all evaluated items in the initial evaluation point have a high percentage in the zone of positive attitudes according to the social issues of pupils with diabetes (friendship, group dynamic in the class, the perception of a pupil with diabetes). One month after the workshop, there was a statistically significant increase in the percentage of positive perception of children with any chronic disease (before 66.7%; after 88.1%), and in positive perception of the needs of a pupil with diabetes in school, such as going out of the classroom (before 71.4%; after 88.1%) and eating during the lesson (before 67.9%; after 83.3%).

Discussion

The aim of the research included an assessment of the knowledge and awareness of a healthy lower grade primary school population of type 1 diabetes and the evaluation of the impact of a creative-educational workshop on increasing the level of knowledge and awareness of everyday situations for pupils with diabetes. The results show a positive impact of the applied art/expressive method on the level of knowledge about diabetes and a positive impact on attitudes towards pupils with diabetes and perception of life situations that they have to deal with.

The initial settings of this research are in line with some previous research (Brizuela and Garzia-Sellers, 2008; Ajduković, 2013; Dumić, 2011), which emphasise the need for psychosocial support based on the principle of complementarity, supportivity, and biopsychosocial approach, according to the needs of a child with type I diabetes. One of the components of psychosocial support is the change of negative attitudes in the social environment of an ill child and, in other words, the process of promoting tolerance and improvement of relationships among peers. The first step in that promotion is raising awareness of the disease, its characteristics, and implications in various areas of daily

activities. For example, a healthy social environment is one of the key preconditions for proper glycaemic control (Dumić & Špehar Urojić, 2010), and peer support is only possible if pupils understand the problems of their diabetic colleagues. This research started with the shaping of the set of basic information about diabetes (definitions, physiological processes, medical treatment, etc.) to be presented to the participants and should have reduced the level of unfamiliar facts that may be the cause of prejudice and negative reactions. In the process of achieving these goals, creative art/expressive techniques, by their nature, represent an adequate method for adopting new content in a way that is close to the child's perception and expression (Bognar, 2012). The thematic story about the little bear called Rino, written for research purposes, offered a fictional space which became the framework of interest and enabled the children to identify with diseased peers and participate in drama activities which facilitated the elaboration of a demanding topic and the implementation of the information about diabetes. As registered in the post-evaluation, the level of presented information one month after the workshop and was, for most of the items, significantly higher.

In the field of awareness and social interactions, the initial evaluation showed positive attitudes according to the social issues of pupils with diabetes. These results can be interpreted by the relevance of the theme of diversity that is often included in different school educational contents, but also in the field of family upbringing. More positive perception of the needs of a pupil with diabetes in school (going out from the classroom and eating during the lesson) in the post-evaluation are connected to the specific diabetic issues and can be interpreted as the impact of the applied creative-educational process.

This process includes teachers and school associates, and it is also necessary to emphasize the importance of their education about chronic diseases and implications of this disease in the education system (Dumić, 2011). These topics should become an integral part of the curriculum (e.g., civil and health education) and extracurricular contents as well. Only in such a way will the social environment become a safe environment which will provide a healthy psychosocial development, so the development of the cooperation between the health, social, and educational system is crucial.

Since no research has been found to assess the impact of creative therapy methods in psychosocial support for children with type I diabetes mellitus, this research has made a step forward in this field. As for research limitations, it can be noted that the sample of the pupils was too small for a generalization of results across the entire population of lower grade pupils, and, for more statistically reliable results, it is necessary to extend the duration of programmes. Also, based on the experience of this research, some suggestion for future stud-

ies can be directed toward a post-evaluation after a longer period (e.g., after 6 or 12 months), the development of programs which will cover a wider spectrum of diabetic issues, and a variation of applied art/expressive media to make individual adjustments to a wider circle of participants. In general, further research should gain empirical guidance and suggestions for the implementation and evaluation of similar creative-educational programs for peers of children with all kinds of chronic conditions and disabilities.

Conclusion

The results of this research show the positive impact of the creative-educational workshop and applied art/expressive methods on the level of knowledge about diabetes in the group of healthy pupils of the lower grade primary school. The results also show positive changes in some attitudes towards peers with diabetes and the perception of life situations that they must deal with. These results confirm the value of the development of new educational and therapeutic methods with the goal of improving the awareness of type I diabetes mellitus among healthy school population and, in that way, supporting the quality of life of peers with diabetes.

References

- Ajdković, D. (2013). *Provjera biopsihosocijalnog modela u bihevioralnim pristupima šećernoj bolesti* [A verification of the biopsychosocial model in behavioral approaches to diabetes]. (Unpublished doctoral dissertation). University of Zagreb, Zagreb.
- Batinica, M., Grugurić, J., & Jadrijević- Cvrlje, F. (2013). Prevenција kroničnih bolesti i stanja u djece: Naglasci s XIII. simpozija preventivne pedijatrije [Chronic disease and health condition prevention in childhood: Emphases from the 13th symposium of preventive pediatrics]. *Liječnički Vjesnik*, 135, 213-218.
- Bognar, L. (2012). Kreativnost u nastavi [Creativity in teaching]. *Napredak*, 153(1), 9-20.
- Brizuela, B., Garcia-Sellers M. (1999). School adaptation: A triangular process. *American Educational Research Journal*, 36(2), 345-370. doi: 10.3102/00028312036002345
- Burić Sarapa, K., Katušić, A. (2012). Primjena muzikoterapije kod djece s poremećajem iz autističnog spektra [Application of music therapy in children with autistic spectrum disorder]. *Hrvatska revija za rehabilitacijska istraživanja*, 48(2), 124-132.
- Dubovicki, S. (2014). Prikaz knjige „Art terapija i kreativnost“ [Review of the book “Art therapy and Creativity”]. *Andragoški glasnik*, 18(1), 93-96.

- Dumić, M. (2011). Šećerna bolest u djece [Diabetes in children]. Zagreb: Cro-graf.
- Dumić, M., & Špehar Uroić, A. (2010). Šećerna bolest u adolescenata [Diabetes Mellitus in Adolescents]. *Medicus*, 19(1), 27-34.
- Kaličanin, I. (2009). *Vaše dijete ima dijabetes? [Does your child have diabetes?]*. Zagreb: Nika naklada.
- Kojić, M., Zeba,, R., & Markov Z. (2013). Crtež i likovni izraz u otkrivanju i suzbijanju dječje agresivnosti [Drawing and visual expression in detecting and suppressing child aggression]. *Život i škola: časopis za teoriju i praksu odgoja i obrazovanja*, 61(1), 163-176.
- Kudek Mirošević, J. (2011). Dramatizacija teksta - mogući pristup u kreativnoj terapiji djece s malignim bolestima [Dramatization of text - possible approach in creative therapy of children with malignant diseases]. *Djeca, vrtić, obitelj*, 17(66), 28-29.
- Lecher-Švarc V., & Radovančević Lj. (2015). Psihodinamski aspekti biblioterapije i prevencija suicida [Psychodynamic aspects of bibliotherapy and prevention of suicide]. *Socijalna psihijatrija*, 43(1), 20-25.
- Martinec, R., (2013). Dance movement therapy in the concept of expressive arts-therapy. *Hrvatska revija za rehabilitacijska istraživanja*. 49 (Suppl.), 143-153.
- McQuaid, E.L., & Nassau, J.H. (1999). Empirically supported treatments of disease-related symptoms in pediatric psychology: Asthma, diabetes and cancer. *Journal of Pediatric Psychology*, 24(4),305-328.
- Miholić, D., Prstačić, M., & Nikolić, B. (2013). Art/ekspresivne terapije i sofrologija u analizi mehanizama suočavanja u djeteta s malignim oboljenjem [Art/expressive therapies in the analysis of coping mechanism in child with malignant disease]. *Hrvatska revija za rehabilitacijska istraživanja*, 49(Supplement), 73-84.
- Pavlić Renar, I. (2009). Dijagnoza i liječenje šećerne bolesti tipa I [Diagnosis and treatment of type 1 diabetes mellitus]. *Medix*, 15(80-81), 100-106.
- Petričić, A., & Vulić-Prtorić, A. (2009). Neki prediktori suočavanja s dijabetesom tipa I i tipa II [Some Predictors of Styles of Coping with Diabetes Type 1 and Type 2]. *Društvena istraživanja*, 1-2(99-100), 47-65.
- Prstačić, M. (1996). *Kreativna terapija [Creative Therapy]*. U M. Turić, K. Kolarić, D. Eljuga: *Klinička onkologija*. Zagreb: Nakladni zavod Globus.
- Severinski, S., Butorac Ahel, I., Božinović, I. (2016). Šećerna bolest tipa I u dječjoj dobi [Type 1 diabetes mellitus in children]. *Medicina Fluminensis*, 52(4), 467-476. doi: 10.21860/medflum2016_4ser
- Vorko-Jović, A., Strand, M., Rudan, I. (ur.), (2010). *Epidemiologija kroničnih nezaraznih bolesti [Epidemiology of chronic non-infectious diseases diseases]*. Zagreb: Medicinska naklada.

Adolescent perception on tobacco and alcohol (non-)abuse among peers – story completion task

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Abstract

Background and aims: The aim of this study was to understand the ways in which adolescents perceive their peers who show resistance to the consumption of alcohol and tobacco products and to examine possible responses to the provided resistance.

Methods: Responses of 298 first- and third-class students of four-year high schools in Bjelovar and Zagreb were collected using a story completion task. A thematic analysis of the completed stories was used in the data processing, and the data were organized into seven superordinate themes related to the peer influence on the consumption of psychoactive substances.

Results: By examining the superordinate themes, it was possible to see the opinions of the participants who believed and stated that the adolescents can bring the decision of (non-)consuming because of their own beliefs or influence of the others. The influence of the peers was particularly emphasized

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showing it to be stronger if the peers were closer to each other, and it was noted that the peers may also influence the non-consumption of psychoactive substances. Furthermore, both the consumption and non-consumption can result in positive and negative outcomes in terms of entertainment, social consequences, and physical effects. Several strategies of resistance were noticed in the responses but not all of them resulted in the end of the pressure.

Conclusion: Finally, the analysis of the data stressed the need for raising the awareness of peer pressure in adolescence and training strategies of resistance through timely prevention programs.

Keywords: peer pressure, resistance to peer pressure, psychoactive substances, adolescence, story completion task

Introduction

Relationships among peers have an extremely significant influence on the psychosocial development throughout the adolescence when they become more intimate based on the mutual acceptance and experience sharing and an important source of support (Klarin, 2006). Building satisfying relationships with peers is connected with building personal identity (Lacković-Grgin, 2006).

It is important for adolescents to fulfill the need for affiliation, so they often conform to their peers (Lacković-Grgin, 2006). That kind of conformity often results in acceptance and a good position inside of the group, whereas non-conformity leads to a bad position or even exclusion. The most distinctive form of peer influence is peer pressure, which includes direct attempts of peers on shaping behavior. Furthermore, the most frequent forms are social modeling and antagonistic behavior, which includes threats, mockery, and teasing (Brown, Bakken, Ameringer, & Mahon, 2008).

Adolescents' inclination to experiment is what often encourages behaviors, such as consumption of alcohol and cigarettes, which already appear at the end of elementary school (Croatian Institute of Public Health, 2016). Some of the motives for consumption are personal reasons, for instance, a desire to relax and have fun, thinking that the consumption will not lead to negative consequences and that it is a normal part of growing up, and because of social reasons (Pettigrew, Miller-Day, Krieger, & Hecht, 2011).

One of the most prominent and consistent predictors of alcohol and cigarette consumption among the youth is peer pressure (Chen et al., 2006; Harakeh & Vollebergh, 2012; Kiuru et al., 2010; McVicar, 2011; Varela & Pritchard, 2011), and the fact that adolescents are ready to consume the substances even when they do not want to in order to gain respect from their peers says enough about its power (Kiran-Esen, 2003). However, it is noticeable that adolescents have a tendency of joining groups which are similar to them in the consumption of

psychoactive substances and that there is generally a higher probability that they are going to consume substances in the company of someone they consider a friend (Ennett & Bauman, 2006; Leung, Toumbourou, & Hemphill, 2014).

It has also been shown that adolescents who are more popular consume some sort of psychoactive substances more often (Van Den Broek, Deutz, Schoneveld, Burk, & Cillessen, 2015). On the other hand, it has been found that groups with a lower prevalence of consumption perceive peers that do consume as less popular and vice versa (Alexander, Piazza, Mekos, & Valente, 2001). Furthermore, peers of higher social status have a stronger impact on the standards of (non-)consumption (Teunissen et al., 2012).

Despite the strong effect of peer pressure, it is not absolute and not all adolescents subject to it, but rather those with a negative self-image and low self-esteem (Lebedina-Manzoni & Ricijaš, 2013). Moreover, parental supervision, support, and inclusion proved to be the most consistent protective factors concerning substance abuse (Lebedina-Manzoni & Ricijaš, 2013; Wood, Read, Mitchell, & Brand, 2004). The main reasons for the resistance were avoiding problems with parents and law, disliking psychoactive substances, concern for health, and previous negative experiences, either personal or the experiences of others (Pettigrew et al., 2011).

The usual ways of showing resistance can be divided into four categories (Pettigrew et al., 2011). *Rejection* is the simplest form of resistance and is often accompanied by an explanation of giving reasons for rejecting the offer. *Avoidance* leads to not getting into a situation in which there is a possibility of the influence, and by the *departure*, a person abandons those types of situations (Pettigrew et al., 2011). Rejection has been shown to be the most commonly used form of resistance and a good predictor of cigarette non-smoking in the future (Gibbon, Griffin, Tanno, Tanigawa, & Botvin, 2014), since a direct rejection gives peers the information that a person will not give up so cigarette consumption offers cease (Charlton, Minagawa, & While, 1999; Gibbon et al., 2014).

A key source of information on the prevalence of alcohol and tobacco consumption among adolescents is the European School Survey Project on Alcohol and Other Drugs (Croatian Institute of Public Health, 2016). It is an international research that has been carried out every year since 1995 among 15-16-year-olds in thirty European countries, including Croatia. The obtained results show that 57.4% of the students reported drinking beer (the most common alcoholic drink) at the age of 13 or earlier (64.2% of boys and 49.9% girls). Moreover, 10.5% of the students reported getting drunk at the age of 13 or earlier (14.3% of boys and 6.5% of girls). Also, until the age of thirteen, 32.1% of the students (34.7% of boys and 29.4% of girls) have had an experience of

smoking a cigarette. At the age of 14 and over, 23.1% of the students (21.6% of boys and 24.7% of girls) smoked daily. Having these facts in mind, tobacco and alcohol intake becomes a serious problem among Croatian adolescents. However, although different forms of resistance have been described, little is known about how adolescents perceive resistance. Taking into account that studies which deal with this topic mostly use quantitative methods, it is necessary to also use qualitative methods with the aim of creating a better understanding of this phenomena. The aim of this research was to describe how adolescents perceive peers who resist persuasion to consume alcohol and tobacco products, and what the perceived outcomes of the resistance to peer pressure are.

Method

Participants

A convenience sample of 289 students of the first and third grades was drawn from different high schools. Two four-year vocational schools and two grammar schools were included, one of each type in Zagreb (the Croatian capital, $N = 150$) and Bjelovar (a smaller town, $N = 139$). The participants were on average 16.25 years old ($SD = 1.08$, range 14-19), with 133 boys (46,02%) and 156 girls (53,98%).

Measures

A story completion procedure was used where the task of the participants was to complete three initiated stories, created for this study. Topics of all stories referred to spending free time with peers. In one of them, peer pressure on the consumption of alcohol was mentioned ("Martina was at her classmate's birthday party on Saturday. First, they met at her house and they planned to head to a club afterward. They went out to a famous club where they all danced. Most of them drank alcohol, but Martina did not although the others tried to persuade her..."). In the second story, the consumption of tobacco products was mentioned, and in the third one, there is no mention of psychoactive substances. There were 2 types of instruments. In one version, the main characters were female and in another one they were male.

Procedure

The school principals and psychologists of the previously selected high schools were contacted in order to get permission to conduct the research in their school. According to the Ethical codes for research with children (Ajduković

& Kolesarić, 2003), the passive parental consent was required, after which the students signed consent forms (since they are older than 14). Thereupon, it was emphasized that the participation is voluntary and anonymous and that they could opt out at any given moment without any consequences.

After signing the consent form, the students were given tasks, as well as the instructions on how to complete them. All the students in the class had the same version of the stories with respect to the main character's gender. Since there were four classes participating in each school, two of them completed the version of the story with male characters, and two the version with female characters. The following instructions were read: "In front of you there are first sentences of three unfinished stories. Please write down those short stories so that you continue from the last written sentence. Each story should be completed with 6-10 sentences, and you have 7 minutes to write each story." The students were notified when there was only 1 minute remaining.

Analysis

The data collected by the story completion task were examined by the method of descriptive thematic analysis. After multiple readings of the collected stories by two researchers, the data coding process followed, which is defined as the identification of certain aspects of the data which have been connected to the aim of the research (Braun & Clarke, 2014). After the coding, subthemes which contained codes of similar themes were formed. Afterward, the subthemes were organized into themes which represent a wider area of subthemes, and in the end, into superordinate themes which reassemble content-related themes.

Results

By identifying codes and building up subthemes, themes, and superordinate themes, in the end, there were seven superordinate themes identified, presented in Table 1.

1) Non-consumption = losing friends and fun

This superordinate theme covers those themes which suggest that the non-consumption has negative social consequences, for example, it will negatively reflect on the relationships between them and their friends:

"Friends put a cigarette under her nose, but she then realized that those are not her real friends. They do not respect her refusals and they want to take her down the wrong path."

Table 1. *Results of the thematic analysis.*

Superordinate themes	Themes
Non-consumption = losing friends and fun	Broken relationships with friends because of non-consumption Negative friends' behavior because of non-consumption Discomfort during a night out without consumption
Who needs psychoactive substances to have fun? Not me!	Support and pleasure during non-consumption Maintaining relationships and influence on friends Positive outcomes of non-consumption
I think, therefore I don't consume	Non-consumption because of the rules and beliefs of others Non-consumption because of personal reasons and beliefs
It is important to say NO	Strategies of resistance to persuasion
After consumption there comes regret	Negative influence on physical, psychological and behavioral state Sanctions because of consumption Discomfort after consumption Noticing harmful effects and making a decision about non-consumption Negative friends' behavior during consumption
He who consumes, wins	Positive relationships with friends during consumption Pleasure and satisfaction during consumption
I consume – but who makes the decision?	External reasons for consumption Internal reasons for consumption

It is obvious how some of the participants consider that a person undergoing persuasion on consumption will leave the group, and possibly stop spending time with them because he/she recognizes that those are not his/her real friends.

“Although they tried to persuade him, Martin did not give in. Everybody told him that he is a coward because he does not dare to drink alcohol. They started to mock him, so Martin went home.”

In continuation displays of inner states, it can be seen that:

“Martin was stiff, he could not relax while his group was too relaxed. Martin wanted to go home because he was bored, but then he might be perceived as unsociable.”

Furthermore, the participants stated that a person would feel excluded from the group and misunderstood, and would feel other different unpleasant emotions.

2) Who needs psychoactive substances to have fun? Not me!

Unlike the previous superordinate theme which referred to negative consequences, this one is about positive outcomes of non-consumption. It includes themes related to support, satisfaction, and pleasure during non-consumption.

If the friends' support fails, parents are seen as a possible source of support:

"When she came home, she talked to her mother about how others tried to persuade her to light a cigarette. The mother told her not to try to fit into a group because of it."

Even if friends show different patterns of behavior, it is still possible to mutually respect each other's choices or that a person encourages non-consumption in others with his/her behavior.

"After considering the situation, they realized that not all of them have to smoke in order to hang out, so they apologized to her. Every time they went out again there were a few friends who also did not drink because Martin had positively influenced them."

The participants show that they are aware that non-consumption keeps their health and capacity:

"The following day she did not have any consequences because of her persistence like her friends. While they had headaches..., she happily went out with other friends."

Within this superordinate theme, it can be noticed that the adolescents are aware of the importance of peer pressure, but also its mutuality.

3) I think, therefore I don't consume

This superordinate theme covers the reasons why adolescents refuse to consume substances, and as for the reasons, they list rules and the beliefs of other people, as well as personal reasons, beliefs, and decisions:

"Martin has responsible parents that do not support alcohol consumption and Martin does not drink so as not to disappoint them."

"Martin is a football player and he takes care of himself and his health. He is not the kind of person who will do everything to fit into a group."

It is obvious from the listed statements that some participants worry about the possible sanctions, but also because of the possibility of disappointing their parents. It also seems that personal responsibility and conscientiousness play an important role.

4) *It is important to say NO*

The fourth superordinate theme refers to different strategies of resistance to persuasion. On one hand, it is noticeable the stating of the reasons for non-consumption to friends, and on the other hand, disregarding persuasion:

“Ivan explained to his friends why he does not smoke. He said that he has never tried it and that it does not appeal to him. They have never made fun of Ivan for that, but they just moved on to another topic.”

“Her friends did not understand her. They tried to persuade her, but they gave up. They gave her strange looks. She did not mind nor care.”

As other possible strategies, the participants listed simulation of the consumption, abandoning the situation and avoiding similar situations in the future.

5) *After consumption there comes regret*

This superordinate theme gathers themes which refer to the negative consequences of consumption. They include the negative effect on a person's state, sanctions, discomfort because of consumption, and noticing harmful effects on others, which is illustrated by the quoted statements:

“He became addicted and in the end, he was suffering from lung cancer.”

“He had a few more drinks and changed his behavior. He got into a fight with two boys.”

Apart from the direct consequences listed above, the participants also mentioned the consequences in the form of sanctions coming from the surroundings.

“When she came home, her parents could not believe it. They grounded her and she promised not to do anything like that ever again.”

“She walked up to Martin to see if she stood a chance. When she approached him, he pushed her away because he does not like people who drink.”

A few participants also described the possibility of having problems with state institutions, for example, with the police, or the economic consequences of consumption:

"Because of the assault and alcoholic condition, he was taken to the police station."

"Ivan spent too much money on it, so he eventually went bankrupt."

Beside this "objective" level, several participants also focused on the emotional level:

"Ivan is now disappointed because he used to be strong, but today he gave in and experienced serious consequences, so he decided to act like himself."

The descriptions also apply to the understanding of a person or his/her friends about the harmful effects of psychoactive substances:

"They informed them that she had barely survived [after getting drunk]. Martin told the news to his friends who were in the club that night. Martin's friends have never touched a bottle of alcohol since."

They are also aware that peers can behave negatively towards a person even when he/she agrees to consumption:

"When she inhaled her first smoke, she started to cough heavily and the others were laughing at her."

"When Martin went to the bathroom, his 'friends' dropped a drug into his drink."

Therefore, it is obvious that the participants are aware of many possible consequences of the consumption of psychoactive substances, both short-term and long-term ones.

6) *He who consumes, wins*

While the previous superordinate theme focuses on the negative consequences of consumption, here the focus turns to the positive outcomes. The descriptions in this superordinate theme mostly contain positive friends' reactions and pleasant feelings:

"Ivan lit the cigarette. They told him that he is a good friend now and that he is cool."

"She got drunk with the rest of the group. It was much nicer out in the city when she drank a little. She was more relaxed. She found a boyfriend."

Evidently, the participants described that a person can feel more comfortable and accepted when consuming.

7) *I consume – but who makes the decision?*

This superordinate theme covers the opinions of the participants about who exactly makes the decision about consumption; the others or the person alone.

The influence of the surroundings can be based on different motives:

“Ivana refused it but after some time she started to give in. Since the popular crew went to that bar, she succumbed because she definitely wanted to feel the popularity.”

“Among Ivana’s friends, there was a boy she liked. He told her that she is not normal if she does not try.”

On the other hand, the participants often listed different pleasant feelings as the reasons for consumption:

“After that day, she has been drinking every time she went out. She knew it is not so good, but she found it great anyway.”

It is evident that the perceived reasons for consumption include fun, relaxation, the feeling of being accepted, and these might be some of the reasons why adolescents are prone to disregard the negative consequences.

Discussion

In this research, we examined the ways adolescents perceive their peers who resist the consumption of alcohol and tobacco products, as well as what are the possible outcomes of resistance to peer pressure. It was shown that the participants think that non-consumption can adversely affect a person. In our research, the participants mostly mentioned the problems with peers, such as teasing and misapprehension of the person who does not want to consume, which is in line with Brown et al.’s (2008) concept of *antagonistic behavior*. Furthermore, the participants suggested that peers have been persistent in persuasion which corresponds to peer pressure (Brown et al., 2008). The stated peer behaviors caused uncomfortable feelings suchlike sadness, isolation, and misunderstanding, which were often the reaction to non-conforming (Lacković-Grgin, 2006), which is in line with our findings.

Contrary to that, some participants focused on the positive outcomes of non-consumption, like accepting and friends’ support in the non-consumption. Additionally, some participants stated that understanding is also possible after the initial rejection of the decision in form of an apology and resolving disputes in order to maintain the friendship. In case friends’ support is missing, adolescents look for it in other persons, mostly in parents. On the other

hand, if the support is present, an adolescent will keep on spending time with them which leads to the possibility of spreading awareness of the noxiousness of psychoactive substances among peers, which verifies the fact that peer influence can encourage healthy behaviors (Lacković-Grgin, 2006; Salvy, de la Haye, Bowker & Hermans, 2012; Van Hoorn, Van Dijk, Meuwese, Rieffe & Crone, 2014),

Furthermore, some consider that psychoactive substances are not necessary to have fun and that the person in the story was in the end pleased with non-consumption, especially after noticing the consequences. Likewise, it is clear that adolescents are aware that somebody can decide to consume in order to fit in or to feel popular, which confirms that adolescents are aware of peer pressure (Brown et al., 2008). Also, the participants state that in the situations of full awareness a person mainly decides not to consume, which indicates that it would be good to make adolescents aware of the personal responsibility for consuming behavior.

The reasons for (non-)consumption can be divided into two groups based on the decision being made on their own or convictions of other people. When it comes to non-consumption and the convictions of others, the most prominent were the actions of parents through their own example, the education of children, or simply through close relationship (Lebedina-Manzoni & Ricijaš, 2013; Marshal & Chassin, 2000). Apart from parents, the importance of sympathy during the decision was also highlighted. Some participants mentioned that a person will continue the consumption even in the case of the unattractiveness of psychoactive substances with the aim to gain sympathy, which is in line with the results of other studies (Pettigrew et al., 2011). When it comes to the convictions of the person, the participants, in the case of non-consumption, listed the consideration for health, unattractiveness of psychoactive substances, and the attitude that consumption leads to unnecessary risks and expenses. Those adolescents were described as responsible and conscientious. In the case of consumption, the reasons were mostly focused on short-term positive effects, while the possible harmful consequences were absent, which was also noticeable in earlier studies (Pettigrew et al., 2011).

In terms of the different strategies of consumption refusal, some adolescents list the following reasons for non-consumption: pretending to consume, disregarding persuasion, abandoning the situation, and future avoidance of similar situations, which was also found by Pettigrew et al. (2011). Some participants stated that a person will disregard persuasion if it comes from peers not close to them, which was also found in previous research (Nash, McQueen & Bray, 2005). It is important to mention that in some stories peers stopped with persuasion after resistance, whereas in some stories they insisted on it.

With that in mind, it would be also useful to discuss the importance of the persistence of resistance in prevention programs.

Of all the possible negative outcomes of substance abuse, the participants mostly mentioned physical, behavioral, and cognitive changes, such as nausea, aggressive behavior, or disorientation. Repercussions on close relationships, for example with parents, friends, and potential romantic partners, as well as personal discomfort, were also proven as significant. The adolescents were aware that even the so-called obedience to peers can lead to negative consequences, such as mocking during the first experience with the substance. Contrary to that, the most outstanding positive consequences were higher peer acceptance, which has also been confirmed by other studies, as well as the pure pleasure of consumption (Engels et al., 2006; Fujimoto & Valente, 2015).

Within the restrictions of this survey was the fact that the questionnaire contained three stories which needed to be completed and it is possible that the participants provided less information in the last one. Through data analysis, it was noticed that the prolixity and the length of the story differed among the participants and stories, although all the answers were relevant for the research matter. A potential for improvement is including fewer stories in order to disburden the participants, as well as to provide more time to complete the story considering that the validity of this technique, in that case, would be more emphasized.

Resistance to alcohol and tobacco could be explored through estimations in what ways and how frequently and successfully their friends and acquaintances resist alcohol and tobacco (D'Amico & McCarthy, 2006), as well as the assessment of certain aggravating or mitigating factors in resisting the consumption of psychoactive substances. Also, story completion task can be used to create stories of consumption in different circumstances (e.g., in different environments, on different occasions), as well as the varying features of the actors (people who offer psychoactive substances, or those to whom it is offered).

Conclusion

This study tried to describe how adolescents perceive their peers who resist persuasion to consume alcohol and tobacco products and which are the perceived outcomes of the resistance to peer pressure. Using a qualitative data analysis, seven superordinate themes, which tried to describe peer pressure on consumption of psychoactive substances, were identified. It was visible from the participants' responses that non-consumption can negatively affect relationships with peers, as well as that consumption can lead to a greater acceptance and satisfaction. However, the answers also indicate the possibility of ac-

cepting non-consumption by peers with whom a person will continue to spend time and have fun without psychoactive substances, where an adolescent who resists can positively influence peers by example. The adolescents understand that consumption can lead to harmful consequences in the physical, emotional, and social sphere. Some describe the willingness to put up with these consequences in order to fit in a group or to enjoy the brief pleasure, whereas others describe the importance to stand up to their own beliefs, respect the expectations of their parents, and the worry about their personal health and general well-being. In their stories, we recognized Pettigrew et al.'s (2011) four categories of resistance to peer pressure: rejection, often followed by explanation, and also avoidance, and departure. The adolescents showed a high level of creativity in elaborated strategies of resistance to peer pressure, for instance, by pretending to consume psychoactive substances.

It is also obvious that parents have a significant role in substance abuse prevention, so they have to be familiarised, through the lectures and workshops in schools, with the importance of the appropriate ways of setting boundaries with adolescents. Although teachers are not directly mentioned, our findings are very relevant for them as well, because they have an important role in setting boundaries, the appropriate teaching of adolescents about the consequences of psychoactive substance abuse, and of "blind obedience" to peers. This study stresses out the need for timely substances abuse prevention programs, the necessity to raise awareness of peer pressure, and the ways to resist it.

References

- Ajduković, M., & Kolesarić, V. (Eds.) (2003). *Etički kodeks istraživanja s djecom [The code of ethic for research with children]*. Zagreb: Vijeće za djecu Vlade Republike Hrvatske. Državni zavod za zaštitu obitelji, materinstva i mladeži.
- Alexander, C., Piazza, M., Mekos, D., & Valente, T. (2001). Peers, schools, and adolescent cigarette smoking. *Journal of Adolescent Health, 29*(1), 22-30. doi: 10.1016/S1054-139X(01)00210-5
- Braun, V., & Clarke, V. (2014). *Successful Qualitative Research: A Practical Guide for Beginners*. London: Sage.
- Brown, B. B., Bakken, J. P., Ameringer, S. W., & Mahon, S. D. (2008). A comprehensive conceptualization of the peer influence process in adolescence. In M. J. Prinstein & K. A. Dodge (Eds.), *Understanding peer influence in children and adolescents* (pp. 17-44). New York, NY: Guilford Publications, Inc.
- Charlton, A., Minagawa, K. E., & While, D. (1999). Saying "no" to cigarettes: a reappraisal of adolescent refusal skills. *Journal of Adolescence, 22*(5), 695-707. doi: 10.1006/jado.1999.0264
- Chen, X., Stanton, B., Fang, X., Li, X., Lin, D., Zhang, J., Liu, H., & Yang, H. (2006). Perceived smoking norms, socio environmental factors, personal at-

- titudes and adolescent smoking in China: a mediation analysis with longitudinal data. *Journal of Adolescent Health*, 38, 359-368. doi: 10.1016/j.jadohealth.2005.03.010
- Croatian Institute of Public Health. (2016). *European School Survey Project on Alcohol and Other Drugs – Research Report 2015*. Zagreb. Retrieved from: <https://www.hzjz.hr/medunarodna-istrazivanja/espada/>
- D'Amico, E. J., & McCarthy, D. M. (2006). Escalation and initiation of younger adolescent's substance use: The impact of perceived peer use. *Society for Adolescent Medicine*, 39(4), 481-487. doi: 10.1016/j.jadohealth.2006.02.010
- Engels, R. C. M. E., Scholte, R. H. J., Cornelis, F. M., van Lieshout, C. F. M. de Kemp, R., & Overbeek, G. (2006). Peer group reputation and smoking and alcohol consumption in early adolescence. *Addictive Behaviors*, 31(3), 440-449. doi: 10.1016/j.addbeh.2005.05.026
- Ennet, S. T., & Bauman, K. E. (1994). The contribution of influence and selection to adolescent peer group homogeneity: the case of adolescent cigarette smoking. *Journal of Personality and Social Psychology*, 67(4), 653-663. doi: 10.1037//0022-3514.67.4.653
- Fujimoto, K., & Valente, T. W. (2015). Multiplex congruity: Friendship networks and perceived popularity as correlates of adolescent alcohol use. *Social Science and Medicine*, 125, 173-181. doi: 10.1016/j.socscimed.2014.05.023
- Gibbon, L., Griffin, K. W., Tanno, S., Tanigawa, T., & Botvin, G. J. (2014). Perceived friend and peer smoking, and direct and indirect refusal skills as predictors of cigarette smoking in U.S. and Japanese middle school students. *Journal of Ethnicity in Substance Abuse*, 13(3), 209-226. doi:10.1080/15332640.2013.847394
- Harakeh, Z., & Vollebergh, W. A. M. (2012). The impact of active and passive peer influence on young adult smoking: An experimental study. *Drug and Alcohol Dependence*, 121(3), 220-223. doi: 10.1016/j.drugalcdep.2011.08.029.
- Kiran-Esen, B. (2003). Examining the adolescents' smoking according to their peer pressure levels and gender. *Educational Sciences: Theory & Practice*, 3(1), 179-188.
- Kiuru, N., Burk, W. J., Laursen, B., Salmela-Aro, K., & Numi, J. E. (2010). Pressure to drink but not to smoke: Disentangling selection and socialization in adolescent peer networks and peer groups. *Journal of Adolescence*, 33, 801-812. doi:10.1016/j.adolescence.2010.07.006.
- Klarin, M. (2006). *Razvoj djece u socijalnom kontekstu [The development of children in a social context]*. Jastrebarsko: Naklada Slap.
- Lebedina-Manzoni, M., & Ricijaš, N. (2013). Obilježja mladih s obzirom na podložnost vršnjačkom pritisku [Characteristics of youth regarding susceptibility to peer pressure]. *Kriminologija i socijalna integracija*, 21(1), 29-38.
- Lacković-Grgin, K. (2006). *Psihologija adolescencije [Psychology of Adolescence]*. Jastrebarsko: Naklada Slap.
- Leung, R. K., Toumbourou, J. W., & Hemphill, S. A. (2014). The effect of peer influence and selection processes on adolescent alcohol use: A systematic

- review of longitudinal studies. *Health Psychology Review*, 8(4), 426-57. doi: 10.1080/17437199.2011.587961
- Marshal, M. P., & Chassin, L. (2000). Peer influence on adolescent alcohol use: The moderating role of parental support and discipline. *Applied Developmental Science*, 4(2), 80-88. doi: 10.1207/S1532480XADS0402_3
- McVicar, D. (2011). Estimates of peer effects in adolescent smoking across twenty-six European Countries. *Social Science & Medicine*, 73(8), 1186-1193. doi: 10.1016/j.socscimed.2011.08.006
- Nash, S. G., McQueen, A., & Bray, J. H. (2005). Pathways to adolescent alcohol use: Family environment, peer influence, and parental expectations. *Journal of Adolescent Health*, 37(1), 19-28. doi: 10.1016/j.jadohealth.2004.06.004
- Pettigrew, J., Miller-Day, M., Krieger, J., & Hecht, M. L. (2011). Alcohol and Other Drug Resistance Strategies Employed by Rural Adolescents. *Journal of Applied Communication Research*, 39(2), 103-122. doi: 10.1080/00909882.2011.556139
- Salvy, S.-J., de la Haye, K., Bowker, J. C., & Hermans, R. C. J. (2012). Influence of peers and friends on children's and adolescents' eating and activity behaviors. *Physiological Behavior*, 106(3): 369-378. doi:10.1016/j.physbeh.2012.03.022.
- Teunissen, H. A., Spijkerman, R., Prinstein, M. J., Cohen, G. L., Engels, R. C. M. E., & Scholte, R. H. J. (2012). Adolescents' conformity to their peers' pro-alcohol and anti-alcohol norms: The power of popularity. *Alcohol Clinical Experimental Research*, 36(7), 1257-1267. doi: 10.1111/j.1530-0277.2011.01728.
- Van Den Broek, N., Deutz, M. H. F., Schoneveld, E. A., Burk, W. J., & Cillessen, A. H. N. (2015). Behavioral correlates of prioritizing popularity in adolescence. *Journal of Youth and Adolescence*, 45, 2444-2454. doi: 10.1007/s10964-015-0352-7
- Van Hoorn, J., van Dijk, E., Meuwese, R., Rieffe, C., & Crone, E. A. (2014). Peer influence on prosocial behavior in adolescence. *Journal of Research on Adolescence*, 26(1), 90-100
- Varela, A., & Pritchard, M. E. (2011). Peer influence: Use of alcohol, tobacco, and prescription medications. *Journal of American College Health*, 59(8), 751-756. doi: 10.1080/07448481.2010.544346.
- Wood, M. D., Read, J. P., Mitchell, R. E., & Brand, N. H. (2004). Do parents still matter? Parent and peer influences on alcohol involvement among recent high school graduates. *Psychology of Addictive Behaviors*, 18(1), 19-30. doi: 10.1037/0893-164X.18.1.19

Cognitive control at the beginning and the end of young adulthood

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Abstract

Background and Aims: Cognitive control is the ability to coordinate and integrate several distinct cognitive processes in accordance with internal goals and current demands. Its emergence is driven by the interaction between biological and environmental factors. Despite the fact that tremendous changes take place during the transition from adolescence to adulthood, young adulthood is often studied in a wider age range, between 18 and 40 years. The aim of the present study was to investigate neural correlates of cognitive control processes at the beginning and the end of young adulthood, using a modified four-color Stroop task and event-related brain potentials (ERPs).

Methods: A total of 77 volunteers participated in the study, divided into two age groups: late adolescents (19- to 21-year-olds) and young adults (28- to 44-year-olds). The study was conducted individually, in two sessions. The

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first session included psychological testing battery (to control for possible differences between the groups) and experimental task training. During the second session, a modified four-color Stroop task was applied in order to investigate cognitive control, while the neural electrophysiological activity (EEG) was recorded.

Results: On the behavioral level, the late adolescents made significantly more errors in the incongruent condition compared to the young adults. On the neurophysiological level, the late adolescents showed enhanced P200 and reduced N200 components compared to the young adults in both congruent and incongruent conditions, as well as a reduced N450 component in the incongruent condition.

Conclusion: Our results suggest that adjustments in cognitive control are still ongoing in the early twenties, as the refinement of the prefrontal control network follows a protracted developmental curve throughout young adulthood, and underscores the importance of including narrow age-range cohorts when investigating the development of cognitive control in young adulthood.

Keywords: cognitive control, late adolescence, young adults, protracted brain development, ERPs

Introduction

Managing everyday life challenges successfully, especially during early adulthood, requires goal-directed, coordinated, and adaptable behavior. Such behavior is thought to be supported by cognitive mechanisms that organize and adjust thoughts and actions in accordance with current demands and internal goals (Botvinick, Braver, Barch, Carter, & Cohen, 2001; Miller & Cohen, 2001). The ability to suppress distracting stimuli from interfering with current demands and internal goals is often referred to as cognitive control (Miller & Cohen, 2001). One of the classic and most widely used tasks that probe cognitive control is the Stroop task (Stroop, 1935). In a typical Stroop task, a stimulus with two features (e.g., a colored word printed in a specific font color) is presented. In the congruent condition, these two features match, while in the incongruent condition they are conflicted. Participants are instructed to name the font color while ignoring the habitual tendency to read the word. A classical behavioral Stroop effect is manifested in an increase in reaction time and error rates in the incongruent condition due to a conflict between the controlled process of color naming and automatic process of word reading (MacLeod, 1991). An efficient integration of several cognitive processes (selective attention, conflict detection, response inhibition, and interference resolution) is required to overcome this conflict. Neuroimaging studies show that performance on the Stroop task depends particularly on the functioning of the frontal and parietal cortex (Adelman et al., 2002; Carter, Mintun, & Cohen, 1995; Leung, Skudlarski, Gatenby, Peterson, & Gore, 2000), which have consistently been shown to

undergo protracted brain development that extends into early adulthood (Bennett & Baird, 2006; Gogtay et al., 2004; Petanjek et al., 2011).

From the developmental perspective, the ability to successfully implement cognitive control advances throughout childhood, adolescence, and early adulthood (Luna, Garver, Urban, Lazar, & Sweeney, 2004; Luna, Marek, Larsen, Tervo-Clemmens, & Chahal, 2015). Although there are significant gains in cognitive control processes during adolescence (Luna et al., 2004) in line with protracted maturational changes in the brain regions that support this cognitive skill (Paus, 2005), cognitive control at this age remains less efficient and more variable compared to adulthood (Luna et al., 2015; Luna & Sweeney, 2004). However, since the transition from adolescence into adulthood is marked by tremendous changes in a young person's life (reaching legal adulthood, completion of schooling, finding a first job, reaching financial independence), this is a life stage in which efficient cognitive control is needed the most (Cohen, Kasen, Chen, Hartmark, & Gordon, 2003).

The advent of functional magnetic resonance imaging (fMRI) has provided great advances in our knowledge about the brain and cognitive development. However, many specific biological processes that produce the effects measured by fMRI remain poorly understood. Scalp event-related brain potentials (ERPs) reflect event locked electrical activity generated by neural ensembles thus enabling a precise analysis of the time courses of neural events that underlie task performance. They have excellent temporal resolution and provide a continuous measure of ongoing brain activity, which enables examination of cognitive processing stages on a millisecond scale (Luck, 2014). As such, ERPs are particularly promising for understanding the developmental course of rapid and complex processes, such as cognitive control.

ERPs consist of a series of positive (P) and negative (N) deflections at particular intervals following stimulus onset. Several Stroop-task-related ERP components have been studied extensively. Early ERP components that occur during the first 100-150 ms are thought to represent sensory and perceptual-related potentials. Stroop effect is usually observed between 250 and 350 ms after stimulus onset as a shift in the negative direction, known as the N200 component (Liotti, Woldorff, Perez, & Mayberg, 2000). A positivity peaking deflection, at around 350 ms (known as P300 component), is thought to reflect stimulus evaluation (Ilan & Polich, 1999). Enhanced negativity, between approximately 400 and 550 ms, post-stimulus (often referred to as an N450) has been observed as a most prominent Stroop-related ERP component (Liotti et al., 2000; Markela-Lerenc et al., 2004; Rebai, Bernard, & Lannou, 1997; West & Alain, 1999). This component has been associated with conflict processing, or more specifically, with the inhibition of competing semantic information elicited by incongruent stimuli (Rebai et al., 1997; West & Alain, 1999).

Developmental studies have found age differences in early components such as P200 which is thought to reflect attentive feature-based stimulus processing (Wild-Wall, Falkenstein, & Gajewski, 2012). These components mature early but remain enhanced throughout adulthood (Crowley & Colrain, 2004). However, the findings on age differences in P300 and N450 components are inconsistent. West and Alain (2000a) observed a P300 enhancement and an N450 reduction in older adults (69.5 ± 3.5 years old) compared to young adults (27 ± 2.4 years old). Killikelly and Szűcs (2013) found a similar effect for P300, showing an amplitude increase from adolescence (16–17 years), throughout young adulthood (23–30 years), and middle adulthood (45–62 years). Mager et al. (2007), on the other hand, observed a smaller P300 amplitude in mid-adults (41–61 years) compared to younger adults (21–39 years), but an increased N450 in the middle-age group, similarly to Killikelly and Szűcs (2013).

Using discriminating measures of development during the early adult years enables a more direct examination of whether and how the experience of adult transitions and the protracted development of the prefrontal cortex foster cognitive development. Detecting typical development patterns at this life stage is of great importance because mental disorders in early adulthood are common and often co-morbid, and they may be particularly harmful to education and employment in this age group (Kessler et al., 2007; Stein & Dumaret, 2011).

To the best of our knowledge, no studies have so far been done to directly examine age-related differences in ERP correlates of cognitive control in late adolescents and younger adults. Therefore, the aim of this study was to investigate differences in neural activity related to cognitive control processes by comparison between late adolescents (19- to 21-year-olds) and young adults (28- to 44-year-olds) on a modified four-color Stroop task, investigating underlying neural processes using ERPs. We hypothesized that cognitive control mechanisms might still not be fully mature in the early 20s. Since it has been shown that between-subject differences in personality traits and general cognitive abilities might be related to differences in EEG signal and behavioral performance (Chi et al., 2005; Gevins, & Smith, 2000; Roslan et al., 2017), each participant completed a battery of standardized psychological tests.

Method

Participants

A total of 77 volunteers participated in the study, divided into two age groups: late adolescents, $n = 38$ (20 female), mean age 19.9 years ($SD = 0.8$, range 19–21 years), and young adults, $n = 39$ (20 female), mean age 32.9 years

Table 1. *Statistics for psychological assessment across age groups*

	Late adolescents (<i>n</i> = 38)	Young adults (<i>n</i> = 39)	<i>U/t</i> (75)	<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
CNT	33.82 (3.76)	31.87 (5.80)	613.50 ^a	.19
Extraversion	14.82 (4.31)	14.18 (4.14)	658.00 ^a	.40
Neuroticism	8.87 (4.75)	7.23 (4.61)	595.50 ^a	.14
Psychoticism	3.68 (2.35)	4.46 (2.13)	1.52 ^b	.13

Note. ^a Mann-Whitney U test, ^b t-test

(SD = 4.1, range 28–44 years). The age groups were well-matched in terms of personality traits and nonverbal IQ since we did not find any differences between the late adolescents and young adults on these variables (Table 1).

Additional 12 participants took part in the study but were excluded due to excessive artifacts (more than 50% of rejected ERP trials) or behavioral data that exceeded three standard deviations from the mean.

All the participants were right-handed (Oldfield, 1971) with normal or corrected-to-normal vision. None reported any previous head injuries, history of neurological or psychiatric disorders, or the use of medication during the study.

Measures

Psychological assessment battery

Each participant completed a battery of standardized psychological tests that included the Cognitive Nonverbal Test (CNT; Sučević, Momirović, Fruk, & Auguštin, 2004) and the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1994).

The CNT is used to examine logical reasoning (non-verbal IQ). It is composed of 40 tasks, each consisting of four drawings (e.g., geometrical shapes). One of the drawings is significantly different from the other three that follow the same logic, and participants are required to mark which one it is. The time limit to complete the test is 15 minutes. Each correct answer equals one point, with the total score calculated as the sum of all correct answers on a scale of 0–40. The CNT has very good psychometric properties; the α coefficient obtained within the Croatian standardization was $\alpha = .93$ (Sučević et al., 2004), while in our sample it was $\alpha = .82$.

The EPQ is used to assess three major personality traits (psychoticism, extraversion, and neuroticism). It contains 90 questions in a *yes/no* answer

format. The extraversion scale (E; 21 items) measures positive affectivity, high sociability, and engagement with the external stimuli, talkativeness, sensation-seeking, impulsivity, and assertiveness. The neuroticism scale (N; 23 items) measures emotional instability, negative affectivity, and low tolerance for aversive stimuli. The psychoticism scale (P; 25 items) measures tough-mindedness, antisociality, and aggression. The EPQ also includes a social desirability scale (L; 21 item). The total scores are computed for each scale separately, whereby a higher score indicates a greater trait expression. The EPQ has generally good psychometric properties. Alpha coefficients for the E, N and L scales demonstrated solid internal consistency across countries ranging from .60 to .88, except for the P scale, whose coefficients mostly indicated lower reliability and were less stable across countries ranging from .40 to .91 (Barrett & Eysenck, 1984). In this study, similar alpha coefficients were computed: $\alpha_E = .83$, $\alpha_N = .85$, $\alpha_L = .81$, $\alpha_P = .45$.

Modified four-color Stroop task

The modified four color Stroop task (Marinkovic, Rickenbacher, Azma, & Artsy, 2012), which combines trials of reading and color-naming in a randomized order, was used to investigate cognitive control processes. The stimuli for the four Croatian color-words were: "CRVENA" (red), "ŽUTA" (yellow), "ZELENA" (green), and "PLAVA" (blue), displayed on a black background. In the congruent condition, the stimuli were presented in the font color that matched the word meaning (e.g., word "ZELENA" [green] written in green), while in the incongruent condition the meaning did not correspond to the displayed word (e.g., word "PLAVA" [blue] written in yellow). In both conditions, the participants were instructed to press the button corresponding to the font color. In the read condition, the color-words were written in grey, and the participants were asked to press the button corresponding to the meaning of the word. This condition was used as a control condition in terms of experimental manipulation. The purpose of this condition was to maintain the reading dominance and automaticity (Marinkovic et al., 2012), reduce the likelihood of possible strategic adjustments during color-naming (Botvinick et. al., 2001), as well as to elicit greater cognitive control demands since it requires switching from one rule to another (Braver, Reynolds, & Donaldson, 2003).

A total of 400 stimuli (100 congruent, 100 incongruent, and 200 read trials) were divided into three blocks and counterbalanced among the participants. Each stimulus was displayed for 500 ms, with 1500 ms of the inter-stimulus interval (ISI). The participants indicated their response by pressing the appropriate key on the Serial Response Box (S-R Box) using the left middle finger for red, left index finger for yellow, right index finger for green, and right middle

finger for blue. The stimuli were programmed and presented using the E-Prime (Version 2.0).

EEG recording and data processing

Electrical brain activity (EEG) was continuously recorded using a standard 32-channel EEG-cap (actiCAP) connected to a recording software (Brain Vision), with a bandpass 0.01–100 Hz and a sampling rate of 1 kHz. FCz electrode was used as a reference. Horizontal eye movements (HEOG) were recorded by the electrodes placed at the outer canthus of each eye, while blinks and vertical eye movements (VEOG) were recorded by the electrodes placed above and below the right eye. The electrode impedance was kept below 5 k Ω .

EEG data processing was carried out offline using Brain Vision Analyzer (Version 2.1) software package, with a bandpass filter from 0.1 to 30 Hz (12 dB/octave). Eye movements were removed using an Independent Component Analysis (ICA) ocular correction algorithm in a semi-automatic manner. All electrodes were re-referenced to the average of the left and right mastoids (TP9/TP10). During the averaging procedure, all segments where the signal surpassed $\pm 100 \mu\text{V}$, or in which the absolute difference between two adjacent sample points of data exceeded 75 $\mu\text{V}/\text{ms}$, were edited out (Luck, 2014). The data were additionally visually inspected by the experimenter. Correct stimulus-locked trials were epoched from -200 to 1800 ms with respect to stimulus onset. The remaining artifact-free trials were averaged for each participant in the congruent ($89 \pm 7\%$ trials) and incongruent condition ($87 \pm 8\%$ trials). The components of interest were determined based on the inspection of the grand average waveforms and in accordance with the literature (Liotti et al., 2000; Zurrón, Lindín, Galdo-Alvarez, & Díaz, 2014). Amplitudes were measured as the mean voltage in a given time window as follows: P200 from 150 to 225 ms, N200 from 225 to 325 ms, P300 from 350 to 425 ms, and N450 from 450 to 550 ms. In order to reduce the number of comparisons, we only report the data from Cz electrode since this is where the components of interest have typically been reported as the most prominent (Leung et al., 2000; Liotti et al., 2000; Zurrón et al., 2014).

Procedure

The participants were recruited via advertisements at the University of Zagreb, e-mails, social networking, and word-of-mouth referrals. The study was conducted at the Laboratory for Psycholinguistic Research at the University of Zagreb, Croatia, and consisted of two sessions. During the first session, the participants were first familiarized with the experimental procedure, and they read and signed the informed consent forms. Afterward, each of them complet-

ed the psychological testing battery and underwent 4 practice runs. They first practiced responding to font color (red, yellow, green, or blue) of the stimulus ("XXXX"), followed by responding to color-words written in grey, and then the combination of the first two. The final practice task was identical to the real experimental task. The purpose of these practice runs was to establish a strong mapping between the colors and response keys.

During the second session, after the EEG electrodes were attached, the participants were given a short practice task to ensure stable performance. They were instructed to respond as quickly and accurately as possible. The EEG data, response time, and accuracy were continuously recorded. A total duration of the experimental task was approximately 25 minutes, including the time for a break and practice trials.

The study was approved by the Ethical Committee of the University of Zagreb.

Statistical analysis

All variables were checked for normality (Shapiro Wilk test), homogeneity of variance (Levene's test), and sphericity (Bartlett's test). Nonverbal IQ, extraversion, neuroticism, response accuracy (both conditions), and reaction time (incongruent condition) variables were not normally distributed across the age groups, which is why Mann-Whitney U-test was applied, while for psychotism and reaction time (incongruent condition) variables independent samples t-test was applied. In order to analyze condition effects, Wilcoxon signed rank test was used for response accuracy, and paired-sample t-test for reaction time variables. The ERPs were analyzed using mixed design ANOVAs, with age (late adolescents, younger adults) as a between-subject factor, and condition (congruent, incongruent) as a within-subject factor (SPSS for Windows), for each ERP component separately. Significant interaction effects were broken down by using pairwise comparisons (LSD). A two-tailed significance level of $p < .05$ was applied.

Results

Behavioral performance

A robust Stroop effect was revealed in significantly prolonged response times, $t(76) = -24.2, p < .001$ and lower accuracy, $z = -7.43, p < .001$, in the incongruent compared to congruent condition.

Significant age differences were found for response accuracy in the incongruent condition ($U = 955.00, p = .03$), showing lower accuracy in the late adolescents ($Mdn = 92, IQR = 10$) compared to young adults ($Mdn = 95, IQR = 7$).

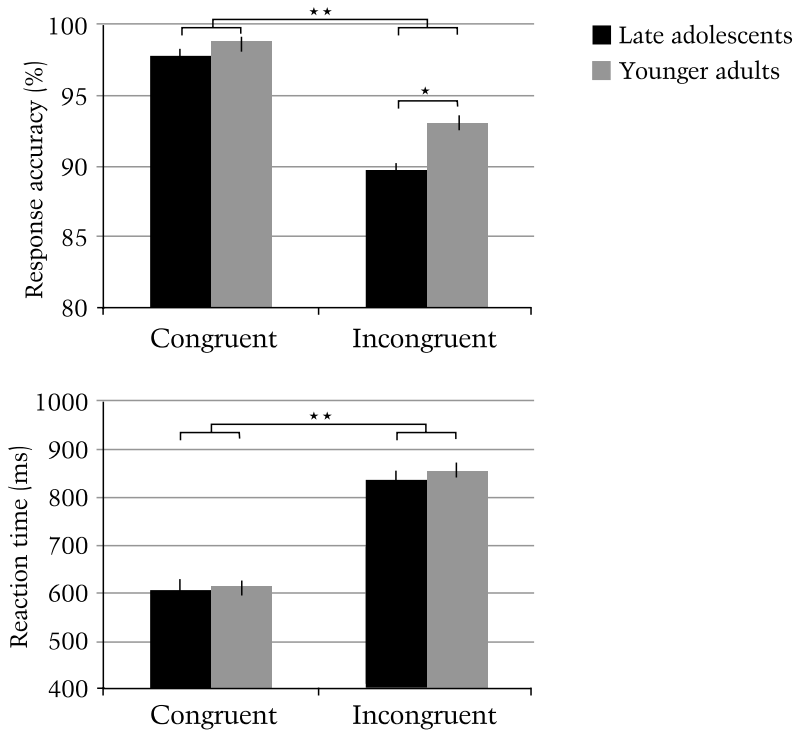


Figure 1. Age differences in response accuracy and reaction time during the Stroop task ($M \pm SE$) (* $p < .05$, ** $p < .001$).

Event-related potentials

P200

The ANOVA revealed a significant main effect of age (Table 2), indicating enhanced (more positive) P200 amplitude in the late adolescents ($M = 2.8$, $SE = 0.41$) compared to the young adults ($M = 1.2$, $SE = 0.40$).

N200

The N200 amplitude showed a significant main effect of age (Table 2). Overall, the N200 amplitude was smaller (less negative) in the late adolescents ($M = 1.1$, $SE = 0.39$) compared the young adults ($M = -0.2$, $SE = 0.39$).

P300

A significant Age \times Condition interaction was found for the P300 (Table 2). Although both the late adolescents and young adults showed a reduced (less positive) P300 amplitude in the incongruent condition ($M_{LA} = 0.7$, $SD_{LA} = 2.63$;

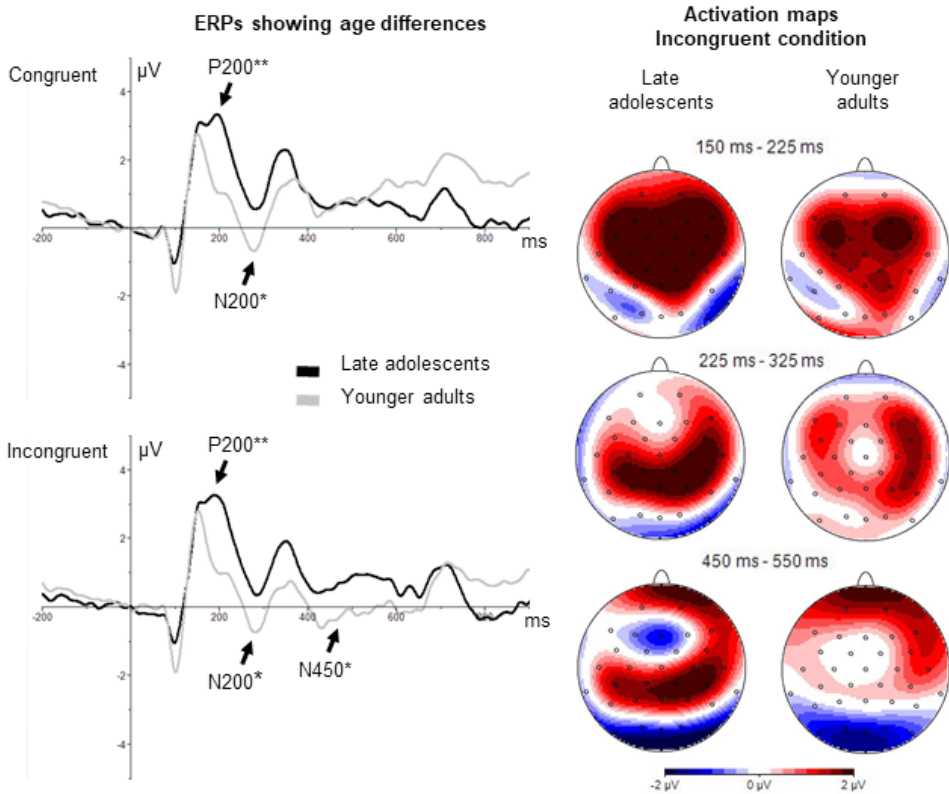


Figure 2. Grand average ERPs for congruent (upper panel) and incongruent (lower panel) trials showing main effects of age (positive is up). Only components where significant age differences were found are marked. The activation maps show topographical distribution for incongruent trials for each age group and component of interest.

$M_{YA} = -0.3$, $SD_{YA} = 2.68$) compared to the congruent condition ($M_{LA} = 0.9$, $SD_{LA} = 2.62$; $M_{YA} = 0.6$, $SD_{YA} = 2.79$), this reduction was more pronounced in the young adults (Fig. 2). However, pairwise comparisons for each condition separately did not show statistically significant age differences.

N450

Significant Age \times Condition interaction was found for the N450 (Fig. 2, Table 2). While both age groups exhibited similar amplitudes in the congruent condition ($M_{LA} = 0.5$, $SD_{LA} = 2.87$; $M_{YA} = 0.5$, $SD_{YA} = 2.69$), the young adults

Table 2. The results of the mixed design ANOVA for testing age differences (late adolescents, young adults), and condition (congruent, incongruent) in the ERPs

		$F(1,75)$	p	p in Pairwise Comparisons Late adolescents vs. Young adults	
				Congruent	Incongruent
P200	Condition	0.12	.733		
	Age	8.11	.006**		
	Condition \times Age	0.31	.579		
N200	Condition	2.27	.136		
	Age	5.08	.027*		
	Condition \times Age	0.08	.776		
P300	Condition	11.84	.001**		
	Age	1.30	.258		
	Condition \times Age	5.65	.020*	.598	.094
N450	Condition	5.62	.020*		
	Age	1.11	.296		
	Condition \times Age	11.22	.001**	.997	.038*

Note. Significant interaction effects were further analyzed by using pairwise comparisons for each condition separately; ** $p < .01$; * $p < .05$

($M_{YA} = -0.5$, $SD_{YA} = 2.42$) showed a more pronounced amplitude enhancement (negativity) compared to the late adolescents ($M_{LA} = 0.7$, $SD_{LA} = 2.53$) in the incongruent condition. Furthermore, the pairwise comparisons of age differences in each condition separately revealed that the late adolescents had a significantly reduced (less negative) N450 component compared to the young adults in the incongruent condition (Table 2).

Discussion

The aim of the present study was to investigate the neural correlates of cognitive control at the beginning and the end of young adulthood, using a modified four-color Stroop task and ERPs. On the behavioral level, the late adolescents made significantly more errors in the incongruent condition compared to the young adults. On the neurophysiological level, the late adolescents showed generally enhanced P200 and reduced N200 components compared to the young adults, as well as a reduced N450 component in the incongruent condition.

Studies report lower accuracy in adolescents (up to age 17) compared to adults (18–45), indicating that cognitive control functions still continue to develop throughout adolescence (Luna et al., 2004; Luna et al., 2015). Our behavioral results suggest that cognitive control functions still continue to develop into early adulthood. However, this function consists of at least two necessary components – one that implements control and another that monitors performance and signals when adjustments in control are needed, and these components are visible in the ERPs.

The P200 component has been identified in various cognitive tasks, for instance, selective attention (Zurrón, Pouso, Lindín, Galdo, & Díaz, 2009) or feature detection paradigms (West, Langley, & Bailey, 2011). In selective attention tasks, P200 is thought to be involved in protection against interference from irrelevant stimuli. Using selective attention, we can consciously orient toward relevant stimuli and ignore irrelevant or competing stimuli (West & Alain, 2000). EEG data suggest that enhanced positivity to the attended color stimuli between 120 and 230 ms post-stimulus at frontocentral electrodes is reflecting sustained attention to color (West & Alain, 2000), and this cortical distribution may be interpreted as evidence for a special role of the frontal cortex in the regulation of non-spatial selective attention. Therefore, the presence of enhanced P200 amplitudes in the late adolescents compared to the young adults in our study might be due to the insufficient higher-order control processes reflected in the strength of processes that focus attention to relevant stimuli in order to prevent a preoccupation with the competing stimuli.

The N200 and later occurring N450 components are both assumed to reflect processes of conflict monitoring that arise from the anterior cingulate cortex (Liotti et al., 2000; Markela-Lerenc et al., 2004). Botvinick, Cohen, and Carter (2004) proposed that conflict monitoring supported by the anterior cingulate cortex serves as a feedback signal for strategic adjustments in cognitive control leading to conflict reduction in subsequent performance. In accordance with other studies in young adults (e.g., Zurrón et al., 2014), we found reduced N200 and N450 amplitudes in the late adolescents compared to the young adults. Reduced N200 amplitude during the Stroop task was found to be associated with higher interference score as seen in higher error rates (Gajewski & Falkenstein, 2015). It seems to be associated with poorer attention to the stimulus and may be directly associated with less effective recruitment of cognitive resources after high-conflict trials. This may result in poorer task performance reported here as lower accuracy for the late adolescents compared to the young adults. Therefore, the reduced N200 in the late adolescents observed in this study could reflect poorer initial adjustments in perceptual selection and

conflict detection necessitating more cognitive resources for the categorization of a stimulus as congruent or incongruent.

The N450 seems to decrease from childhood (Larson, Clawson, Clayson, & South, 2012) and adolescence (Spronk & Jonkman, 2012) to young adulthood. Our late adolescents showed a significantly reduced incongruent N450 amplitude compared to the young adults which could, in line with the aforementioned studies, indicate a greater cognitive efficiency in the late adolescents. However, this conclusion could partly be justified if there were no behavioral differences (Larson, Clayson, & Clawson, 2014). As noted earlier, the late adolescents, in fact, had significantly lower accuracy than the young adults. Furthermore, we observed the age-by-condition interaction which showed an absence of a shift to negativity in the incongruent condition among the late adolescents, which was present in the young adults. This shift was demonstrated in previous research (e.g., Liotti et al., 2000; West & Alain, 1999) and it is thought to contribute to superior performance (Gajewski & Falkenstein, 2015). A similar absence of the shift to negativity was found in male Internet addicts (Dong, Zhou, & Zhao, 2011) and schizophrenic patients (Markela-Lerenc et al., 2009), which probably reflects a reduced awareness of a conflict or poorer cognitive control processes. Larson et al. (2014) suggested that some degree of conflict-related activation is necessary in order to signal the presence of response conflict, as well as to guide response selection. Considering the evidence and contextual factors, we can infer that our results most likely indicate less efficient conflict monitoring in late adolescents compared to young adults.

Taken all together, higher error rates in the incongruent condition indicated weaker performance in the late adolescents, whereas the ERPs revealed underlying mechanisms. The late adolescents displayed poorer adjustments in attentional focus on stimulus information and conflict detection, less efficient stimulus evaluation, as well as conflict-related activation necessary for the guidance of response selection. Our results suggest that these cognitive control skills and underlying neural processes are still not fully mature in the early 20s and continue to improve during late adolescence. These age-related improvements probably reflect ongoing maturational changes in brain structures and functions in early adulthood. Cognitive control depends on distributed brain networks that involve various portions of the frontal, parietal, and insular cortices (Adleman et al., 2002; Cole & Schneider, 2007; Marsh et al., 2006; Ridderinkhof, Van Den Wildenberg, Segalowitz, & Carter, 2004). Functional imaging studies showed a linear increase in recruitment of the prefrontal and anterior cingulate cortex from childhood to young adulthood in conjunction with improvements in cognitive control processes (Adleman et al., 2002). These changes probably reflect the underlying structural changes in the white

and grey matter, such as synaptic reorganization and axonal myelination (Bennett & Baird, 2006; Gogtay et al., 2004; Petanjek et al., 2011; Pfefferbaum et al., 1994; Sowell et al., 2003; Sowell, Thompson, Holmes, Jernigan, & Toga, 1999), which support improved integration of specialized brain networks giving rise to a more efficient cognitive functioning (Fair et al., 2009; Fields & Stevens-Graham, 2002; Luna & Sweeney, 2004).

One of the main limitations of the present study is the cross-sectional design, so in the future, a longitudinal approach is desirable. Future research should include the whole age range of the 20s, as well as younger and older age groups in order to more thoroughly characterize developmental trajectories of cognitive control and its neural underpinnings. Moreover, we analyzed the results on one electrode (Cz), but it would be interesting to investigate age differences in topography comparing left-to-right, and posterior-to-anterior activation, since some research demonstrated age-related topographical differences (Killikelly & Szűcs, 2013).

Considering the role of efficient cognitive control in successful goal-directed behavior, as well as in the promotion and maintenance of mental health (Cole, Repovš, & Anticevic, 2014), our findings have some important implications. For instance, some mental health problems that peak during the early 20s, such as depression or anxiety disorders (American Psychiatric Association, 2013), are associated with reduced cognitive control capacity while other (e.g., schizophrenia) result in dysfunctional cognitive control (Cole et al., 2014). Our results support researchers (e.g., Arnett, 2004) that propose that the early 20s should be treated as a distinct developmental period between adolescence and young adulthood. However, further characterization of this period of transition to adulthood is warranted.

Conclusion

The present study revealed clear age differences in behavioral performance coupled with neurophysiological underpinnings of cognitive control, indicating poorer cognitive control in the late adolescents (19- to 21-year-olds) compared to the young adults (28- to 44-year-olds). Our results suggest that the refinement of the cognitive control network is still ongoing in the early 20s, and underscore the importance of including narrow age-range cohorts when investigating the development of cognitive control in young adulthood.

References

ActiCAP [Apparatus and software]. Munich, Germany: Brain Products GmbH.

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Association.
- Adleman, N. E., Menon, V., Blasey, C. M., White, C. D., Warsofsky, I. S., Glover, G. H., & Reiss, A. L. (2002). A developmental fMRI study of the Stroop color-word task. *Neuroimage*, *16*(1), 61-75. doi: 10.1006/nimg.2001.1046
- Arnett, J. J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties*. New York, NY: Oxford University Press, Inc.
- Barrett, P., & Eysenck, S. (1984). The assessment of personality factors across 25 countries. *Personality and individual differences*, *5*(6), 615-632. doi: 10.1016/0191-8869(84)90110-7
- Bennett, C. M., & Baird, A. A. (2006). Anatomical changes in the emerging adult brain: A voxel-based morphometry study. *Human brain mapping*, *27*(9), 766-777. doi: 10.1002/hbm.20218
- Botvinick, M. M., Braver, T. S., Barch, D. M., Carter, C. S., & Cohen, J. D. (2001). Conflict monitoring and cognitive control. *Psychological Review*, *108*(3), 624-652. doi: 10.1037//0033-295X.108.3.624
- Botvinick, M. M., Cohen, J. D., & Carter, C. S. (2004). Conflict monitoring and anterior cingulate cortex: an update. *Trends in Cognitive Sciences*, *8*(12), 539-546. doi: 10.1016/j.tics.2004.10.003
- Brain Vision Analyzer (Version 2.1.) [Software Package]. Munich, Germany: Brain Products GmbH.
- Brain Vision Recorder Software [Software]. Munich, Germany: Brain Products GmbH.
- Braver, T. S., Reynolds, J. R., & Donaldson, D. I. (2003). Neural Mechanisms of Transient and Sustained Cognitive Control during Task Switching. *Neuron*, *39*(4), 713-726. doi:10.1016/s0896-6273(03)00466-5
- Carter, C. S., Mintun, M., & Cohen, J. D. (1995). Interference and facilitation effects during selective attention: an H 2 15 O PET study of Stroop task performance. *Neuroimage*, *2*(4), 264-272. doi: 10.1006/nimg.1995.1034
- Chi, S. E., Park, C. B., Lim, S. L., Park, E. H., Lee, Y. H., Lee, K. H., ... & Kim, H. T. (2005). EEG and personality dimensions: A consideration based on the brain oscillatory systems. *Personality and Individual Differences*, *39*(3), 669-681. doi: 10.1016/j.paid.2005.02.017
- Cohen, P., Kasen, S., Chen, H., Hartmark, C., & Gordon, K. (2003). Variations in patterns of developmental transmissions in the emerging adulthood period. *Developmental Psychology*, *39*(4), 657-669. doi: 10.1037/0012-1649.39.4.657
- Cole, M. W., Repovš, G., & Anticevic, A. (2014). The frontoparietal control system: a central role in mental health. *The Neuroscientist*, *20*(6), 652-664. doi: 10.1177/1073858414525995
- Cole, M. W., & Schneider, W. (2007). The cognitive control network: integrated cortical regions with dissociable functions. *Neuroimage*, *37*(1), 343-360. doi: 10.1016/j.neuroimage.2007.03.071
- Crowley, K. E., & Colrain, I. M. (2004). A review of the evidence for P2 being an independent component process: age, sleep and modality. *Clinical Neurophysiology*, *115*(4), 732-744. doi: 10.1016/j.clinph.2003.11.021

- Dong, G., Zhou, H., & Zhao, X. (2011). Male Internet addicts show impaired executive control ability: evidence from a color-word Stroop task. *Neuroscience Letters*, 499(2), 114-118. doi: 10.1016/j.neulet.2011.05.047
- E-Prime (Version 2.0) [Software]. Pittsburgh, PA: Psychology Software Tools, Inc. Retrieved from <http://www.pstnet.com>
- Eysenck, H., & Eysenck, S. (1994). *Priručnik za Eysenckov upitnik ličnosti (EPQ-djeca i odrasli)*[*Manual of the Eysenck Personality Questionnaire (Junior and Adult)*]. Jastrebarsko: Naklada Slap.
- Fair, D. A., Cohen, A. L., Power, J. D., Dosenbach, N. U., Church, J. A., Miezin, F. M., . . . Petersen, S. E. (2009). Functional brain networks develop from a "local to distributed" organization. *PLoS Computational Biology*, 5(5), e1000381. doi: 10.1371/journal.pcbi.1000381
- Fields, R. D., & Stevens-Graham, B. (2002). New insights into neuron-glia communication. *Science*, 298(5593), 556-562. doi: 10.1126/science.298.5593.556
- Gajewski, P. D., & Falkenstein, M. (2015). Long-term habitual physical activity is associated with lower distractibility in a Stroop interference task in aging: behavioral and ERP evidence. *Brain and Cognition*, 98, 87-101. doi: 10.1016/j.bandc.2015.06.004
- Gevins, A., & Smith, M. E. (2000). Neurophysiological measures of working memory and individual differences in cognitive ability and cognitive style. *Cerebral Cortex*, 10(9), 829-839. doi: 10.1093/cercor/10.9.829
- Gogtay, N., Giedd, J. N., Lusk, L., Hayashi, K. M., Greenstein, D., Vaituzis, A. C., . . . Toga, A. W. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences of the United States of America*, 101(21), 8174-8179. doi: 10.1073/pnas.0402680101
- Ilan, A., & Polich, J. (1999). P300 and response time from a manual Stroop task. *Clinical Neurophysiology*, 110(2), 367-373. doi: 10.1016/s0168-5597(98)00053-7
- Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. B. (2007). Age of onset of mental disorders: a review of recent literature. *Current Opinion in Psychiatry*, 20(4), 359-364. doi: 10.1097/YCO.0b013e32816ebc8c
- Killikelly, C., & Szűcs, D. (2013). Asymmetry in stimulus and response conflict processing across the adult lifespan: ERP and EMG evidence. *Cortex*, 49(10), 2888-2903. doi: 10.1016/j.cortex.2013.08.017
- Larson, M. J., Clawson, A., Clayson, P. E., & South, M. (2012). Cognitive control and conflict adaptation similarities in children and adults. *Developmental Neuropsychology*, 37(4), 343-357. doi: 10.1080/87565641.2011.650337
- Larson, M. J., Clayson, P. E., & Clawson, A. (2014). Making sense of all the conflict: a theoretical review and critique of conflict-related ERPs. *International Journal of Psychophysiology*, 93(3), 283-297. doi: 10.1016/j.ijpsycho.2014.06.007
- Leung, H.-C., Skudlarski, P., Gatenby, J. C., Peterson, B. S., & Gore, J. C. (2000). An event-related functional MRI study of the Stroop color word interference task. *Cerebral Cortex*, 10(6), 552-560. doi: 10.1093/cercor/10.6.552

- Liotti, M., Woldorff, M. G., Perez, R., & Mayberg, H. S. (2000). An ERP study of the temporal course of the Stroop color-word interference effect. *Neuropsychologia*, 38(5), 701-711. doi: 10.1016/s0028-3932(99)00106-2
- Luck, S. J. (2014). *An introduction to the event-related potential technique*. Cambridge, MA: MIT press.
- Luna, B., Garver, K. E., Urban, T. A., Lazar, N. A., & Sweeney, J. A. (2004). Maturation of cognitive processes from late childhood to adulthood. *Child development*, 75(5), 1357-1372. doi: 10.1111/j.1467-8624.2004.00745.x
- Luna, B., Marek, S., Larsen, B., Tervo-Clemmens, B., & Chahal, R. (2015). An integrative model of the maturation of cognitive control. *Annual Review of Neuroscience*, 38, 151-170. doi: 10.1146/annurev-neuro-071714-034054
- Luna, B., & Sweeney, J. A. (2004). The emergence of collaborative brain function: FMRI studies of the development of response inhibition. *Annals of the New York Academy of Sciences*, 1021(1), 296-309. doi: 10.1196/annals.1308.035
- MacLeod, C. M. (1991). Half a century of research on the Stroop effect: an integrative review. *Psychological Bulletin*, 109(2), 163-203. doi: 10.1037/0033-2909.109.2.163
- Mager, R., Bullinger, A. H., Brand, S., Schmidlin, M., Schärli, H., Müller-Spahn, F., . . . Falkenstein, M. (2007). Age-related changes in cognitive conflict processing: an event-related potential study. *Neurobiology of Aging*, 28(12), 1925-1935. doi: 10.1016/j.neurobiolaging.2006.08.001
- Marinkovic, K., Rickenbacher, E., Azma, S., & Artsy, E. (2012). Acute alcohol intoxication impairs top-down regulation of stroop incongruity as revealed by blood oxygen level-dependent functional magnetic resonance imaging. *Human Brain Mapping*, 33(2), 319-333. doi: 10.1002/hbm.21213
- Markela-Lerenc, J., Ille, N., Kaiser, S., Fiedler, P., Mundt, C., & Weisbrod, M. (2004). Prefrontal-cingulate activation during executive control: which comes first? *Cognitive Brain Research*, 18(3), 278-287. doi: 10.1016/j.cogbrainres.2003.10.013
- Markela-Lerenc, J., Schmidt-Kraepelin, C., Roesch-Ely, D., Mundt, C., Weisbrod, M., & Kaiser, S. (2009). Stroop interference effect in schizophrenic patients: an electrophysiological approach. *International Journal of Psychophysiology*, 71(3), 248-257. doi: 10.1016/j.ijpsycho.2008.10.005
- Marsh, R., Zhu, H., Schultz, R. T., Quackenbush, G., Royal, J., Skudlarski, P., & Peterson, B. S. (2006). A developmental fMRI study of self-regulatory control. *Human brain mapping*, 27(11), 848-863. doi: 10.1002/hbm.20225
- Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, 24(1), 167-202. doi: 10.1146/annurev.neuro.24.1.167
- Oldfield, R. C. (1971). The assessment and analysis of handedness: the Edinburgh inventory. *Neuropsychologia*, 9(1), 97-113. doi: 10.1016/0028-3932(71)90067-4
- Paus, T. (2005). Mapping brain maturation and cognitive development during adolescence. *Trends in Cognitive Sciences*, 9(2), 60-68. doi: 10.1016/j.tics.2004.12.008

- Petanjek, Z., Judaš, M., Šimić, G., Rašin, M. R., Uylings, H. B., Rakic, P., & Kostović, I. (2011). Extraordinary neoteny of synaptic spines in the human prefrontal cortex. *Proceedings of the National Academy of Sciences*, *108*(32), 13281-13286. doi: 10.1073/pnas.1105108108
- Pfefferbaum, A., Mathalon, D. H., Sullivan, E. V., Rawles, J. M., Zipursky, R. B., & Lim, K. O. (1994). A quantitative magnetic resonance imaging study of changes in brain morphology from infancy to late adulthood. *Archives of Neurology*, *51*(9), 874-887. doi: 10.1001/archneur.1994.00540210046012
- Roslan, N. S., Izhar, L. I., Faye, I., Saad, M. N. M., Sivapalan, S., & Rahman, M. A. (2017). Review of EEG and ERP studies of extraversion personality for baseline and cognitive tasks. *Personality and Individual Differences*, *119*, 323-332. doi: 10.1080/psns20.v005.i04
- Rebai, M., Bernard, C., & Lannou, J. (1997). The Stroop's test evokes a negative brain potential, the N400. *International Journal of Neuroscience*, *91*(1-2), 85-94. doi: 10.3109/00207459708986367
- Ridderinkhof, K. R., Van Den Wildenberg, W. P., Segalowitz, S. J., & Carter, C. S. (2004). Neurocognitive mechanisms of cognitive control: the role of prefrontal cortex in action selection, response inhibition, performance monitoring, and reward-based learning. *Brain and Cognition*, *56*(2), 129-140. doi: 10.1016/j.bandc.2004.09.016
- Sowell, E. R., Peterson, B. S., Thompson, P. M., Welcome, S. E., Henkenius, A. L., & Toga, A. W. (2003). Mapping cortical change across the human life span. *Nature Neuroscience*, *6*(3), 309-315. doi: 10.1038/nn1008
- Sowell, E. R., Thompson, P. M., Holmes, C. J., Jernigan, T. L., & Toga, A. W. (1999). In vivo evidence for post-adolescent brain maturation in frontal and striatal regions. *Nature Neuroscience*, *2*(10), 859-861. doi: 10.1038/13154
- Spronk, M., & Jonkman, L. M. (2012). Electrophysiological evidence for different effects of working memory load on interference control in adolescents than adults. *International Journal of Psychophysiology*, *83*(1), 24-35. doi: 10.1016/j.ijpsycho.2011.09.019
- Stein, M., & Dumaret, A. C. (2011). The mental health of young people aging out of care and entering adulthood: Exploring the evidence from England and France. *Children and Youth Services Review*, *33*(12), 2504-2511. doi: 10.1016/j.childyouth.2011.08.029
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of experimental psychology*, *18*(6), 643-662. doi: 10.1037/h0054651
- Sučević, Đ., Momirović, A., Fruk, G., & Auguštin, B. (2004). *Priručnik za kognitivno neverbalni test (KNT) [Manual for Cognitive Nonverbal Test (CNT)]*. Jastrebarsko: Naklada Slap.
- West, R., & Alain, C. (1999). Event-related neural activity associated with the Stroop task. *Cognitive Brain Research*, *8*(2), 157-164. doi: 10.1016/S0926-6410(99)00017-8
- West, R., & Alain, C. (2000). Effects of task context and fluctuations of attention on neural activity supporting performance of the Stroop task. *Brain Research*, *873*(1), 102-111. doi: 10.1016/s0006-8993(00)02530-0

- West, R., Langley, M. M., & Bailey, K. (2011). Signaling a switch: neural correlates of task switching guided by task cues and transition cues. *Psychophysiology*, 48(5), 612-623. doi: 10.1111/j.1469-8986.2010.01123.x
- Wild-Wall, N., Falkenstein, M., & Gajewski, P. D. (2012). Neural correlates of changes in a visual search task due to cognitive training in seniors. *Neural Plasticity*, 2012, 1-11. doi: 10.1155/2012/529057
- Zurrón, M., Lindín, M., Galdo-Alvarez, S., & Díaz, F. (2014). Age-related effects on event-related brain potentials in a congruence/incongruence judgment color-word Stroop task. *Frontiers in Aging neuroscience*, 6, 128. doi: 10.3389/fnagi.2014.00128
- Zurrón, M., Pouso, M., Lindín, M., Galdo, S., & Díaz, F. (2009). Event-Related Potentials with the Stroop color-word task: Timing of semantic conflict. *International Journal of Psychophysiology*, 72(3), 246-252. doi: 10.1016/j.ijpsycho.2009.01.002

Flow in academic activities at the faculty: A qualitative analysis

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Abstract

Background and aims: Flow is a highly enjoyable state people feel when they are so focused on a task that it amounts to complete absorption in an activity (Csikszentmihalyi, 1975). Flow in academic activities results in various positive educational outcomes and is more important for students' well-being than flow in other areas of their life (Ljubin Golub, Rijavec, & Olčar, 2016). Keeping in mind these positive outcomes, the aim of this study was to identify the characteristics of academic activities at a faculty which students report as the most flow-inducing.

Method: The sample comprised 126 third-year and 77 fifth-year students of teacher education at the Faculty of Teacher Education, University of Zagreb. The participants were presented with three quotes about flow experience (Csikszentmihalyi & Csikszentmihalyi, 1988) and asked to describe in detail one such experience in academic activities at the faculty that was the most

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flow-inducing. They also rated how challenging the activity was and to what extent they had the necessary skills to perform it.

Results: Forty-four percent of the third-year and 77% of the fifth-year students had experienced flow in some academic activity during their studies. For the third-year students, these were mainly various engaging activities related to their interest and talents, and specific activities during lessons and seminars. For the older students, these activities mostly included various obligatory tasks (preparing for lectures, lecturing, preparing obligatory tasks, and exams) that offered them an opportunity to be creative and demonstrate skills both at the faculty and in the real-life context. The levels of challenges and necessary skills were rated above average for all groups of activities.

Conclusion: It was concluded that the most flow-inducing academic activities are those that are engaging and most important for achieving students' academic goals, but other explanations were offered as well.

Keywords: academic flow, higher education, qualitative analysis, students

Introduction

The topic of student engagement in higher education has received considerable attention due to the concerns about their success and retention rates in the European Union (Vossensteyn et al., 2015). A considerable number of students fail to finish their studies, which can have negative consequences both for them and their families, as well as for the society in whole. In Croatia, the number of such students is over 40%, which is a higher percentage than in other EU countries (File, Farnell, Doolan, Lesjak, & Šćukanec, 2013). However, even when students finish their studies, we should be aware that academic performance is not the only element of university student experience. Equally important for students is to engage in learning, enjoy it, and make the most of their education. In spite of the importance of attending classes, many students often miss them, mostly because of boredom or a general lack of interest (Rijavec & Miljković, 2015). Different curriculum redesigns have been suggested in order to deal with these issues and foster intrinsic motivation. They all stress that it is important for students to meaningfully engage in continuous learning experiences that may lead to a state of optimal experience or flow, a state closely related to intrinsic motivation (e.g., Fullan, 2012; Litky & Grabelle, 2014).

Csikszentmihalyi (1991) defined flow "as a state in which people are so involved in an activity that nothing else seems to matter" (p. 4). Other characteristics include deep concentration, absorption, control of the situation, clear goals, and clear feedback, accompanied by a complete loss of the sense of time and place. Flow theory postulates that the necessary conditions for this state to occur are that both skills and challenges are above average (Csikszentmihalyi, 1997; Delle Fave & Massimini, 2004). If challenges are too high compared to

skills, a person feels anxiety. On the contrary, when challenges are too low and skills too high, a person feels bored. The relationship between flow and the balance of challenges and skills has been empirically supported in numerous settings (see Nakamura & Csikszentmihalyi, 2002).

Individuals experience flow in various settings and activities. Flow experience is the most frequent in structured leisure activities (e.g., Delle Fave & Massimini, 2003) or productive activities, such as work (e.g., Csikszentmihalyi & LeFevre, 1989) and study (e.g., Rijavec, Ljubin Golub, & Olčar, 2016). Students can experience flow as part of their schoolwork and university activities (for a review see Shernoff & Csikszentmihaly, 2009), or while studying at home (Bassi & Delle Fave, 2004).

In academic settings, flow has the potential to increase student achievement and produce the optimization of student talent (Csikszentmihalyi, Rathunde, & Whalen, 1993). Experiencing flow in academic activities has been found to be positively related to various educational outcomes, such as a higher grade point average (GPA) (Ljubin Golub et al., 2016; Shernoff & Schmidt, 2008) and better performance (Engeser, Rheinberg, Vollmeyer, & Bischoff, 2005). There are several possible explanations for this relationship. One of them is that flow state is intrinsically rewarding and, once experienced, students seek to replicate it. In order to do so, they have to master new challenges and develop their existing skills, which can result in better academic achievement (Nakamura & Csikszentmihalyi, 2002). Studies have shown that experiencing flow repeatedly in any activity, including academic activities, leads to an increase in skills and competencies in that activity (Delle Fave, Massimini, & Bassi, 2011). There is also evidence that flow is a mediating variable for the effect of motivation on performance (Vollmeyer & Rheinberg, 2006).

In addition to educational outcomes, flow was also found to contribute to students' well-being (Asakawa, 2010). Specifically, flow in academic activities, although less frequent, was found to be more important for students' well-being than flow in other areas such as leisure or maintenance activities (Rijavec et al., 2016).

Previous research on academic flow was conducted mainly with high school students, while studies on university population have been less frequent. Keeping in mind all the aforementioned positive consequences of flow and the fact that it is less frequent in academic activities than in other areas of student life, it would be of great importance for university teachers and education policy-makers to have an insight into the type and specific characteristics of flow-inducing academic activities. Since, to our knowledge, there are no studies on the sources of flow in academic activities in the university population of Croatia, an explorative qualitative study would provide important information

on this topic. Thus, the central aim of the study was to identify the types and characteristics of academic activities at the faculty that students report to be the most frequent source of flow experience.

Method

Participants and procedure

The sample comprised 203 university students of teacher education, mostly female (95.1%). There were 126 third-year and 77 fifth-year students. The students participated voluntarily and anonymously in the study and received no credits for their participation. An open-ended questionnaire was developed to gather data. The questionnaire was administered during regular class sessions and the students were informed that they can opt out at any time without consequences.

Measures

The participants were presented with three quotes from The Flow Questionnaire (FQ; Csikszentmihalyi & Csikszentmihalyi, 1988) that vividly describe flow experience:

“My mind isn’t wandering. I am not thinking of something else. I am totally involved in what I am doing. My body feels good. I don’t seem to hear anything. The world seems to be cut off from me. I am less aware of myself and my problems.”

“My concentration is like breathing, I never think of it. When I start, I really do shut out the world. I am really quite oblivious to my surroundings after I really get going. I think that the phone could ring, and the doorbell could ring, or the house could burn down or something like that. When I start, I really do shut out the world. Once I stop, I can let it back in again. ”

“I am so involved in what I am doing. I don’t see myself as separate from what I am doing.” (p. 195)

First, the participants were asked to indicate if they had ever experienced this state in the academic activities at the faculty. If their answer was positive, they were asked to recall one situation or activity that induced this state the most and describe it in as many details as they could (“In what situation did you experience it? What exactly were you doing? In which course? What characteristics of the task or the situation contributed to the experience?”)

In addition to that, they were also asked to assess how challenging the activity had been on a 9-point scale ranging from 1 (*not at all challenging*) to 9 (*extremely challenging*), and their level of skills for performing the activity on a 9-point scale ranging from 1 (*extremely low level of skills*) to 9 (*extremely high level of skills*).

Overview of Data Analysis

A thematic analysis was used to code the common themes of academic activities that the students described as flow-inducing. Following the procedure described by Braun and Clarke (2006), the data were read twice by the primary investigator. After that, initial codes were construed to represent the specific activities that occurred throughout the entire data set. These codes were then collated into groups of activities (categories), which were defined, named, and described. After that, a content analysis was used. For each category, the frequency of responses was recorded (including the characteristics of activities the students mentioned and their frequency), as well as the average level of challenges and skills for the activities in each category.

The analysis was done separately for the two groups of students. For each group, the major categories of activities were identified (those stated by at least 10% of the students).

Results

It was found that 43.7% of the third-year and 76.6% of the fifth-year students experienced flow in some academic activity during their studies, the difference between the two groups being significant ($\chi^2[1] = 21.10, p < .001$), with more students in the fifth year reporting the experience of flow.

The frequencies of the major categories and the median value of challenges and skills are presented in Tables 1 and 2. Some students described more than one activity.

Third-year students

Art activities and preparing for exams were by far the most frequently mentioned flow-inducing activities for the third-year students (reported by 49.3 % of them) (Table 1), followed by various activities that included active involvement. The ratings of activities, challenges, and skills were above the median for all categories.

Table 1. Top four categories of flow-inducing activities for third-year students who experienced flow (N=55) and the median for challenges and skills ratings (9-point scale)

Category	n	%	% total (N=126)	challenges	skills
Artistic activities (visual arts and music)	16	29.1	12.7	7	7
Preparing for exams	11	20.2	9.7	7	8
Various activities that include active involvement	9	16.4	7.1	7	6
Attending lectures	7	12.7	5.6	7	7

Art activities

In describing art activities, the students reported that they enjoyed doing them (n = 6), they had the necessary skills (3), and that these activities were interesting (3) and relaxing (3):

“Once we had to paint a portrait of a famous painter. I chose Van Gogh. When I started and realized how well it was going (my painting was really similar to Van Gogh), I couldn’t stop for hours.” (*skills*)

“I really like visual art tasks. Doing them is very enjoyable for me and I am fully concentrated.” (*enjoyment*)

Preparing for exams

The students who mentioned preparing for exams as a flow-inducing activity stated that the topic was interesting (n = 7), and two students reported that the preparation included some practical activity: “(I experience flow) sometimes when I study for my English course exams. They are very interesting, I enjoy learning about the topic and have a feeling that I am growing as a person.”

Various activities that include active involvement

A certain number of students stated various activities that were rather different in content, but they all included active involvement as the source of flow experience:

“I have often had this experience during choral singing especially while preparing for a performance and during the performance. We sing, dance, act, there is only us and the most wonderful professor in the world.”

“I experienced this state while reading in Braille during the Inclusive pedagogy course. The task required a great deal of concentration and effort. I was totally involved, unaware of anything around me and without any interrupting thoughts.”

“While we were making dolls that we used for our show.”

“Watching a film with a child and interviewing the child afterward.”

Attending lectures

The students who stated that they experienced flow while attending lectures mentioned that the lectures were interesting (n = 7) and stated that the professor’s approach to teaching was the main factor for experiencing flow (n = 5).

Fifth-year students

Preparing for formally-assessed lectures and lecturing (lectures they themselves give in primary schools in front of pupils) were by far the most frequently mentioned flow-inducing activities for the fifth-year students (reported by 67% of them) (Table 2), followed by preparing for various obligatory tasks, exams, and group activities. The ratings of activities, challenges, and skills were above the median for all categories.

Preparing for lectures

In most descriptions of flow experience during lecture preparations, the students described this experience in their own words and then added some specific attributes of the activity:

Table 2. *Top five categories of flow-inducing activities for fifth-year students who experienced flow (n=59) and the median for challenges and skills ratings (9-point scale)*

Category	n	%	% total (N=77)	Mdn	
				challenges	skills
Preparing for lectures	26	44.1	33.8	7	7
Lecturing	14	23.7	18.2	7	7
Preparing for various obligatory tasks	7	11.9	9.1	7	8
Preparing for exams	7	11.9	9.1	7	7
Group activities	6	10.2	7.8	8	8

"I am completely absorbed in what I am doing when the topic I am preparing is extremely important and interesting. I love and enjoy preparing for lessons, I don't think about anything else during that time and I am completely concentrated on the topic. I recall that once (while I was preparing for a Croatian language lesson) I was completely isolated from the world around me for several hours."

"Sometimes, while preparing for a lecture, I forget to eat for hours."

In addition to the main characteristics of flow state, the students most frequently mentioned that preparing for lectures allowed them to be creative (n = 10), it was interesting (n = 5), they enjoyed doing it (n = 5), and the activity was meaningful because they tried to prepare it so that the children would really understand it and learn about the topic (n = 3).

"I think I felt like this because mathematics is definitely the best topic that allows you to be creative." (*creativity*)

"I feel like that every time the lecture I am preparing is interesting." (*interest*)

"I wanted to prepare the lecture in such a way that pupils find the answers by themselves, through playing." (*meaning*)

"I was really enjoying preparing that lecture." (*enjoying*)

Lecturing

While giving a lecture, the majority of the students stated that they were completely concentrated on the lecture and the children, and were not aware of anything around them. They usually did not specify what made them enter this state of flow. The examples of these are:

"I was completely immersed in the lecture and I did not notice anything around me except the children."

"I am completely concentrated on the lecture and the children. I neither see nor hear anything else."

Some of the students mentioned that they try to get into that state on purpose.

"I experienced that state while giving lectures. I think it is because I feel good and I like to do it. But also because I am aware that I would not accomplish my goal if I were not totally concentrated."

"I try not to think about anything else, especially personal problems."

Other activities

Other activities that the students described as flow-inducing included preparing obligatory tasks, preparing for exams, and group activities. In describing obligatory tasks (such as preparing presentations and other kinds of homework) and preparing for exams, the students did not report any special attributes of the activities, except for one student who reported that she tried to make the task more challenging. "I don't like standard presentations. They are boring. So my colleague and I decided we will do it differently. We made our presentations in the form of play". While describing group activities, three students mentioned creativity while demonstrating their work to others; challenge and interest were mentioned once.

Discussion

Since flow experiences were found to be related to various positive educational outcomes, as well as students' well-being, this study aimed to identify the types and characteristics of academic activities that are the most flow-inducing for university students. Using a qualitative approach, we attempted to identify in more detail the main types and attributes of these activities for students of teacher education.

The findings show that 44% of the third-year students and 77% of the fifth-year students experienced flow state at some point in academic activities related to their studies. This is consistent with previous research indicating that flow experience can emerge during academic activities in school and university (Bakker, Ljubin Golub, & Rijavec, 2017; Shernoff & Csikszentmihaly, 2009). However, it should be noted that the percentage of the participants that reported experiencing flow in academic activities is significantly higher among the fifth-year students. This may be due to the fact that by being students for a longer period of time, they had more chances to experience flow, but also that they had an opportunity to participate in activities that are more flow-producing.

The fifth-year students showed a very clear pattern of results indicating that preparing lectures and lecturing (lectures they give in primary schools in front of pupils) are the most frequently mentioned flow-inducing academic activities reported by 52% of the total sample (and 67% of those who experienced flow). These findings could be theoretically linked to several conditions related to flow-inducing activities: a high opportunity for creativity, the importance of goals, and social identity.

Preparing for lectures and lecturing are activities that give students most opportunities to be creative and use their skills and knowledge to plan the lecture in the best way they can. In fact, both creativity and desire to help children learn were often mentioned in their descriptions. Previous studies with high school students showed that they are more likely to experience flow when academic work intellectually involves them in the process of meaningful inquiry extending beyond the classroom (Newman, Wehlage, & Lamborn, 1992). This is exactly what the students participating in this study were required to do while preparing and giving lectures.

Next, these activities are probably the most important for achieving their future goals. Being successful in preparing for lectures and lecturing is necessary not only to graduate but also to feel competent to be a teacher. Csikszentmihalyi (1991) states that if a person organizes his/her life around a central and important goal, it can lead to the feeling of general flow state. Previous studies found that students were most engaged and reported being in a better mood when they felt that their activities were relevant to their lives (Shernoff, Csikszentmihalyi, Schneider, & Steele-Shernoff, 2003).

Finally, these activities are also strongly related to students' social identity of being teachers because the majority of them are going to enter that profession in a year or two. Recent research suggests that participation in activities that are important for identity formation at the social level (i.e., professional identification) could facilitate flow (Mao, Roberts, Pagliaro, Csikszentmihalyi, & Bonaiuto, 2016).

Apart from preparing for lectures and lecturing, the students also mentioned preparing for various obligatory tasks, exams, and group activities. Both the preparation for such tasks and group activities had common characteristics of intensive involvement, active engagement, and demonstrating skills and abilities. One study with second-year students of teacher education also showed that flow experiences were the most frequent in academic activities which involved preparations for various obligatory tasks (Rijavec et al., 2016). This is in line with the data obtained in a study with high school students, suggesting that homework is more frequently associated with flow than schoolwork activities (Delle Fave, 1996).

For the third-year students, the pattern of results was different. The most frequent flow-inducing activities were those related to visual art and playing an instrument. This is probably due to their interest and talents since they mostly mentioned that they enjoyed doing these activities, they had the necessary skills, and the activities were interesting and relaxing. There is also a group of various flow-inducing activities that vary in content but their main feature was that they required students to be actively engaged. These activities were

mainly related to various tasks assigned to them by teachers during seminars. In addition to these activities, preparing for exams is also mentioned by some students as a flow-inducing activity.

The least mentioned flow-inducing activity is attending lessons (mentioned only once by the fifth-year students) which is in accordance with previous research with university students showing that flow is least frequent during lessons (Rijavec et al., 2016). Studies with high school students found that students were most engaged in school while taking tests, doing individual work, and doing group work, and less so when listening to lectures or watching videos (Shernoff, Knauth, & Makris, 2000). Since students spend a considerable amount of time passively listening to lectures, they may not be adequately challenged or motivated to learn.

Generally, it can be concluded that flow-inducing academic activities are different for the third- and fifth-year students. For the older students, these mainly include various interesting obligatory tasks (preparing for lectures, lecturing, preparing obligatory tasks, and exams) that offer them an opportunity to be creative and demonstrate their skills both at the faculty and in the real-life context. For the third-year students, these are mainly various engaging activities related to their interest, talents, and specific activities during lessons and seminars. However, both groups of students stated that both challenges and skills for the mentioned flow-inducing activities were above average, confirming that both high challenges and high skills are necessary to flow state to occur.

In the last decade, several authors suggested that traditional educational methods mostly seem to fail to provide experiences that students find meaningful (Shernoff & Csikszentmihalyi, 2009). For example, Csikszentmihalyi (1991) stressed that “perhaps the most powerful effect flow theory could have in the public sector is in providing a blueprint for how institutions may be reformed so as to make them more conducive to optimal experience” (p. 191).

Although it is a fact that much of the students’ motivation to learn stems from their interests, teachers also play an important role in the engagement of their students. Teacher- and classroom-level variables explain a significant portion of student engagement (Hill & Rowe, 1996). Our study also suggests that students become more engaged if the academic activities match their interests and present opportunities for active engagement and demonstration of their skills.

This study has a number of limitations that must be taken into account. Namely, it involved only students of university teacher education (mainly female) and did not sample the experiences of students at other faculties. The types and characteristics of flow-inducing activities for students at other faculties or male students may be quite different. Future research should include

students of both genders and different faculties to see whether the same patterns of results would be replicated.

Another limitation stems from the fact that the students wrote about their flow experiences in academic activities, rather than being interviewed about them. It is possible that some students are less prone to writing about their experiences and for them, an interview might have been a better approach for this research aim.

However, the study presents important information for university teachers and can be the first step for further quantitative research about the frequency and intensity of specific flow-inducing academic activities and their relation to relevant educational and well-being outcomes.

Conclusion

The results show that 44% of the third-year students and 77% of the fifth-year students experienced flow at some point in their academic activities. However, flow-inducing academic activities are different for the third- and fifth-year students. The later experience flow most frequently while preparing lectures and lecturing, whereas the former experience flow in various engaging activities related to their interest, talents, and specific activities during lessons and seminars.

This preliminary evaluation suggests that academic activities should be designed so as to offer students possibilities to use and develop their skills in practical activities related to their interests and future professions. According to Csikszentmihalyi (1991), such challenging and meaningful activities would foster intrinsic motivation with the primary focus on improving the quality of students' academic experiences.

References

- Asakawa, K. (2010). Flow experience, culture, and well-being: How do autotelic Japanese college students feel, behave, and think in their daily lives? *Journal of Happiness Studies*, *11*, 205–223. doi: 10.1007/s10902-008-9132-3.
- Bakker, A. B., Ljubin-Golub, T., & Rijavec, M. (2017). Validation of the study-related flow scale based on WOLF. *Croatian Journal of Education*, *19*(1), 147-173. doi: 10.15516/cje.v19i1.2194.
- Bassi, M., & Delle Fave, A. (2004). Adolescence and the changing context of optimal experience in time: Italy 1986–2000. *Journal of Happiness Studies*, *5*, 155-179. doi:10.1023/B:JOHS.0000035914.66037.b5

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. doi:10.1191/1478088706qp063oa
- Csikszentmihalyi, M. (1991). *Flow: The psychology of optimal experience*. New York: Harper Perennial.
- Csikszentmihalyi, M. (1997). *Finding Flow: The psychology of engagement with everyday life*. New York: Harper Collins.
- Csikszentmihalyi, M., & Csikszentmihalyi, I. (1988). *Optimal experience. Psychological studies of flow in consciousness*. New York: Cambridge University Press.
- Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56, 815–822. doi: 10.1037/0022-3514.56.5.815
- Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers: The roots of success and failure*. New York: Cambridge University Press.
- Delle Fave, A. (1996). Esperienza ottimale e fluttuazioni dello stato di coscienza: risultati sperimentali [Optimal experience and fluctuation in the state of consciousness]. In F. Massimini, P. Inghilleri, & A. Delle Fave (Eds.) *La Selezione Psicologica Umana—Teoria e Metodo D'analisi* (p.p. 541– 568). Milano: Cooperativa libreria I.U.L.M.
- Delle Fave, A., & Massimini, F. (2003). Optimal experience in work and leisure among teachers and physicians: Individual and bio-cultural implications. *Leisure Studies*, 22, 323–342. doi: 10.1080/02614360310001594122
- Delle Fave, A., & Massimini, F. (2004). The cross-cultural investigation of optimal experience. *Ricerche di Psicologia*, 27, 79–102.
- Delle Fave, A., Massimini, F., & Bassi, M. (2011). *Psychological selection and optimal experience across cultures*. New York: Springer.
- Engeser, S., Rheinberg, F., Vollmeyer, R., & Bischoff, B. (2005). Motivation, Flow-Erleben und Lernleistung in universitären Lernsettings. *Zeitschrift für Pädagogische Psychologie*, 19, 159–172. doi: 10.1024/1010-0652.19.3.159
- File, J., Farnell, T., Doolan, K., Lesjak, D., & Šćukanec, N. (2013). *Higher education funding and the social dimension in Croatia: Analysis and policy guidelines*. Zagreb: Institute for the Development of Education.
- Fullan, M. (2012). *Stratosphere: Integrating technology, pedagogy, and change knowledge*. Toronto: Pearson Canada.
- Hill, P., & Rowe, K. (1996). Multilevel modeling in school effectiveness research. *School Effectiveness and School Improvement*, 7, 1–34. doi: 10.1080/0924345960070101
- Littky, D., & Grabelle, S. (2014). *The Big Picture: Education is Everyone's Business*. Alexandria, USA: Association for Supervision and Curriculum Development.
- Ljubin Golub, T., Rijavec, M., & Olčar, D. (2016). The relationship between executive functions and flow in learning. *Studia Psychologica*, 58(1), 47–58.
- Mao, Y., Roberts, S., Pagliaro, S., Csikszentmihalyi, M., & Bonaiuto, M. (2016). Optimal Experience and Optimal Identity: A Multinational Study of the Associations between Flow and Social Identity. *Frontiers in Psychology*, 7 (67). doi: 10.3389/fpsyg.2016.00067

- Nakamura, J., & Csikszentmihalyi, M. (2002). The concept of flow. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 89–105). Oxford: Oxford University Press.
- Newmann, F. M., Wehlage, G. G., & Lamborn, S. D. (1992). The significance and sources of student engagement. In F. M. Newmann (Ed.), *Student engagement and achievement in American secondary schools* (pp. 11-39). New York: Teachers College Press Columbia University.
- Rijavec, M., & Miljković, D. (2015). Reasons for missing classes in college; the role of personality traits. *Procedia-Social and Behavioral Sciences*, 205, 480-484. doi: 10.1016/j.sbspro.2015.09.046
- Rijavec, M., Ljubin Golub, T., & Olčar, D. (2016). Can learning for exams make students happy? Faculty related and faculty unrelated flow experiences and well-being. *Croatian Journal of Education*, 18(1), 153-164. doi: 10.15516/cje.v18i0.2223
- Sherhoff, D. J., & Csikszentmihalyi, M. (2009). Flow in schools: Cultivating engaged learners and optimal learning environments. In R. C. Gilman, E. S. Heubner, & M. J. Furlong (Eds.), *Handbook of positive psychology in schools* (pp. 131-145). New York, NY: Routledge.
- Sherhoff, D. J., Csikszentmihalyi, M., Schneider, B., & Steele-Sherhoff, E. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly*, 18, 158–176. v10.1521/scpq.18.2.158.21860
- Sherhoff, D. J., Knauth, S., & Makris, E. (2000). The quality of classroom experiences. In M. Csikszentmihalyi & B. Schneider (Eds.), *Becoming adult: how teenagers prepare for the world of work* (pp. 141-164). New York: Basic Books.
- Sherhoff, D., & Schmidt, J. (2008). Further evidence of an engagement-achievement paradox among US high school students. *Journal of Youth and Adolescence*, 37, 564-580. doi: 10.1007/s10964-007-9241-z
- Vollmeyer, R., & Rheinberg, F. (2006). Motivational Effects on Self-Regulated Learning with Different Tasks. *Education Psychology Review*, 18, 239-253. doi: 10.1007/s10648-006-9017-0
- Vossensteyn, H., Kottmann, A., Jongbloed, B., Kaiser, F., Cremonini, L., Stensaker, B., ... & Wollscheid, S. (2015). *Dropout and completion in higher education in Europe: Main report*. Luxembourg: Publications Office of the European Union.

Determinants of academic dishonesty among students

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Abstract

Background and aims: Since previous research has found a high frequency of academic cheating among students, it seems important to investigate certain correlates and causes of academic dishonesty in order to prevent it. The aim of this study was to examine some of the determinants of academic dishonesty among students: goal orientations in learning, the reasons for cheating and non-cheating, and the acceptability of cheating.

Method: The study included a total of 234 students (194 female). The questionnaire consisted of the Croatian version of the Cheating Scale (Carpenter, Harding, & Finelli, 2006), which measured the occurrence of exam- and homework-related cheating, and severe forms of cheating in academic setting and their acceptability; the Reasons to Cheat Scale (Petрак & Bartolac, 2013; Šimić Šašić & Klarin, 2009), the Reasons not to Cheat Scale (Petрак & Bartolac, 2013), which measured different reasons for non-cheating, and of the Croatian version of the Goal Orientation Scale (Niemvitra, 1999), which measured mastery, performance, and work avoidance goal orientation in learning.

Results: The results showed that cheating in the academic context is highly present, with the most common form being exam-related cheating,

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while the severe forms of cheating were the rarest. Apart from that, cheating is highly acceptable among the students. The reasons for cheating and the acceptability of cheating were found to be significant positive predictors of the occurrence of exam- and homework-related cheating. A significant positive predictor of the severe forms of cheating was the acceptability of cheating, while the mastery goal orientation was a significant negative predictor.

Conclusion: The findings have important practical implications for both professors and students and could contribute to a reduction of different kinds of cheating in the academic setting.

Keywords: academic dishonesty, reasons for cheating, reasons for non-cheating, goal orientations in learning

Introduction

Academic dishonesty is a very broad term and there is no unique definition thereof in literature. Generally speaking, it is defined as the use of unauthorized techniques and the ways of answering or achieving academic tasks (Anderman & Danner, 2008). Jensen, Arnett, Feldman, and Cauffman (2002) use a more specific definition of academic dishonesty as an attempt by students to present other's academic work as their own involving different behaviors, such as cheating on an exam, rewriting tasks and projects of other students, and plagiarism.

Over the past decade, there has been a large increase in the interest in research of academic dishonesty, which could be explained by the increasing number of new instances of plagiarism within the academic community, as well as the growing number of new universities (Macfarlane, Zhang, & Pun, 2012). The percentage of students cheating at exams increased between 1961 and 1993 from 39% to 64% (McCabe, Trevino, & Butterfield, 2001), and recent research shows that, on average, about 80% of students cheat in some way (Witherspoon, Maldonado, & Lacey, 2012).

Research conducted in Croatia has shown similar results. Hrabak et al. (2004) showed that 94% of the students at the Faculty of Medicine in Zagreb had behaved in an academically dishonest way at least once, while in the research of Petrak and Bartolac (2013) 98.4% of the students stated that they had copied from others during an exam. Among the rarest forms of the violation of academic honesty are "severe forms" such as counterfeiting grades, having someone else other than the student sit an exam, and changing the answer after their exam had been evaluated (Petrak & Bartolac, 2013). However, what is even more worrying than the high percentage of students who behave in an academically dishonest way is the percentage of the acceptance of academically dishonest behavior. According to Bernardi, Banzhoff, Martino and Savasta

(2012), 43.1% of the respondents believe that cheating is not bad, and in one Croatian research by Petrak and Bartolac (2013), 73.5% of the students consider it acceptable to ask colleagues about an exam which they still have not written, while 51% think it is acceptable to allow colleagues to copy from them.

Therefore, much research in this area is focused on discovering why students decide to behave in an academically dishonest way. According to Petrak and Bartolac (2013), the most common causes of cheating include poor supervision of exams, poor organization of exams, and a desire to avoid bad grades. By contrast, the most common reason for non-cheating is the students' fear that they will be caught. Generally, current research on the reasons for academic cheating can be divided into two groups. The first group of studies assesses individual characteristics related to academic dishonesty, such as age, sex, success in school, parents' level of education, and students' motivational characteristics, for instance, self-efficacy, goal orientation, and morality (Murdock & Anderman, 2006). The second group of studies assessed environmental factors associated with academic dishonesty, such as the responsibility of professors, methods of punishing, cheating of other peers, the pressure of parents, and morale at the university (McCabe et al., 2001). However, although there are many studies which assess the relationship between various factors and academic dishonesty, this area is still an atheoretical domain and as such lacks systematic theories that would encompass a wide range of variables (Murdock & Anderman, 2006).

Cheating is a "motivated" behavior, and an individual has to make a decision about whether or not to cheat, or, for certain reasons, whether he or she is motivated for or against cheating. Most of the researchers in the motivational determinants of academic dishonesty are based on the model of goal orientation in learning (Anderman & Danner, 2008). The basic construct of this model is the orientation towards a goal that is defined as a set of beliefs that leads to different modes of engagement and response to situational demands (Pintrich & Schunk, 1996, according to Stanišak Pilatuš, Jurčec, & Rijavec, 2013). Therefore, researchers studying academic dishonesty from the perspective of goal orientation assume that the goal which a student has affects the various strategies which will be used in the pursuit of that goal, and cheating is one of the strategies (Anderman & Danner, 2008). In the literature, two types of target orientation are the most often referred to mastery and performance goal orientation (Dweck & Legget, 1988). Mastery goal orientation refers to the true development of skills and task mastery, while performance goal orientation refers to demonstrating ability by comparing it with their colleagues' or by avoiding a lack of ability (Dweck, 1986; according to Stanišak Pilatuš et al., 2013). Nicholls, Patashnick, and Nolen (1985) also define a third goal orienta-

tion called work avoidance, which refers to the accomplishment of a task with minimal effort. Dweck (1986, according to Stanišak Pilatus et al., 2013) states that mastery goal orientation encourages students to initiate and solve tasks and to research independently.

The results of the research on the relationship between performance orientation with different educational outcomes are not consistent. Some research shows that performance orientation is associated with negative educational outcomes (e.g., learned helplessness) and avoiding seeking help from others (Elliott & Dweck, 1988; Ryan, Hicks, & Midgley, 1997), whereas other studies show a positive correlation between this goal orientation and school success and other positive outcomes, for example, perseverance and persistence during learning (Brdar, Rijavec, & Lončarić, 2006). The work avoidance goal orientation is associated with less intrinsic motivation for learning and with lower school success (Brdar et al., 2006). Anderman and Danner (2008) state that the student's orientation to a particular goal is directly related to the decision-making process on whether or not to cheat. In a case when students are oriented to performance and just want to show their ability or avoid proving incompetence, cheating is one of the adaptive strategies for achieving that goal. On the other hand, for students who are genuinely oriented to mastery and their goal is to learn, such strategies are less likely because they do not benefit from them (Anderman, Griesinger, & Westerfield, 1998). In the research of Anderman and Danner (2008), the results confirm these assumptions, and mastery orientation is associated with a lesser frequency of cheating, while performance orientation is associated with a greater representation of cheating.

Since research has found a strong relationship between academic dishonesty at the faculty and undesirable behavior at the workplace (Bernardi et al., 2012) and that Croatian society is increasingly debating academic dishonesty, we believe that it is important to investigate certain correlates and causes of academic dishonesty with the aim of preventing it. The examination of the current literature reveals no research with a sample of Croatian students that would lead to the appearance of academic dishonesty from the perspective of the theory of goal orientation in learning. Therefore, the main purpose of this paper was to assess the relationship between different forms of academic dishonesty and goal orientations in learning. Based on the theory of goal orientation, it was expected that students who report mastery goal orientation would also exhibit less academic dishonesty behavior, as opposed to students who report work avoidance and performance goal orientation. In addition, we wanted to explore the predictive contribution of the acceptance of cheating, the reasons for cheating and non-cheating, and the goal orientations in learning for the occurrence of cheating among students.

Method

Participants

The study included 234 students (194 female) from different faculties in Zagreb. Out of the total number of participants, 24.8% were students of the first year, 21.8% of the second, 26.5% of the third, 16.7% of the fourth, and 10.3% of the fifth year of study. Of the sample, 19% attended an integrated 5-year study programme, 54% attended an undergraduate and 27% a graduate study programme. Almost all students from the sample were full-time students (94.9%), while only 5.1% were part-time students. Most of the students studied social sciences (38.5%), followed by natural sciences (29.9%), medical and health sciences (18.8%), and a minor number (12.8%) were students of other sciences (humanities, art, technical sciences).

Instruments

The Cheating Scale (Petрак & Bartolac, 2013) consists of 26 items describing different kinds of academic cheating. The scale was constructed by Petрак and Bartolac (2013) based on two questionnaires about cheating from Carpenter, Harding, & Finelli (2006) and Šimić Šašić & Klarin (2009) and was adapted to the student population. The scale consists of two subscales: the occurrence of different forms of cheating and its acceptability. For the subscale of occurrence, the answers are given on a 3-point scale: 1 (*never*), 2 (*1-2 times*), 3 (*multiple times*). For the subscale of acceptability of a certain form of cheating, the answers are given on a 3-point scale: 1 (*unacceptable*), 2 (*partially acceptable*), 3 (*acceptable*). All the items are summed for each subscale and a higher score indicates a higher level of cheating or a higher level of acceptance of such behavior. Three factors were extracted, which explained a total of 44.36% of the variance. Due to the low factor saturation and the impairment of subscale reliability, item 13 was left out of the analysis. The first factor can be interpreted as *Exam-related cheating* (e.g., copying answers from a colleague during a written examination; 11 items, $\alpha=.86$), the second factor as *Homework-related cheating* (e.g., allowing other students to copy homework from me; 8 items, $\alpha=.77$), and the third factor can be interpreted as *Severe forms of cheating* (e.g., using private connections to receive a grade [at an examination or final]; 6 items, $\alpha=.69$).

The Reasons to Cheat Scale (Šimić Šašić & Klarin, 2009; Petрак & Bartolac, 2013) consists of 24 items describing various potential reasons for academic cheating (e.g., "I cheat because I don't have time to study"). The answers are given on a 5-point scale ranging from 1 (*not at all true for me*) to 5 (*completely*

true for me). All items are summed to a total score, and a higher score indicates more reasons for cheating among students. One factor is extracted, which explains the 49.2 % of the variance ($\alpha=.95$).

The Reasons not to Cheat Scale (Petruk & Bartolac, 2013) consists of 7 items describing various potential reasons why students should not cheat. Answers are given on a 5-point scale ranging from 1 (*not at all true for me*) to 5 (*completely true for me*). According to the previous research (Petruk & Bartolac, 2013), two factors were extracted that explain 54.8% of the variance. The first factor can be interpreted as *Fear* (e.g., "I do not cheat because I am afraid of being caught"; 3 items, $\alpha=.85$), while the other factor can be interpreted as the *Moral reasons* for non-cheating (e.g., "I do not cheat, because other students do not approve of it"; 4 items, $\alpha=.67$). Items are summed for each subscale separately, and a higher result indicates more fear- or moral-related reasons for non-cheating.

The Goal Orientation Scale (Niemvitra, 1999; according to Rijavec & Brdar, 2002) consists of 15 items measuring three goal orientations: mastery orientation, performance orientation, and work avoidance orientation. This scale is originally part of an instrument that measures the components of self-regulated learning, and in this research, the Croatian version of the scale was used (Rijavec & Brdar, 2002). The answers are given on a 5-point scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Three factors account for 49.2% of the variance. Item 2 was excluded from further analysis because it did not have the satisfactory saturation on the factor and disrupted the reliability of the subscale. The internal consistency was satisfactory: $\alpha=.81$ for mastery orientation (e.g., "I am very happy when I learn something new"; 4 items), $\alpha=.82$ for performance orientation (e.g., "I am very happy when I am performing better than others at college"; 5 items), and $\alpha=.80$ for work avoidance orientation (e.g., "I am very happy when I do not have to learn a lot"; 5 items). Items for each subscale are summed to a total score for each goal orientation, and a higher score indicates a higher presence of particular goal orientation.

Sociodemographic variables. The data on sociodemographic characteristics of the participants were collected by a questionnaire that contained questions about gender, year of study, field of study, level of study (undergraduate, graduate, integrated), and type of study (full-time student, part-time student).

Procedure

Approval for the research was granted by the Ethics Committee of the Catholic University of Croatia and the consent for the use of all measures used in the research was obtained by the authors. The questionnaire was set up using Google Forms and sent to different student groups on the Internet,

whereby participants had agreed to participate in the research by reading written consent before completing the form. The data was collected from May to June 2017.

Results

The results show that the most frequent form of cheating is exam-related cheating, which includes behaviors such as not reporting a cheating student (Table 1). Homework-related cheating was the next most frequent kind of cheating, such as copying someone else's essay or homework. The rarest forms of cheating were the severe ones, such as changing the answers on the exam after being evaluated. Exam-related cheating was also the most acceptable by the students, followed by homework-related cheating, and severe forms of cheating. The students consider fear and moral reasons for non-cheating to be almost on the same level. As for goal orientations, the students mostly agreed with the fact that they use work avoidance, followed by performance and mastery goal orientation.

Table 1. *Descriptive statistics for the forms of cheating, reasons for cheating and non-cheating, and goal orientations*

		M	SD	Range	
				Observed	Theoretical
<i>Forms of cheating</i>					
Exam-related cheating	Occurrence	21.48	5.02	11-33	11-33
	Acceptability	20.24	5.60	11-33	11-33
Homework-related cheating	Occurrence	14.71	3.63	8-24	8-24
	Acceptability	15.55	3.86	8-24	8-24
Severe forms of cheating	Occurrence	6.24	0.85	6-14	6-18
	Acceptability	6.59	1.55	6-18	6-18
Reasons for cheating		53.15	21.91	24-120	24-120
<i>Reasons for non-cheating</i>					
Fear		10.29	3.78	3-15	3-15
Moral reasons		11.49	3.73	4-20	4-20
Goal orientations					
Mastery		16.70	2.88	5-20	4-20
Performance		17.00	4.59	5-25	5-25
Work avoidance		18.27	4.15	7-25	5-25

Regarding correlations, which are presented in Table 2, exam-, homework-related and severe forms of cheating had a statistically significant moderate positive correlation with the acceptability of that kind of behavior. All three kinds of cheating had a statistically significant positive correlation with reasons for cheating, that is, this relationship was moderate for exam- and homework-related cheating and low for severe forms of cheating. On the other hand, exam-related cheating had a statistically significant moderate negative correlation with moral reasons for non-cheating, while homework-related and severe forms of cheating had a significant negative low correlation with moral reasons for non-cheating. Only severe forms of cheating had a statistically significant low negative correlation with fear-related reasons for cheating. Concerning goal orientations, different forms of cheating were in a statistically significant low negative correlation with mastery goal orientation and no correlation with performance goal orientation. Exam- and homework-related cheating had a significant positive low correlation with work avoidance goal orientation, while there was no correlation with severe forms of cheating.

To assess the determinants of the occurrence of each form of academic cheating, we conducted three separate regression analyzes (Table 3). The acceptability of each form of academic cheating was included as a predictor in the regression analysis. For all three forms of cheating, a statistically significant positive predictor was acceptability of that form of cheating. The reasons for cheating were a statistically significant positive predictor for exam- and homework-related cheating. Fear-related reasons for non-cheating did not have a statistically significant correlation with exam- and homework-related cheating, but in the regression analyzes they turned out to be a statistically significant negative predictor. This points to the fact that fear-related reasons for non-cheating could be a suppressor variable. Moreover, none of the three goal orientations was a significant predictor for exam- and home-related cheating. However, mastery goal orientation was a statistically significant negative predictor of the severe forms of cheating. Although performance and work avoidance goal orientations were in no correlation with the severe forms of cheating, in the regression analyzes, they turned out to be statistically significant predictors, though probably as suppressor variables. In general, regression models explained 50% of the variance of exam-related cheating, 49% of the homework-related cheating, and 26% of the severe forms of cheating.

Table 2. Pearson's correlation coefficients for all variables included in the research

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Exam-related cheating	-	.51**	.18**	.61**	.30**	.24**	.62**	-.07	-.45**	-.20**	-.06	.17**
2. Homework-related cheating		-	.26**	.47**	.67**	.30**	.43**	-.07	-.36**	-.14*	-.01	.21**
3. Severe forms of cheating			-	.18**	.16*	.42**	.15*	-.14*	-.24**	-.24**	.02	-.05
4. Acceptability of exam-related cheating				-	.64**	.40**	.62**	.07	-.55**	-.23**	-.06	.29**
5. Acceptability of homework-related cheating					-	.34**	.41**	-.02	-.37**	-.13*	-.06	.27**
6. Acceptability of severe forms of cheating						-	.23**	-.06	-.25**	-.10	.03	.06
7. Reasons for cheating							-	.21**	-.45**	-.30**	.08	.32**
8. Reasons for non-cheating – fear								-	.18**	-.05	.27**	.24**
9. Reasons for non-cheating – moral									-	.39**	.24**	-.25**
10. Mastery goal orientation										-	.21**	-.29**
11. Performance goal orientation											-	.16*
12. Work avoidance goal orientation												-

Note: * $p < .05$; ** $p < .01$

Table 3. Results of regression analyses for the occurrence of three different forms of cheating

	Exam-related cheating		Homework-related cheating		Severe forms of cheating	
	<i>b</i>	<i>SE b</i>	<i>b</i>	<i>SE b</i>	<i>b</i>	<i>SE b</i>
Constant	13.40	2.47	5.62	1.76	6.77	0.52
Acceptability of cheating	0.30	0.06	0.54	0.05	0.20	0.03
Reasons for cheating	0.10	0.02	0.03	0.01	0.00	0.00
Reasons for non-cheating – fear	-0.22	0.07	-0.10	0.05	-0.03	0.02
Reasons for non-cheating – moral	-0.05	0.09	-0.05	0.06	-0.02	0.02
Mastery goal orientation	0.03	0.10	0.00	0.07	-0.07	0.02
Performance goal orientation	-0.02	0.06	0.04	0.04	0.03	0.01
Work avoidance goal orientation	-0.04	0.07	-0.00	0.05	-0.03	0.01
		$R^2 = .50$ $adj. R^2 = .49$		$R^2 = .49$ $adj. R^2 = .48$		$R^2 = .26$ $adj. R^2 = .24$
		$F(7, 226) = 32.41^{**}$		$F(7, 226) = 31.40^{**}$		$F(7, 226) = 11.52^{**}$

Note: * $p < .05$; ** $p < .01$

Discussion

This study aimed to examine the acceptability of different forms of cheating, reasons for cheating and non-cheating, and goal orientations as determinants of different forms of academic cheating. Regarding the frequency of cheating behavior and their acceptability, the results showed that exam- and homework-related forms of cheating are moderately frequent and partly acceptable, while the severe forms of cheating are low frequent and unacceptable, which is in line with previous studies conducted in Croatia (Petruk & Bartolac, 2013; Šimić Šašić & Klarin, 2009).

The results showed that all three forms of cheating had a moderate positive correlation with the acceptability of each kind of cheating. The students who find different cheating behaviors acceptable also cheat more. This could be explained by the concept of neutralizing attitudes which refers to the justifications for behaviors which are not legal according to the legal system or society but are seen legal by the delinquent (Sykes & Matza, 1957). In this context, students who cheat and know that this is not acceptable behavior could experience feelings of guilt or shame, but if they rationalize their actions, they could mitigate dissonance (Rettinger & Kramer, 2009). Also, students often find cheating behaviors acceptable if they are caused by external factors rather than their dishonesty (McCabe, Trevino, & Butterfield, 1999). An external factor could be witnessing cheating behavior directly in other students which could facilitate neutralization of the cheating behavior. If students believe that many of their colleagues are cheating and find cheating acceptable, peer pressure to cheat can occur.

Different kinds of cheating were in a low to moderate positive correlation with the reasons for cheating with low negative correlations with the moral reasons for non-cheating. Only the severe forms of cheating were in a low negative correlation with fear-related reasons for non-cheating. It is not surprising that those students who exhibit some kinds of severe cheating behavior, such as taking an exam instead of someone else, feel fewer fear-related reasons for non-cheating, but this correlation, although significant, is quite low so we should interpret it with caution. Also, those who decide to exhibit such behavior probably have more courage than others and will be less afraid to do it. As expected, the students who cheat more at exams and homework, have fewer moral reasons for non-cheating. This is in accordance with the concept of neutralizing attitudes (Sykes & Matza, 1957), because students who cheat more do not find those behaviors unacceptable.

Students who have mastery goal orientation study because they want to gain knowledge (Rettinger & Kramer, 2009) and, if they cheat while doing different kinds of academic tasks, they will not achieve their goal to learn more.

The results from our study, although showing quite low correlations, are in line with this assumption – those who want to learn more and gain new knowledge will cheat less.

On the other hand, students who have performance goal orientation only want to get a good grade and prove their ability and competence. Earlier studies showed that those who are performance-motivated are more likely to cheat, in contrast to mastery-oriented students (e.g., Jordan, 2001). In our study, contrary to the expectations, performance goal orientation was not related to any kind of cheating behavior. The results may have been different had we divided the students into those who do not cheat and those who cheat, as Jordan (2001) did, and showed that those two groups of students differed regarding mastery or performance goal orientation. In our study, we conducted all the analyzes in the entire sample. Also, some research measured goal orientations and cheating separately for different courses which could also lead to different results (e.g., Anderman & Midgley, 2004). Moreover, recent revisions of goal theory acknowledge that there is also an approach/avoid distinction among mastery/performance goal orientations (Anderman & Danner, 2008). Respectively, interaction effects between these different kinds of goal orientations could also lead to potentially different results (Midgley, Kaplan, & Middleton, 2001).

As expected, the students who report higher levels of different types of cheating also report lower levels of master and higher levels of work avoidance goal orientation, although these correlations were quite low. It could be that the students who are not motivated to master the task and want to avoid work will also not invest much effort in cheating (Nicholls et al., 1985).

Finally, we wanted to examine the determinants of cheating behavior. The higher levels of both exam- and home-related cheating could be predicted by the higher levels of acceptability of that kind of cheating and reasons for cheating. The more reasons students have for cheating, the more likely they will resort to more exam- and homework-related cheating, while the more they find cheating acceptable, the more common behavior of all three forms of cheating will be. Petrak and Bartolac (2013) also state that students who cheat more will have a higher need to rationalize their unethical behavior and explain it with several reasons.

The results imply that fear-related reasons for non-cheating are a possible suppressor variable because they did not have a significant correlation with exam- and homework-related cheating but became a significant predictor in the regression analyzes. These kinds of variables are in relationship with other predictors and could account for or a suppress outcome-irrelevant variation or errors in predictors and therefore lead to an increased overall predictive power of the model (Pandey & Elliott, 2010). Fear-related reasons for cheating prob-

ably have a significant correlation with some other predictor and therefore could lead to an insignificance of moral reasons for non-cheating as a predictor. Apart from that, Petrak and Bartolac (2013) claim that, because of different environmental impacts, students have a reduced internal moral regulation of attitudes and behaviors, which could be the reason why moral attitudes have not been shown as a significant predictor.

The higher levels of severe forms of cheating could be predicted by the lower levels of mastery goal orientation. The more students are focused on gaining new knowledge, the less they use the severe forms of cheating. Performance and work avoidance goal orientation had no correlation with severe forms of cheating, and in the regression analyzes they were both significant predictors. Just like with the exam- and homework-related cheating, the performance and work avoidance goal orientation were probably suppressor variables in this model.

Regarding significant predictors, it is interesting that only mastery goal orientation is a significant predictor for the severe forms of cheating, and not for the other forms of cheating. It is possible that goal orientations were not significant predictors of exam- and homework-related forms of cheating because of the high frequency of those behaviors. In accordance with Turiel's explanation of the spread of cheating (1983; according to Šimić Šašić & Klarin, 2009), who claims that cheating is conventional rather than a moral problem, students consider cheating as normal and socially acceptable and that does not have to be determined by their different goal orientation in learning. Also, it is possible that students do not consider some behaviors as cheating because all their colleagues do it and professors do not explain what academically dishonest behavior truly is.

It is also important to note some limitations of this research. This study included a homogenous, convenience sample of participants, mostly female students of social and humanistic studies. Moreover, some of the items in the cheating scale could also be seen as a protective behavior (e.g., asking others about exam questions from an exam they had not yet written), not necessarily attempt to cheat, so there is a need for developing more valid measures of academic cheating. For future studies, it is important to include students from different fields of studies and more male participants, which would allow us to examine whether there are any differences between the different groups of participants. Additionally, it is desirable to include other individual and contextual determinants of academic dishonesty to obtain more comprehensive knowledge about this important issue in the academic context.

Despite the limitations, the aim of this study was to point out the importance of this topic in view of the growing phenomenon of academic dishonesty among students internationally and in Croatia. These and earlier findings can

be useful for both students and professors. Students can encourage greater accountability and raise awareness of the harm of academic dishonesty, whereas professors can become better informed and thus carry out modifications of their own exam organization. Also, it is important to point out the high acceptability of cheating among students. Bearing that in mind, school and faculties should attempt to change the attitudes of their students towards academic dishonesty. All this could contribute to a possible reduction of academically dishonest behavior.

Conclusion

This study showed that students often cheat on exams and also find this kind of cheating acceptable. Separate regression analyzes showed that for exam- and homework-related cheating the positive predictors were acceptability of that kind of cheating and reasons for cheating, while for the severe forms of cheating, the positive predictor was acceptability of cheating and the negative predictor was mastery goal orientation.

References

- Anderman, E. M., & Danner, F. (2008). Achievement goals and academic cheating. *Revue Internationale de Psychologie Sociale*, 1(21), 155-180.
- Anderman, E. M., Griesinger, T., & Westerfield, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology*, 90(1), 84-93. doi: 10.1037//0022-0663.90.1.84
- Anderman, E. M., & Midgley, C. (2004). Changes in self-reported academic cheating across the transition from middle school to high school. *Contemporary Educational Psychology*, 29(4), 499-517. doi: 10.1016/j.cedpsych.2004.02.002
- Bernardi, R. A., Banzhoff, C. A., Martino, A. M., & Savasta, K. J. (2012). Challenges to academic integrity: Identifying the factors associated with the cheating chain. *Accounting Education: An International Journal*, 21(3), 247-263. doi: 10.1080/09639284.2011.598719
- Brdar, I., Rijavec, M., & Lončarić, D. (2006). Goal orientations, coping with school failure and school achievement. *European Journal of Psychology of Education*, 21(1), 53-70. doi: 10.1007/bf03173569
- Carpenter, D. D., Harding, T. S., & Finelli, C. J. (2006). The implications of academic dishonesty in undergraduate engineering on professional ethical behavior. In R. Graham (Ed.), *World Environmental and Water Resource Congress 2006: Examining the Confluence of Environmental and Water Concerns* (pp. 1-12). Omaha: American Society of Civil Engineers.

- Dweck, C. S., & Legget, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*(2), 256-273. doi: 10.1037//0033-295x.95.2.256
- Elliott, E., & Dweck, C. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, *54*(1), 5-12.
- Hrabak, M., Vujaklija, A., Vodopivec, I., Hren, D., Marušić, M., & Marušić, A. (2004). Academic misconduct among medical students in a post-communist country. *Medical Education*, *38*(3), 276-285. doi: 10.1111/j.1365-2923.2004.01766.x
- Jensen, L. A., Arnett, J. J., Feldman, S. S., & Cauffman, E. (2002). It's wrong, but everybody does it: academic dishonesty among high school and college students. *Contemporary Educational Psychological*, *27*, 209-228. doi: 10.1006/ceps.2001.1088
- Jordan, A. E. (2001). College student cheating: The role of motivation, perceived norms, attitudes, and knowledge of institutional policy. *Ethics & Behavior*, *11*(3), 233-247. doi: 10.1207/s15327019eb1103_3
- Macfarlane, B., Zhang, J., & Pun, A. (2012). Academic integrity: a review of the literature. *Studies in Higher Education*, *39*(2), 339-358. doi: 10.1080/03075079.2012.709495
- McCabe, D. L., Trevino, L. K., & Butterfield, K. D. (1999). Academic integrity in honor code and non-honor code environments: A qualitative investigation. *The Journal of Higher Education*, *70*(2), 211-234. doi: 10.2307/2649128
- McCabe, D. L., Trevino, L. K., & Butterfield, K. D. (2001). Cheating in academic institutions: A decade of research. *Ethics & behavior*, *11*(3), 219-232. doi: 10.1207/s15327019eb1103_2
- Midgley, C., Kaplan, A., & Middleton, M. J. (2001). Performance approach goals: Good for what, for whom, under what circumstances, and at what cost?. *Journal of Educational Psychology*, *93*(1), 77-86. doi: 10.1037//0022-0663.93.1.77
- Murdock, T. B., & Anderman, E. M. (2006). Motivational perspectives on student cheating: Toward integrated model of academic dishonesty. *Educational Psychologist*, *41*(3), 129-145. doi: 10.1207/s15326985ep4103_1
- Nicholls, J. G., Patashnick, M., & Nolen, S. B. (1985). Adolescents theories of education. *Journal of Educational Psychology*, *77*(6), 683-692. doi: 10.1037//0022-0663.77.6.683
- Pandey, S., & Elliott, W. (2010). Suppressor variables in social work research: Ways to identify in multiple regression models. *Journal of the Society for Social Work and Research*, *1*(1), 28-40.
- Petrak, O., & Bartolac, A. (2013). Academic honesty among the students of health studies. *Croatian Journal of Education*, *16*(1), 81-117.
- Rettinger, D. A., & Kramer, Y. (2009). Situational and personal causes of student cheating. *Research in Higher Education*, *50*(3), 293-313. doi: 10.1007/s11162-008-9116-5
- Rijavec, M., & Brdar, I. (2002). Coping with school failure and self-regulated learning. *European Journal of Psychology of Education*, *1*(2), 177-194. doi: 10.1007/bf03173257

- Ryan, A. M., Hicks, L., & Midgley, C. (1997). Social goals, academic goals, and avoiding seeking help in the classroom. *Journal of Early Adolescence*, 17(2), 152 – 171. doi: 10.1177/0272431697017002003
- Sykes, G. M., & Matza, D. (1957). Techniques of neutralization: A theory of delinquency. *American Sociological Review*, 22(6), 664-670. doi: 10.2307/2089195
- Stanišak Pilatuš, I., Jurčec, L., & Rijavec, M. (2013). Ciljne orijentacije u učenju: Dobne i spolne razlike i povezanost sa školskim uspjehom. [Students goal orientation: Age and gender differences and correlation with academic achievement]. *Napredak*, 154(4), 473-491.
- Šimić Šašić, S., & Klarin, M. (2009). Varanje u srednjim školama u Hrvatskoj i u Bosni i Hercegovini. [High School Cheating in Croatia and Bosnia and Herzegovina]. *Društvena istraživanja*, 18(6), 999-1022.
- Witherspoon, M., Maldonado, N., & Lacey, C. H. (2012). Undergraduates and academic dishonesty. *International Journal of Business and Social Science*, 3(1), 76-86.

Phubbing among Croatian students

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Abstract

Background and aims: Phubbing is an emerging social phenomenon defined as looking at a smartphone during a face-to-face conversation. Phubbing is a global trend, but since it was acknowledged only several years ago, still little is known about its association with other Internet-related behaviors and well-being. This study is part of an ongoing international study on phubbing “A phubbing phenomenon – its predictors and consequences in a cross-cultural perspective” that is currently being conducted in thirty countries worldwide.

Methods: The research was conducted on 688 students, using e-questionnaires. To survey “technology-related-habits”, we employed The Phubbing Scale, Adapted Mobile Phone Use Habits, The Internet Addiction Scale, and assessed the number of hours the participants spent online. To assess “well-being”, we applied one item measures of life satisfaction and overall happiness, The Flourishing Scale and the K6-quantifier of non-specific psychological distress. “Self-control” was measured using the Brief Self-Control Scale.

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Results: Although the students spent over 9 hours per day logged on to the Internet, phubbing, mobile phone habits, and Internet addiction were low to moderate. Women were more likely to phub and reported more mobile phone-related habits, but men spent more hours per day logged on to the Internet and reported a higher Internet addiction. We explained 50% of the variance of phubbing in the female and 54% of the variance of phubbing in the male sample. Mobile phone use habits were the strongest predictor of phubbing in both samples. In the male sample, self-control contributed to the explanation of the variance of phubbing, while among the women, Internet addiction, the amount of time spent online during the weekends, and non-specific psychological distress contributed to the explanation of the variance of phubbing.

Conclusion: This research was the first to investigate the phubbing phenomenon in Croatia. It contributed to further studies by providing a Croatian adaptation of the questionnaire and set basic standards and reference points for further research of the phenomenon in Croatia.

Keywords: Phubbing, Well-being, Face-to-face communication, Mobile phones, Internet addiction

Introduction

Tremendous advancement of new communication technologies, including social networks, smartphones, and easily accessible and affordable Internet connection strongly influence people's daily lives. Amongst other things, massive changes in daily face-to-face communication routine that have recently occurred are fostered by the new technologies. People carry mobile phones with them almost all the time, and checking messages and status updates has become a routine part of ordinary life. Lenhart (2015) reported that more than 50% of 13 to 17 year-olds go online several times per day and almost 25% claim to be online "almost constantly". Pew Research Center (2014) reported that 98% of Americans between the ages of 18 and 29 owned mobile phones, and 97% were using the Internet. In the same year, 99% of Croatian students were using the Internet (Pugar & Markuš, 2014).

Of course, people still communicate in a face-to-face manner, but even then, we rarely abandon smartphone activities. Checking smartphones during in-person conversations, group discussions, meals, classes, and other private or business social occasions has become common behavior. Drago (2015) studied the effects of new technologies on face-to-face communication. She found that excessive technology use resulted in a decrease in the amount and quality of face-to-face communication. Since technology has become an integral part of our lives and partially replaced face-to-face communication (Drago, 2015), people feel disconnected if they are not permanently available, and they often

feel the fear of missing something important (Przybylski et al, 2013) which leads to continuous checking of smartphones, even in the presence of others.

Phubbing can be defined as looking at a mobile phone during a face-to-face communication. The word “phubbing” was created by merging the words phone and snubbing, to describe the act of snubbing others in social interactions and focusing on one’s smartphone instead (Haigh, 2015). Phubbing often includes ignoring and neglecting the presence of others in favor of smartphones; therefore, it is generally considered to be a form of disruptive behavior. While phubbing, people most often check for updates on social networks or similar applications, send messages, or play games. Many applications, especially on-line games, directly stimulate phubbing since they require that a player make specific moves continually during the day in order to maximize the result. A similar principle of regular checking can be found on social networks or stock-market, where disconnection may mean missing out on important information or opportunity (e.g., Przybylski, Murayama, DeHaan, & Gladwell, 2013).

Phubbing is a new social phenomenon since it became possible only with recent development and broader availability of smartphones and the advancement of Internet access. Only a few years ago, phubbing was quite expensive if one was not connected to Wi-Fi, and especially when traveling abroad. But nowadays, free Wi-Fi access is standard, and mobile operators’ contracts between countries allow traveling users to go online at affordable rates, so a lot of people are logged on to the Internet permanently, which allows constant possibilities of phubbing.

Since phubbing was acknowledged only about five years ago, the body of the literature on this topic is still quite modest. The problematic smartphone use has been better explored and associated with withdrawal, intolerance, functional impairment (Lin et al., 2014; Mok et al., 2014), inhibition in interpersonal closeness (Przybylski & Weinstein, 2013), and insecurity in romantic relationships (Kuss & Griffiths, 2011). Most phubbing research so far has studied phubbing in romantic relationships. For example, Roberts and David (2016) found that phubbing had negative consequences for communication between partners, detrimentally affecting relationship satisfaction and feelings of personal well-being, while McDaniel and Coyne (2014) reported that 70% of women phub their romantic partner at least occasionally. Misra, Cheng, Genevie and Young (2014) reported decreased empathy during conversations where smartphones were present, while Roberts and David (2016) found lower levels of perceived relationship quality, partner trust, and perceived empathy in the presence of mobile phones. Ugur and Koc (2015) studied phubbing in class and found that 95% of students confessed they phubbed in class at least once or twice, and about one third reported daily phubbing. Although it is generally

perceived as disruptive behavior, there are certain cases in which phubbing can stimulate in-person interaction. For example, it can provide a conversation topic (e.g., "Hey look at this!").

Most research so far has found a positive association between smartphone and Internet addiction. However, De-Sola Gutiérrez et al. (2016) focused on the differences between smartphone and Internet addictions and reported different user profiles and motives. They found that while smartphone abusers tend to be young, female, and seeking social gratification, Internet-addicted individuals are more likely to be male and socially introverted. Much other research (e.g., Baron & Cambell, 2012; Ha & Hwang, 2014; Karadağ et al., 2015) also reported gender differences regarding smartphone and Internet (ab)use.

Phubbing behavior was found to be positively associated with Internet addiction (Karadağ et al., 2015), but more strongly to smartphone addiction, which was found to be related to depression (Thomee, Harenstam, & Hagberg, 2011), anxiety (Lepp, Barkley, & Karpinski, 2014), aggression, and a lack of attention (Park & Park, 2014). As per DSM-V (American Psychiatric Association, 2013), Internet addiction and smartphone addiction are not yet recognized as disorders. However, both are constantly and seriously being considered as an area in need of further research (De-Sola Gutiérrez, Rodríguez de Fonseca, & Rubio, 2016).

Billieux, Van der Linden, d'Acremont, Ceschi and Zermatten (2007) found a negative relationship between self-control and problematic smartphone use. More recently, Chotpitayasunondh and Douglas (2016) found that Internet addiction, fear of missing out, and self-control predicted smartphone addiction, which in turn predicted the extent to which people phub. Studying heavy Internet users, Brkljačić, Majetić, and Wertag (2018) found that they report a lower level of general happiness, and different sources of satisfaction, compared to light users. The light Internet users more often listed social activities, such as spending time with family and partner, as sources of life satisfaction, while the heavy users more often listed various entertainment activities.

The emergence of phubbing became increasingly widespread and now it can be considered a global phenomenon with evidence from around the world, such as the United States (Roberts and David, 2016), Brazil and China (e.g. Angeluci & Huang, 2015), Australia (Walsh, White, and Young, 2010), Finland (Suominen, Hyrynsalmi, and Knuutila (2014), and many other countries. However, its association with other online behaviors and psychological well-being has still not been fully explored.

Furthermore, to the best of our knowledge, phubbing has systematically not yet been studied in Croatia, so we lack general information on its prevalence in the country. The present study primarily sought to investigate the prevalence

of phubbing among Croatian students and its relationship with other Internet-related behaviors, well-being, and self-control. In this context, the research aims of this study were: (1) to study the prevalence of phubbing and phubbing-related behaviors among Croatian students, and to test the differences between male and female students, and (2) to explain phubbing through Internet-related behavior and mobile phone use habits, Internet addiction, well-being, and self-control.

Method

Participants

The research was conducted on 688 Croatian students (52.6% female) who filled in an online questionnaire. On average, the students were 22 years old ($M=21.8$, $SD=2.38$; range: 18-39), showing that mostly older students responded to the questionnaire.

Instruments

We applied a comprehensive battery of questionnaires. All instruments were translated using the back-translation procedure. For this study, we used data on various online behavior habits, well-being, and self-control.

Online behavior was assessed via:

The reported number of hours participants were logged on to the Internet per day: during (a) weekdays, and (b) the weekend.

The Phubbing Scale (Karadağ et al., 2015) was developed to capture the practice of dealing with a mobile phone in the presence of others. The scale consisted of 10 items (e.g., "My eyes start wandering on my phone when I'm together with others."), with a corresponding 5-point scale ranging from 1 (*never*) to 5 (*always*). The total result of the scale was presented as the arithmetic mean of all items, whereby a higher score indicated a higher tendency of phubbing. Karadağ and his associates (2015) found a two-factor structure for the phubbing scale, with Cronbach's alpha $\alpha = .87$ for the first (Communication disturbance), and $\alpha = .85$ for the second factor (Phone obsession). Factor analysis in our research yielded a similar structure. However, just as Karadağ and his associates (2015), we opted to present the total result of the scale. In our research, Cronbach's alpha for the whole scale was $\alpha = .79$.

The Adapted Mobile Phone Use Habits (Smetaniuk, 2014) was developed to assess the pathological mobile phone use. The items were semantically modified from addressing gambling behaviors to describing mobile phone use.

This scale consisted of 10 items (e.g., "Are you preoccupied with your mobile phone?"), and in the original version possible answers were dichotomous (*yes/no*). In this survey, we used the same questions but with a corresponding 5-point scale ranging from 1 (*never*) to 5 (*always*). The total result of the scale was presented as the arithmetic mean of all items, whereby a higher score indicated a higher tendency of mobile phone use habits. Cronbach's alpha in the original research was $\alpha = .75$, and in our research, it was $\alpha = .65$.

The Internet Addiction Scale (Karadağ et al., 2015) consisted of 6 items (e.g., "I spend time using the Internet more than I plan to."), with a corresponding 5-point scale ranging from 1 (*never*) to 5 (*always*). Cronbach's alpha in the original research was $\alpha = .83$, while in our research it was $\alpha = .73$.

Well-being and self-control were assessed via one-item measures of general life satisfaction and overall happiness. General life satisfaction was measured by asking participants: "All things considered, how satisfied are you with your life as a whole nowadays?", taken from the World Values Survey (2007). The participants rated their answers on an 11-point scale ranging from 0 (*not satisfied at all*) to 10 (*extremely satisfied*). The overall happiness was assessed by the item: "In general, how happy do you feel?" (Fordayce, 1988). The participants rated their answers on an 11-point scale ranging from 0 (*not happy at all*) to 10 (*extremely happy*).

The Flourishing Scale (Diener et al., 2010) consisted of 8 items (e.g., "I lead a purposeful and meaningful life.") with a corresponding 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale was designed to capture self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism. The total result of the scale was presented as the arithmetic mean of all items, whereby a higher score indicated a higher flourishing. The Flourishing Scale in the original research had Cronbach's alpha $\alpha = .83$, while in our research, it was $\alpha = .94$.

The Kessler's K6 quantifier of non-specific psychological distress (Kessler et al., 2002) consisted of 6 items (e.g., "How often you had this feeling during the last month?" [e.g., *nervous*]) with a corresponding 5-point scale ranging from 1 (*none of the time*) to 5 (*all of the time*). The K6 was designed to capture mood or anxiety disorders symptoms. The total result of the scale was presented as the arithmetic mean of all items, whereby a higher score indicated higher psychological distress. The K6 reliability in the original research was $\alpha = .89$, while in our research it was $\alpha = .86$.

The Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004) comprised 13 items (e.g., "I am good at resisting temptation.") with a corresponding 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale was developed to measure five domains of self-control: controlling thoughts,

controlling emotions, controlling impulses, regulating behavior/performance, and habit-breaking. The total result of the scale was presented as the arithmetic mean of all items, whereby a higher score indicated higher self-control. In the original research, the scale proved to be reliable, with Cronbach's alpha ranging from $\alpha = .83$ to $\alpha = .85$, and in our research, it was $\alpha = .84$.

Procedure

This research is part of an ongoing international study on phubbing entitled "A phubbing phenomenon – its predictors and consequences in a cross-cultural perspective"¹. The same methodology is being used across 30 countries worldwide, with the aim of examining the prevalence of phubbing in different countries, and determining the role of country indices and personal characteristics in phubbing.

The survey was advertised on different online forums and social networks, in specialized student groups, and students were additionally encouraged by their teachers during some classes at various Zagreb faculties (e.g., University Department of Croatian Studies, Catholic University of Croatia, Faculty of Electrical Engineering and Computing, Zagreb Academy of Music, Faculty of Veterinary Medicine, Faculty of Architecture). Participation was voluntary and anonymous, open to all adults, and we selected the students' sample for this report.

After giving their informed consent, the participants completed an online questionnaire in Google Docs. It took about 15 minutes to fill in the questionnaire.

Results

Descriptive statistics are presented in Table 1. Almost all participants answered all questions. The answers covered a full range of theoretically possible answers. The participants reported levels of phubbing, mobile phone use, and Internet addiction that were somewhat lower than the theoretical average, whereas they evaluated their well-being fairly above it. Self-control was very close to the theoretical average, indicating moderate levels of this quality among our participants.

1 <http://www.blizejemocji.pl/lab/index.php/research-team?id=82>

Table 1. Descriptive data of mobile- and Internet-related behaviors (N=688)

	N	M	SD	Range	Min	Max	M _{th}	>3	≥3.5
Age	688	21.80	2.38	21	18	39	-		
Hours-weekday	684	9.04	5.51	24 h	0	24	-		
Hours-weekend	685	9.78	5.71	24 h	0	24	-		
Phubbing	688	2.53	0.62	4	1	5	3	22.1%	6.8%
Mobile habits	688	2.06	0.52	4	1	5	3	4.7%	1.9%
Internet Addiction	688	2.54	0.76	4	1	5	3	19.1%	1.0%
Life satisfaction	686	6.72	2.24	10	0	10	5		
Happiness	688	6.64	2.41	10	0	10	5		
Flourish	688	5.34	1.19	6	1	7	4		
Distress-K6	688	2.24	0.75	4	1	5	3		
Self-control	668	3.00	0.66	4	1	5	3		

Note: for all variables, values of theoretical minimum, maximum, and range are the same as observed values.

Regarding the first research question, the prevalence of phubbing among Croatian students was low to moderate. With theoretical mean 3, the average was 2.5 (sd=0.62) and less than 7% of the achieved results were over 3.5 on the phubbing scale. Similarly, the majority of students showed low scores concerning mobile phone habits and Internet addiction (Table 1), although they spent 9 to 10 hours per day logged on to the Internet. Interestingly, while the men spent more hours per day logged on to the Internet ($M_{men}=9.9$, $SD_{men}=5.59$; $M_{women}=8.2$, $SD_{women}=5.32$; $t(df)=4.1(682)$; $p<0.001$), the women reported more phubbing ($M_{men}=2.4$, $SD_{men}=0.63$; $M_{women}=2.6$, $SD_{women}=0.60$; $t(df)=4.2(686)$; $p<.000$) and more mobile phone habits ($M_{men}=2.0$, $SD_{men}=0.55$; $M_{women}=2.2$, $SD_{women}=0.49$; $t(df)=3.4(686)$; $p<.001$), but the difference regarding Internet addiction was slightly in favor of the female students, who reported lower levels of addiction ($M_{men}=2.6$, $SD_{men}=0.79$; $M_{women}=2.5$, $SD_{women}=0.74$; $t(df)=2.2(686)$; $p<.001$).

The second research question was to assess phubbing correlates and to explain the variance in phubbing on the basis of mobile-/Internet-related behaviors, well-being, and self-control. We calculated the Pearson correlation separately for male and female samples (Table 2). It was easy to notice that in both sub-samples all mobile- and Internet-related behaviors were inter-correlated, as well as all well-being indicators. However, only weak correlations were found between mobile- and Internet-related behavior and well-being indicators, suggesting a weak negative association between the behavior and well-being. In-

Table 2. Person correlations between studied variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Age	-	.14**	.05	-.08	-.05	-.00	.01	.05	.11*	-.14**	.11*
(2) Hours-weekday	.03	-	.84**	.27**	.13*	.18**	.01	-.01	.02	.05	-.07
(3) Hours-weekend	-.08	.87**	-	.31**	.11*	.22**	-.00	-.01	-.04	.04	-.08
(4) Phubbing	-.07	.14*	.14*	-	.64**	.55**	-.01	-.05	-.09	.16**	-.34**
(5) Mobile	-.09	.08	.10	.72**	-	.56**	-.07	-.13*	-.14**	.26**	-.37**
(6) Addiction	-.02	.15**	.25**	.36**	.38**	-	-.15**	-.16**	-.28**	.29**	-.44**
(7) Life Satisfaction	.07	.06	.00	-.05	-.14*	-.16**	-	.87**	.51**	-.44**	.22**
(8) Happiness	.04	-.00	-.05	-.03	-.13*	-.23**	.86**	-	.54**	-.48**	.27**
(9) Flourishing	.02	-.01	-.04	-.04	-.17**	-.20**	.58**	.61**	-	-.50**	.35**
(10) Distress	-.09	.07	.12*	.28**	.29**	.37**	-.38**	-.45**	-.49**	-	-.43**
(11) Self-Control	-.09	-.12*	-.15**	-.26**	-.17**	-.29**	.20**	.22**	.15**	-.35**	-

Note: * = $p < .05$, ** = $p < .01$ Female students above the diagonal, male students below the diagonal.

ternet addiction and mobile phone habits were significantly, though weakly, associated with almost all well-being indicators (except for mobile phone habits and life satisfaction which did not reach significance level in the female sample), while phubbing, in both sub-samples, was associated only with non-specific psychological distress. Hours spent online were not associated with any of the well-being indices. The younger female students spent less time online during the weekdays reported lower levels of well-being (lower flourishing and higher non-specific psychological distress) and lower levels of self-control. The students with higher levels of self-control in both samples reported fewer mobile- and Internet-related behaviors and higher levels of well-being in both sub-samples.

We conducted a hierarchical regression analysis in four steps, separately for male and female sub-samples (Table 3). At step 1, we entered age, as a control variable which did not explain the significant amount of variance in either sample. At step 2, various mobile- and Internet-related behaviors were added, producing an increment of 49% in the explanation of the variance of phubbing in the female sample, and 52% in the male sample. At step 3, we added the non-specific psychological distress as the only well-being indicator, which reached a significant correlation with phubbing (Table 2). Still, the increment was close to zero and not significant. In the final step, we included self-control, which produced a small (1%) but significant rise in the explained variance of phubbing in the male sub-sample, but the increment was not significant in the female sub-sample. However, once self-control was added into the equation, in the female sub-sample, the non-specific psychological distress reached a significance level suggesting a suppressor effect of the self-control in the female sub-sample. In the male sub-sample, Internet addiction, which was initially a significant predictor, lost its significance once self-control was included.

While in the male sub-sample 3.5% more variance was explained, in the final equation only mobile phone habits and self-control contributed to the explanation of phubbing, indicating that the male students who reported more mobile use habits and lower self-control were more likely to phub.

In the female subsample, however, besides mobile phone habits, Internet addiction, the hours spent online during the weekends and non-specific psychological distress were also significant predictors of phubbing, while self-control was at the border of significance. Therefore, the female students who reported more mobile phone habits, higher levels of Internet addiction, and non-specific psychological distress, and who spent more time online during the weekends were more likely to phub. In conclusion, with the help of the studied variables, we managed to explain a little over 50% of the variance of phubbing, with mobile phone habits contributing most to the explanation in both samples.

Table 3. Regression analysis with phubbing as criterion variable.

	Male students					Female students				
	<i>b</i>	<i>SE b</i>	β	<i>t</i>	<i>p</i>	<i>b</i>	<i>SE b</i>	β	<i>t</i>	<i>p</i>
Step 1										
Age	-0.02	0.02	-.08	-1.33	.18	-0.02	0.01	-.07	-1.22	.23
	$R^2=.006$					$R^2=.004$				
Step 2										
Age	-0.01	0.01	-.02	-0.44	.66	-0.02	0.01	-.07	-1.66	.10
Hours-weekday	0.02	0.01	.13	1.64	.10	-0.00	0.01	-.01	-0.16	.88
Hours-weekend	-0.01	0.01	-.06	-0.67	.50	0.02	0.01	.22	3.05	.00
Mobile	0.75	0.05	.66	15.52	.00	0.56	0.06	.46	9.76	.00
Addiction	0.09	0.04	.11	2.43	.02	0.21	0.04	.25	5.33	.00
	$R^2=.524^{**}$ $\Delta R^2=.518^{**}$					$R^2=.494^{**}$ $\Delta R^2=.490^{**}$				
Step 3										
Age	-0.00	0.01	-.02	-0.37	.71	-0.02	0.01	-.07	-1.85	.07
Hours-weekday	0.02	0.01	.14	1.69	.09	-0.00	0.01	-.01	-0.13	.90
Hours-weekend	-0.01	0.01	-.06	-0.73	.47	0.02	0.01	.22	3.04	.00
Mobile	0.75	0.05	.66	15.18	.00	0.57	0.06	.46	9.89	.00
Addiction	0.08	0.04	.09	2.04	.04	0.22	0.04	.27	5.52	.00
Distress	0.04	0.04	.05	1.15	.25	-0.05	0.03	-.06	-1.52	.13
	$R^2=.526^{**}$ $\Delta R^2=.002$					$R^2=.497^{**}$ $\Delta R^2=.003$				
Step 4										
Age	-0.01	0.01	-.03	-0.78	.43	-0.02	0.01	-.07	-1.69	.09
Hours-weekday	0.02	0.01	.14	1.71	.09	-0.00	0.01	-.01	-0.12	.91
Hours-weekend	-0.01	0.01	-.07	-0.87	.38	0.02	0.01	.22	3.03	.00
Mobile	0.74	0.05	.65	15.24	.00	0.56	0.06	.45	9.57	.00
Addiction	0.06	0.04	.07	1.60	.11	0.19	0.04	.24	4.85	.00
Distress	0.01	0.04	.01	0.32	.75	-0.07	0.03	-.09	-2.08	.04
Self-control	-0.12	0.04	-.12	-2.83	.01	-0.08	0.04	-.09	-1.96	.05
	$R^2=.538^{**}$ $\Delta R^2=.012^{**}$					$R^2=.503^{**}$ $\Delta R^2=.006$				

Note: $p < .05$, $p < .01$; in bold - differences in the patterns of significant predictors observed in the two samples

Discussion

In our research, the average time students were logged on to the Internet was over 9 hours per day, which is in line with recent research and considering the fact that smartphones enable constant (24/7) Internet access. For example, Rideout, Saphir, Pai, Rudd, and Pritchett (2013) reported that adolescents

spend on average 9 hours per day using screen-based media, while Quinn and Oldmeadow (2013) and Vorderer and colleagues (2015) argue that many people are permanently online.

Earlier research, conducted at the beginning of the century, found that an increased amount of time spent on the Internet represented a fundamental indicator of Internet addiction (Chou, Condrón, & Belland, 2005). In our research, the amount of time one spent logged on to the Internet and the level of Internet addiction shared only a small amount of common variance (3%-5%). It is reasonable to assume that in the past, the time spent logged on to the Internet was a good indicator of the time spent using the Internet, while today this association may have weakened since people often do not log off when they are inactive. Time spent logged on provides information on phubbing possibilities, but not actual phubbing: only if one is logged on to the Internet can he/she phub, but does not have to do so. Therefore, the amount of time one is logged on only shows the maximum time during which one may phub. Recent qualitative research, also conducted on Croatian students, revealed that over half of the participants were constantly logged on (Brkljačić, Pandžić, & Glavaš, 2017). Quite low rates of average time spent online in this study suggest that although the question was simple and straightforward, there still might have been some participants who reported the time they were active, instead the total time they were logged on to the Internet.

Our participants reported below average levels of Internet addiction, mobile phone habits, and phubbing. Still, almost all of them reported occasional phubbing, thereby confirming the results of Ugur and Koc (2015), who found that about 95% admitted that they phub in class at least once or twice. Our results go in line with Karadağ and his colleagues' research (2015), who found very similar mean values for phubbing and phubbing-related behaviors. They examined phubbing, mobile phone, SMS, Internet, social media, and game addictions, and all average values were slightly below the theoretical average, with the exception of game addiction that was even lower.

The comparison between the men and the women revealed that the men spent more hours logged on to the Internet and were more likely to score higher results at the Internet addiction scale, but the women reported more phubbing and more mobile phone habits. These results go in line with De-Sola Gutiérrez et al.'s (2016) findings that smartphone abuse was more frequent among the young women who were, more often than men, seeking social gratification via messaging and social networks available on smartphones, while Internet addiction was more frequent among men, and usually related to gaming. As for age, the younger female participants spent less time online during the weekdays but showed lower levels of flourishing and higher levels of non-specific

psychological distress. Additionally, they reported lower levels of self-control. In the male sample, there were no associations between age and any of the studied variables.

The strongest predictor of phubbing, in both the male and female sample, were mobile phone habits. These results go in line with the results of Karadağ and colleagues (2015) who reported that phubbing behavior was positively associated with Internet addiction, but more strongly to smartphone addiction. In the male sub-sample, the only other significant predictor was self-control, so those who phubbed more reported lower levels of self-control. In the female sample, however, those who phubbed more also spent more weekend time online reported higher levels of Internet addiction and more non-specific psychological distress. Hence, except for the mobile phone habits, it seems that different predictors are responsible for explaining the variance in the male and female sub-samples and further research should take this possibility into account. Furthermore, the results suggest that in the female sub-sample non-specific psychological distress and self-control interact, with self-control acting as a suppressor variable. In the male sub-sample, however, with the inclusion of self-control, Internet addiction stopped being a significant predictor. Therefore, it seems that the indirect and direct effects of self-control and the concept itself should be further studied. The amount of the explained variance of phubbing in the male sub-sample was equivalent to Karadağ et al.'s research (2015) that managed to explain 54% of the phubbing variance, using mobile phone, SMS, Internet, social media, and game addictions as predictors, while it was 3.5% lower in the female sub-sample. Previous research (e.g., Davey et al., 2018; Karadağ et al., 2015) suggests that the inclusion of fear of missing out and specific addictions such as game and social media addictions in the regression model may increase the amount of the explained variance of phubbing.

We believe this pioneering work on phubbing in Croatia provides several important contributions to the current state of knowledge. First, we translated, adapted, and tested the psychometric properties of the measures of phubbing, mobile phone use, and Internet addiction on Croatian students. A second contribution is that we assessed the average levels of phubbing among Croatian students with regard to sex and also explored the correlation between student age and phubbing. Finally, we investigated the association of phubbing and other Internet- and mobile-related behavior, as well as self-control and well-being. However, despite its advantages, we are aware of some drawbacks or ambiguities that are discussed below.

We have already expressed certain concerns over the accuracy of the answers regarding the reported time of being logged on to the Internet, since it is possible that some participants interpret this as the amount of time they are ac-

tive on the Internet, and not only logged on. Therefore, we suggest that further research include a question on active time online, before the question about the total time being logged on to the Internet. We believe this would clarify the distinction between the two.

One may argue that the well-being indicators, or even the lack of self-control, are more likely to be the consequences rather than determinants of phubbing. However, this research, since it is purely correlational, does not enable causal conclusions. Our intention was to explain correlates and variations in phubbing without specifying the direction of possible influences. We suggest that future researchers implement a longitudinal model and/or experimental design in order to examine the antecedents and effects of phubbing.

The Adapted Mobile Phone Use Habits (Smetaniuk, 2014) used in this study did not reach satisfactory internal reliability. This scale was developed from the scale addressing gambling behaviors and comprised several items that were, in our opinion, quite unsuitable for exploring problematic mobile phone use. For example, some items concerned financial problems, which is typical for gambling behavior, but at least to some extent questionable for examining problematic mobile phone use. Even in the original research (Smetaniuk, 2014), the alpha reliability index was somewhat lower (.75). For future research, we suggest using some other instrument, or even better, two or three instruments, and comparing their metric characteristics. In the literature review, Billieux (2012) listed seven different scales to measure problematic mobile phone use, and some new, including the one used in this research, have been constructed since then. Bianchi and Phillips's (2005) Mobile Phone Problem Use Scale (MPPUS), for instance, which comprises issues such as withdrawal, craving, and various negative consequences, is one of the most comprehensive and most often used, and therefore probably a better choice than the scale applied in this research.

Furthermore, in our study, as in almost all other research on phubbing, the sample was restricted to students, which decreased variability in age and education. Further research should aim to explore phubbing on more heterogeneous samples in order to gain a better insight as to how age and education are associated with phubbing.

As already mentioned, this work is only a part of a large international study on phubbing. In this manuscript, we only presented a brief preliminary overview of the selected variables which only regarded the Croatian sample. In future work, we intend to go deeper into the analysis and include variables such as fear of missing out and Facebook addiction. Finally, once the research is conducted in other countries, we will compare the Croatian students to their colleagues worldwide.

Conclusion

This study provided a general insight into the prevalence of phubbing among students in Croatia. The study revealed that the students spent 8 to 9 hours per day logged on to the Internet. However, Internet addiction, mobile phone habits, and phubbing were all below the theoretical average and only a very small percentage of the participants reported problematic behavior. As for demographic variables, some differences related to sex and age appeared. Although the men spent more time on the Internet and showed higher levels of Internet addiction, the women reported more mobile phone habits and were more likely to phub. In regard to the age, older female students spent more time online but reported higher levels of well-being and self-control.

According to the regression analysis, 54% of the variance of phubbing was explained in the male, and 51% in female sub-sample. In both samples, mobile phone use habits contributed most to the explanation of the variance of phubbing. In the male sample, apart from mobile phone habits, only self-control contributed to the explanation of phubbing, while in the female sub-sample, weekend time online, Internet addiction, and non-specific psychological distress contributed to the explanation of the variance of phubbing.

Further research should include other age groups, and a longitudinal design would be helpful in determining determinants and consequences of phubbing. Furthermore, future research should also investigate how phubbing influences various areas of a person's life.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Angeluci, A., & Huang, G. (2015). Rethinking media displacement: the tensions between mobile media and face-to-face interaction. *Revista FAMECOS: mídia, cultura e tecnologia*, 22 (4), 173-190. doi:10.15448/1980-3729.2015.4.21005
- Baron, N., & Campbell, E. (2012). Talking takes too long: Gender and cultural patterns in mobile telephony. *Language Sciences*, 34, 13–27.
- Bianchi A., & Phillips, J.G. (2005). Psychological predictors of problem mobile phone use. *Cyberpsychological behavior*, 8(1): 39-51.
- Billieux, J. (2012). Problematic use of the mobile phone: A literature review and a pathways model. *Current Psychiatry Reviews*, 8, 299-307. <http://dx.doi.org/10.2174/157340012803520522>
- Billieux, J., Van der Linden, M., d'Acremont, M., Ceschi, G., & Zermatten, A. (2007). Does impulsivity relate to perceived dependence on and actual use of the mobile phone? *Applied Cognitive Psychology*, 21(4), 527-538. doi:10.1002/acp.1289

- Brkljačić, T. Majetić, F. & Wertag, A. (2018). I'm always online: Well-being and main sources of life dis/satisfaction of heavy Internet users. In. B. Bozoglan (Ed.). *Social, and Cultural Aspects of Internet Addiction* (pp. 72-89). Hershey PA: IGI Global. doi:10.4018/978-1-5225-3477-8.ch004
- Brkljačić, T., Pandžić, M., & Glavaš, D. (2017). Sound of Silence: Comparison of ICT and speech deprivation among students. *ILIRIA International Review*, 7 (2), 9-30. doi:10.21113/iir.v7i2.322
- Chotpitayasunondh, V., & Douglas, K.M. (2016). How “phubbing” becomes the norm: The antecedents and consequences of snubbing via smartphone. *Computers in Human Behavior*, 63, 9-18. Retrieved December 2017 from <http://www.sciencedirect.com/science/article/pii/S0747563216303454>.
- Chou, C., Condron, L., & Belland, J. C. (2005). A review of the research on Internet addiction. *Education Psychology Review*, 17, 363–388. doi:10.1007/s10648-005-8138-1
- Davey S., Davey A., Raghav S.K., Singh J.V., Singh N., Blachnio A., & Przepiorka A. (2018). Predictors and consequences of “Phubbing” among adolescents and youth in India: An impact evaluation study. *Journal of Family and Community Medicine*, 25, 35-42. doi: 10.4103/jfcm.JFCM_71_17
- De-Sola Gutiérrez, J., Rodríguez de Fonseca, F., & Rubio, G. (2016). Cell-phone addiction: a review. *Frontiers in Psychiatry*, 7, 175. doi:10.3389/fpsy.2016.00175
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D.-W., Oishi, S., Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, 97, 143–156. doi:10.1007/s11205-009-9493-y
- Drago, E. (2015). The Effect of Technology on Face to Face Communication. *The Elon Journal of Undergraduate Research in Communications*, 6(1), 13-19.
- Fordyce, M. W. (1988): A review of research on The Happiness Measures: A sixty second index of happiness and mental health. *Social Indicators Research*, 20, 63-89.
- Ha, Y., & Hwang, W. J. (2014). Gender differences in internet addiction associated with psychological health indicators among adolescents using a national webbased survey. *International Journal of Mental Health and Addiction*, 12(5), 660-669. doi:10.1007/s11469-014-9500-7
- Haigh, A. (2015). Stop phubbing. Retrieved December 2017 from <http://stopphubbing.com>.
- Karadağ, E., Tosuntaş, Ş. B., Erzen, E., Duru, P., Bostan, N., Şahin, B. M., & Babadağ, B. (2015). Determinants of phubbing, which is the sum of many virtual addictions: a structural equation model. *Journal of Behavioral Addictions*, 4(2), 60–74. doi:10.1556/2006.4.2015.005
- Kessler, R.C., Andrews, G., Colpe, L.J., Hiripi, E., Mroczek, D.K., Normand, S.L., Walters, E.E., & Zaslavsky, A.M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*. 32, 959–976. doi:10.1017/S0033291702006074

- Kuss, D. J., & Griffiths, M. D. (2011). Online social networking and addiction—a review of the psychological literature. *International Journal of Environmental Research and Public Health*, 8(9), 3528-3552. doi:10.3390/ijerph8093528.
- Lenhart, A. (2015). Teens, Social Media & Technology: Overview 2015. Retrieved December 2017 from <http://www.pewInternet.org/2015/04/09/teens-social-media-technology-2015/>
- Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior*, 31, 343-350. doi:10.1016/j.chb.2013.10.049
- Lin, Y. H., Chang, L. R., Lee, Y. H., Tseng, H. W., Kuo, T. B., & Chen, S. H. (2014). Development and validation of the smartphone addiction inventory (SPAI). *PloS One*, 9(6), e98312. doi:10.1371/journal.pone.0098312
- McDaniel, B. T., & Coyne, S. M. (2014). “Technoference”: The interference of technology in couple relationships and implications for women’s personal and relational well-being. *Psychology of Popular Media Culture*, 5(1), 85-98. doi:10.1037/ppm0000065
- Misra, S., Cheng, L., Genevie, J., & Yuan, M. (2014). The iPhone effect the quality of in-person social interactions in the presence of mobile devices. *Environment and Behavior*, 1-24. doi:10.1177/0013916514539755
- Mok, J. Y., Choi, S. W., Kim, D. J., Choi, J. S., Lee, J., Ahn, H., & Song, W. Y. (2014). Latent class analysis on internet and smartphone addiction in college students. *Neuropsychiatric Disease and Treatment*, 10, 817-828. doi:10.2147/NDT.S59293
- Park, C., & Park, Y. R. (2014). The conceptual model on smart phone addiction among early childhood. *International Journal of Social Science and Humanity*, 4, 147-150. doi:10.7763/IJSSH.2014.V4.336
- Pew Research Center (2015). Technology device ownership 2015. Retrieved December 2017 from <http://www.pewinternet.org/2015/10/29/technology-device-ownership-2015/>
- Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, 29, 1841-1848. doi:10.1016/j.chb.2013.02.014
- Przybylski, A. K., & Weinstein, N. (2013). Can you connect with me now? how the presence of mobile communication technology influences face-to-face conversation quality. *Journal of Social and Personal Relationships*, 30(3), 237-246. doi:10.1177/0265407512453827
- Pugar, J. & Markuš, H. (2014). Usage of information and communication technologies (ict) in households and by individuals, 2014, first results. *Croatian Bureau of Statistics*, Retrieved December 2017 from https://www.dzs.hr/Hrv_Eng/publication/2014/02-03-02_01_2014.htm
- Quinn, S., & Oldmeadow, J. A. (2013). Is the igeneration a ‘we’ generation? Social networking use among 9- to 13-year-olds and belonging. *British Journal of Developmental Psychology*, 31, 136-142. doi:10.1111/bjdp.12007

- Rideout, V. J., Saphir, M., Pai, S., Rudd, A., & Pritchett, J. (2013). *Zero to eight: Children's media use in America 2013*. San Francisco, CA.: Common Sense Media.
- Roberts, J. A., & David, M. E. (2016). My life has become a major distraction from my cell phone: partner phubbing and relationship satisfaction among romantic partners. *Computers in Human Behavior, 54*, 134-141. doi:10.1016/j.chb.2015.07.058
- Smetaniuk, P. (2014). A preliminary investigation into the prevalence and prediction of problematic cell phone use. *Journal of Behavioral Addictions, 3*(1), 41-53. doi:10.1556/JBA.3.2014.004
- Suominen, A., Hyrynsalmi, S., & Knuutila, T. (2014). Young mobile users: Radical and individual – Not. *Telematics and Informatics, 31*(2), 266-281.
- Tangney, J.P., Baumeister, R.F., & Boone, A.L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*, 271-322. doi:10.1111/j.0022-3506.2004.00263.x
- Thomee, S., Harenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults: a prospective cohort study. *BMC Public Health, 11*(1), 66. doi:10.1186/1471-2458-11-66
- Ugur N.G., & Koc, T. (2015) Time for digital detox: Misuse of mobile technology and phubbing. *Procedia Social and Behavioral Sciences, 195*, 1022-31. doi:10.1016/j.sbspro.2015.06.491
- Vorderer, P., Klimmt, C., Rieger, D., Baumann, E., Hefner, D., Knop, K., ...Wessler, H. (2015). Der mediatisierte Lebenswandel: permanently online, permanently connected [The mediatized lifestyle: permanently online, permanently connected]. *Publizistik, 60*, 259-276. doi:10.1007/s11616-015-0239-3
- Walsh, S., White, K., & Young, R. (2010). Needing to connect: The effect of self and others on young people's involvement with their mobile phones. *Australian Journal of Psychology, 62*(4), 194-203.
- World Values Survey. (2007). Retrieved from www.worldvaluessurvey.org

Determinants of volunteers' motives

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Abstract

Background and aims: Volunteering is recognized as socially and personally useful, but volunteers can have different reasons to engage in volunteering. Clary and Snyder (1999) listed six motives for volunteering: values, understanding, enhancement, career, social, and protective motive. The goal of this research was to examine (1) the frequency of each motive, (2) the difference in motive representation depending on the regularity of volunteering and the type of organization the participants volunteer in, and (3) whether the characteristics of volunteers or their volunteering would predict different types of motives.

Method: A sample of 147 young people (119 women) with volunteering experience, mostly students working in religious and civic organizations, filled in questionnaires on volunteer motives, self-esteem, and sociodemographic data.

Results: The most frequent motives were the values and understanding, and the least frequent was the protective motive. A statistically significant difference was shown between motives by the type of organization and the regularity of volunteering. The social motive was more common among vol-

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unteers in religious than in civic organizations. Those who volunteer in civic organizations were more often motivated by career or understanding. Those who volunteer on a regular basis tended to be motivated by the value and understanding more often than those who volunteer occasionally. Self-esteem was found to be a significant positive predictor of the value motive, and religiosity of the social motive. A tendency to invest more effort in volunteer work predicted the value motive, and the type of organization was found to be a negative predictor of the career and understanding motive. Also, the regularity of volunteering was a positive predictor of the understanding motive.

Conclusion: These findings allow a better understanding of the characteristics of volunteering and could improve the ways to promote volunteering, educate volunteers, and assign them the right volunteer tasks.

Keywords: volunteering, motives for volunteering, volunteers' characteristics, volunteering characteristics, youth

Introduction

Nowadays, there is a lot more talk about volunteering, probably because it is more common than it used to be. Volunteering is often considered one of the key components of a developed civil society (Pološki Vokić, Marić & Horvat, 2013), recognized as a civic virtue that is improving the community, helping to develop solidarity, developing the individual and common potential, as well as making a change in the world (Ledić, 2007).

Volunteering is defined as freely giving one's time to improve the lives of others, giving them new content and values without expecting any material gain in return (Wilson, 2000; according to Pološki Vokić et al., 2013). A lot of research has been done on the motives behind volunteer work (Miljković & Jurčec, 2015; Miljković & Rijavec, 2009; Pološki Vokić et al., 2013). Clary and Snyder (1999) note that one's wishing and enduring to help others depends on fulfilling their own needs by doing so. They propose a functional model that explains the motivation for engaging in volunteering by wanting to satisfy many different personal psychological motives. The motivation can change at times because volunteers change or their goals match their respective volunteer experience in a different way.

Clary and Snyder (1999) list six different functions of volunteering that represent motives for volunteer work. The first is the value function, which explains engaging in volunteering so as to act out of one's important values, such as humanitarianism and helping others. The second is the understanding function, in which someone learns and develops skills through volunteering. The third is the enhancement function, meaning that volunteers can develop and grow psychologically through this experience. The fourth is the social function, which allows volunteers to meet new people, strengthen one's relation-

ships, and adjust to the social surroundings. The fifth is the career function, which describes enrolling in volunteering activities in order to gain as many career-related experiences as they can. The last one is the protective function, in which an individual uses volunteer work to reduce guilt or to address personal problems. These motives can be divided into intrinsic and extrinsic motives. The intrinsic motives are the value, enhancement, and understanding, whereas the extrinsic are the motives for career and the social motive. The protective motive can be both intrinsic and extrinsic. Miljković and Jurčec's (2015) research shows that most volunteers see the intrinsic motives as more important than the extrinsic. Of course, someone can be motivated by more than one motive or need, and the motives can change with time, age, and the type of activities they volunteer in.

A research on volunteering (Lammers, 1991; Pološki Vokić et al., 2013) found differences between gender and age groups for both enrolling and commitment to volunteering activities. They also found differences arising from the specific characteristics of an individual such as religiosity and fields of study, where value-oriented volunteers were associated more with students engaged in human sciences and jobs that include higher levels of communication skills. Most volunteers are usually younger and female. Lammers (1991) even proposes a typical volunteer profile of a highly educated woman who considers volunteering her obligation. Most volunteers identify with intrinsic motives in their volunteer work (Juzbašić & Vukasović Hlupić, 2015; Miljković & Jurčec, 2015; Pološki Vokić et al., 2013) and that can indicate an altruistic view on volunteering.

By examining the predictors for these motives, it is found that the intrinsic motives of value, understanding, and enhancement can be predicted by religiosity. A person who thinks of himself/herself as a religious person, and is more involved in the religious community, is more frequently encouraged to help others (Pološki Vokić et al., 2013). Also, a higher self-esteem predicted a helping behavior and care for the well-being of others connected to these motives. On the other hand, the well-being of a person, including their self-esteem, grows with engaging in volunteer activities (Thoits & Hewitt, 2001). The motives for career and social motives are more common for male volunteers. A significant predictor for these extrinsic motives is the field of study (Pološki Vokić et al., 2013), but until now, research has included only few different predictors for the disciplines of social sciences (such as education and economy) and formal sciences (such as computer science).

The goal of our research was to examine the motives underlying volunteer participation and specific characteristics of volunteers and their volunteering. We wanted to examine the frequency of the specific motives, the difference in

motive representation depending on the type of organization they volunteer in, and the regularity of volunteering. Also, we wanted to see if individual characteristics of a volunteer (religiosity and self-esteem) or their volunteering (the regularity of volunteering, the type of organization, effort, and satisfaction) could predict their motives for volunteering. Based on the literature reviewed, it was expected that the volunteers would mostly identify with the intrinsic motives, such as values, understanding, and enhancement. Due to the mixed results in the literature, we could not predict the differences in motive representation between volunteers in religious and civic organizations and between those who volunteer regularly and irregularly. Finally, it could not be estimated whether individual characteristics of a volunteer or his/her volunteering would predict the motives for volunteering.

Method

Participants

A total of 147 participants were involved after contacting several volunteer organizations. The participants were young people who are a part of a volunteer organization. The sample comprised 66.7% students, 25.2% young workers, and 8.2% were unemployed. Eighty-one percent of the participants were female. The average volunteering length was 38.5 months ($SD = 29.37$, range 0–120) and 65% of the respondents were regular volunteers who volunteer at least once a month. There were 53.7% of the participants who volunteer in religious and 46.3% in civic organizations.

Instruments

Volunteers Functions Inventory (VFI; Clary et al., 1998; Croatian adaptation by Miljković & Rijavec (2009) was used to measure the motives for volunteering. It has 30 statements, five for each of the six functions (value, understanding, enhancement, career, social, and protective). The participants were asked to indicate the importance of each reason for volunteering on a 7-point scale ranging from 1 (*I strongly disagree*) to 7 (*I strongly agree*). The score for every motive was obtained by summing up the answers for every motive, with a range from 5 to 35. Reliability for the value function motive is Cronbach's $\alpha = .68$, the understanding function motive $\alpha = .82$, the enhancement function motive $\alpha = .74$, the social function motive $\alpha = .81$, the career function motive $\alpha = .86$, and the protective function motive $\alpha = .76$.

The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965; Croatian adaptation by Lacković-Grgin, 1994) has 10 items, five measuring positive and

five negative feelings about oneself. All items are answered on a 5-point scale ranging from 0 (*I strongly disagree*) to 4 (*I strongly agree*). Five items should be reversed and a global measure of self-worth is formed by summing the items. A higher result indicates a higher self-worth assessment. Cronbach's α in the research with Croatian students was between .74 and .89. In this study, the α was .86.

The questionnaire contained sociodemographic data of the participants including gender, working status, and the field of study. The participants were asked to self-assess their religiousness from 0 (*I don't consider myself religious*) to 10 (*I consider myself very much religious*). Furthermore, there were questions about their volunteer work: the regularity of volunteering (where *regular* is at least once a month and *irregular* is less frequent than once a month), the length of volunteering in months, the type of organization (religious or civil), the effort they put in volunteering (from 1 = *I don't invest effort* to 7 = *I invest a lot of effort*), and the satisfaction they receive from volunteering (from 1 = *I am not at all satisfied* to 7 = *I am extremely satisfied*).

Procedures

The participants had been recruited by their volunteer organization leaders and university volunteers. We contacted various volunteering organizations working in the Zagreb area with a request to share the link to our online questionnaire with their volunteers. With the snowball sampling method, the online questionnaire was shared with other volunteers. The inclusion criterion was at least one volunteering activity during the last year. Volunteer work was defined according to the Croatian Law on Volunteering (2013, p. 1) as an "investment of personal time, effort, knowledge, and skills out of free will with which services and activities are executed for the well-being of another person or wider public, and are executed by persons in a way anticipated by this Law, without existence of any conditions of providing a financial reward or seeking any other material benefit for volunteering accomplished". A formal volunteering contract was not a prerequisite for volunteer experience. The ethical permission was obtained by the Ethics Committee of the Catholic University of Croatia. Before filling in the questionnaire, the participants were asked to read the informed consent form. By clicking on the "Next" button, they confirmed that they agreed to the terms and entered the questionnaire.

Results

The first problem was to examine the frequency of a particular motive for volunteering. In this research, the most frequent motive was the value function

Table 1. Descriptive statistics for the motives for volunteering, religiosity, self-esteem, the effort invested in volunteering and satisfaction with volunteering

	<i>M</i>	<i>SD</i>	Min	Max
Value function motive	29.28	4.13	15	35
Understanding function motive	28.75	4.67	11	35
Enhancement function motive	23.22	5.66	7	34
Social function motive	18.68	6.13	5	31
Career function motive	23.31	6.98	5	35
Protective function motive	17.86	6.14	5	34
Self-esteem	22.19	3.70	14	40
Religiosity	8.65	2.00	0	10
The effort invested in volunteering	5.50	1.13	2	7
Satisfaction with volunteering	5.34	1.21	2	7

($M = 29.28$, $SD = 4.13$), and the least frequent was the protective function ($M = 17.86$, $SD = 6.14$). The representation of other motives and other variables used in the analysis is shown in Table 1.

To explore the difference in the representation of a particular motive by the type of organization, we used a t-test. A statistically significant difference is shown in the understanding function motive, $t(145) = 2.72$, $p < .01$, the career function motive $t(145) = 4.03$, $p < .01$, and in the social function motive, $t(145) = -2.42$, $p < .05$. The career function motive is more represented in participants of non-religious organizations ($M = 25.69$, $SD = 6.23$) than in those in religious organizations ($M = 21.27$, $SD = 6.98$). Also, volunteers in non-religious organizations ($M = 29.85$, $SD = 4.12$) have more of the understanding function motive than those in religious organizations ($M = 27.79$, $SD = 4.94$). Those in religious organizations ($M = 19.79$, $SD = 5.85$) more often have the social function motive than those in non-religious organizations ($M = 17.38$, $SD = 6.23$).

Furthermore, we wanted to explore the difference in the representation of a particular motive based on the regularity of volunteering (regular/irregular). A statistically significant difference is shown in the value function motive, $t(145) = -2.30$, $p < .05$, and the understanding function motive, $t(145) = -2.85$, $p < .01$. Those who volunteer regularly have more of the value function motive ($M = 29.84$, $SD = 3.69$) than those who volunteer irregularly ($M = 28.22$, $SD = 4.73$). Also, those who volunteer regularly have more of the understanding

function motive ($M = 29.53, SD = 5.65$) than the irregular ones ($M = 22.67, SD = 5.7$).

To explore which variables (individual characteristics or volunteering characteristics) predict particular a motive, we performed six regression analyses with each motive as the criterion variable. The model was significant for the value function motive, understanding function motive, social function motive, and career function motive (Table 2). Insignificant models were for the ones for the enhancement function motive, $R^2 = .04; F(6, 140) = 0.94, p > .05$ and the protective function motive, $R^2 = .04; F(6, 140) = 10.1, p > .05$.

From Table 2 it can be seen that the value function motive can be predicted by higher levels of self-esteem and the effort invested in volunteering. The understanding function motive can be predicted by the regularity of volunteering and the type of organization, where the participants who reported regular volunteering and were from civil organizations reported higher levels of understanding as a motive for volunteering. Of all the extrinsic motives it is the social function motive that can be predicted by lower levels of satisfaction with

Table 2. Prediction of a particular motive for volunteering by individual characteristics and characteristics of volunteering

	Value function motive		Understanding function motive		Social function motive		Career function motive	
	β	t	β	t	β	t	β	t
<i>Individual characteristics</i>								
Self-esteem	.19*	2.55	.09	1.20	-.02	-0.30	.04	0.56
Religiosity	-.01	-0.19	-.07	-0.79	.15	1.77	-.18*	-2.13
<i>Characteristics of volunteering</i>								
Regularity of volunteering ^a	.10	0.13	.16*	2.04	.08	0.93	.08	1.01
Type of organization ^b	-.13	-1.60	-.18*	-2.14	.14	1.63	-.26**	-3.06
The effort invested in volunteering	.29**	2.92	.15	1.46	.16	1.56	.09	0.92
Satisfaction with volunteering	.06	0.56	.11	1.04	-.27*	-2.57	-.07	-0.66
R^2	.20		.16		.11		.15	
F	$F(6, 140) = 5.66^{**}$		$F(6, 140) = 4.51^{**}$		$F(6, 140) = 2.88^*$		$F(6, 140) = 3.95^{**}$	

Note: * $p < .05$, ** $p < .01$; ^aRegularity of volunteering: 0 – irregular, 1 – regular; ^bType of organization: 0 – civil, 1 – religious.

volunteering, while the career function motive can be predicted by religiosity and the type of organization. Moreover, the volunteers who reported lower levels of religiosity and those from the civil type of volunteering organizations also reported higher levels of career motives for volunteering. These individual characteristics and the characteristics of volunteering explain 10-20% of the variance of volunteering motives.

Discussion

The goal of our research was to examine the motives underlying volunteer participation and the specific characteristics of volunteers and their volunteering among young volunteers. The results showed that the value function motives were the most common among the volunteers, while the protective function motives were the least common. Earlier research has also found the value function to be the most frequent reason to volunteer, but the understanding function motive was found to be more common among volunteers in earlier studies than in the current study (Juzbašić & Vukasović Hlupić, 2015; Pološki Vokić et al. 2013). The protective function motive, which was found to be the least frequent in our study, was earlier found to be the second least frequent motive in a study conducted by Juzbašić and Vukasović Hlupić (2015), with the social motive as the least frequent.

Furthermore, according to the results of our study, individuals volunteering in religious organizations are more likely to be driven by social motives than those who volunteer in a non-religious organization. There has been no study that examined motives for volunteering based on the type of organization, but according to Grönlund et al. (2011), religion is generally often connected to both value-based and social motivations for volunteering.

As for the regularity of volunteering, the results of the current study found that the value and understanding as motives are connected to regular volunteering. According to Lammers (1991), individuals are in part motivated to volunteer in order to gain new skills. They stay in voluntary positions while they continue to train those skills (gain understanding), which gives them intrinsic rewards in their work experience. Training a skill includes learning and could relate to the motive of understanding. Therefore, these findings are similar to those in our study, where it was found that understanding as a motive is connected to regular volunteering, that is, staying in a volunteering position. On the other hand, in another study, social motives were found to be linked to irregular volunteering (Zrinščak et al., 2012), which was not replicated in our study, in which the social motives were linked to regular volunteering.

In the current study, it was found that value-driven motivation was predicted by a higher self-esteem and making more effort while volunteering. The understanding motive was predicted by the regularity of volunteering in a way that those who volunteer on a regular basis tend to be motivated by understanding, and this is more frequent among those who volunteer in a civil organization than among those who volunteer in a religious organization. The social motives were predicted by less satisfying volunteer experiences, and finally, career driven motivation to volunteer was predicted by less religiosity. Similarly, Miljković and Jurčec (2015) found that extrinsic motives in general result in a less satisfying volunteering experience. Volunteering on a regular basis was shown to be a predictor of intrinsic motivation, more precisely, the understanding motive (Lammers, 1991). On the other hand, irregular, from time to time volunteering could be motivated by extrinsic motives (such as career).

This study had some limitations that should be addressed. The data were collected online, and the link to the questionnaire was mainly given out to the volunteers by the person who organizes their volunteering. In case they wanted to impress that person, the volunteers' answers might have been insincere or socially desirable. Furthermore, we measured the motives using only one questionnaire, with 30 items. It would be advisable to use a more thorough measure to gain a deeper insight into a volunteer's motives. Also, only a limited number of personal characteristics was included. It would be useful to measure, for example, some personality traits, such as consciousness, or to include a measure of loyalty, altruism, and so forth, in future studies. Finally, based on this data, we cannot conclude upon causality. We do not know if, for instance, regularity predicts motives or motives predict causality. Therefore, longitudinal studies are needed. In future studies, it would also be advisable to include volunteers from smaller towns and less urban areas to see if there are any differences in motivation since this study was conducted in an urban area. Also, the inclusion of less urban areas would be useful in order to examine the difficulties of engaging in a volunteer activity and the difficulties of volunteering in general, because the difficulties might be demotivating. Moreover, it would be interesting to find out how much volunteers know about the different chances offered to volunteers and how familiar they are with, for example, the Croatian Law on Volunteering (2013), because this might change their motivation to volunteer.

Despite all the limitations of the study, these findings still have valuable implications. For an individual, the study can be beneficial if it makes them think about and recognize their own motivation to volunteer, choose volunteering activities that will satisfy their specific needs and result in increasing their

well-being and life satisfaction, as well as their satisfaction with their volunteer work. The results are also valuable to the organizations that coordinate volunteers; they can be helpful when presenting and advertising volunteering activities, direct the organizations to recruit the right people considering their motives, and help them recognize the individuals that volunteer more often. Finally, these findings can be useful to the society as a whole, in order to promote volunteering, pro-social behavior, and altruism.

Conclusion

People are driven by different motives while volunteering. In this study, six different motives were listed: value, understanding, career, enhancement, social, and protective function motive, with the value as the most common, and the protective function as the least common motive for volunteering. Volunteering in a religious organization was found to be linked to social motives, while volunteering in non-religious organizations was found to be more likely driven by the career and understanding motives. Those people who volunteer because they are motivated by the values or understanding tended to volunteer regularly. Both individual characteristics and the characteristics of volunteering had a significant role for the different types of motivation for volunteering. Intrinsic motives could be predicted by higher levels of self-esteem and effort, more regular volunteering, and volunteering in civic organizations. Extrinsic motives, on the other hand, could be predicted by lower levels of satisfaction and religiosity, as well as volunteering in the civil type of organizations.

References

- Clary, E.G., Snyder, M., Ridge, R.D., Copeland, J., Stukas, A.A., Haugen, J., & Miene, P. (1998). Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology*, 74, 1516–1530.
- Clary, E. G., & Snyder, M. (1999). The motivations to volunteer: Theoretical and practical considerations. *Current Directions in Psychological Science*, 8(5), 156-159.
- Grönlund, H., Holmes, K., Kang, C., Cnaan, R. A., Handy, F., Brudney, J. L., ... Zrinščak, S. (2011). Cultural values and volunteering: A cross-cultural comparison of students' motivation to volunteer in 13 Countries. *Journal of Academic Ethics*, 9, 87-106.
- Juzbašić, M., & Vukasović Hlupić, T. (2015). Osobine ličnosti i motivi za volon-tiranje [Personality traits and motives for volunteering]. *Psihologijske teme*, 24(2), 279– 304.

- Lacković–Grgin, K. (1994). *Samopoimanje mladih [Self-concept of youth]*. Naklada Slap. Jastrebarsko.
- Lammers, J. C. (1991). Attitudes, motives, and demographic predictors of volunteer commitment and service duration. *Journal of Social Service Research, 14*(3), 125-140.
- Ledić, J. (2007). *Zašto (ne) volontiramo?: Stavovi javnosti o volonterstvu [Why we do (not) volunteer?: Public attitudes about volunteering]*. Zagreb: Academy for Educational Development.
- Miljković, D., & Jurčec, L. (2015). Povezanost pristupa sreći, motiva za volontiranje i subjektivne dobrobiti volontera [Relationship between approaches to happiness, motivation to volunteer and volunteers' subjective well-being]. *Napredak, 156*(1-2), 115–129.
- Miljković, D., & Rijavec, M. (2009). In: I. Jerković (Ed.), *Pristupi ostvarenju sreće, motivi za volontiranjem i psihološka dobrobit volontera [Approaches to happiness, motives for volunteering and psychological well-being of volunteers]* (pp. 16-18). Novi Sad: University of Novi Sad, Faculty of Philosophy, Department of Psychology.
- Pološki Vokić, N., Marić, I., & Horvat, G. (2013). Motivacija za volontiranje – jesu li motivi za volontiranje povezani sa spolom, ličnosti i područjem studiranja? [Motivation to volunteer - are the motives for volunteering connected with the gender, personality and area of study?] *Revija za socijalnu politiku, 20*(3), 225– 252.
- Rosenberg, M. (1965). Rosenberg self-esteem scale (RSE). *Acceptance and Commitment Therapy. Measures Package, 61*, 52.
- Thoits, P. A., & Hewitt, L. N. (2001). Volunteer work and well-being. *Journal of Health and Social Behavior, 42*(2), 115 – 131.
- Zakon o volonterstvu [The Law on Volunteering], Narodne novine 58/07, 22/13. (2013).
- Zrinščak, S., Lakoš, I., Handy, F., Cnaan, R., Brudney, J. L., Haski-Leventhal, D., ... & Pessi, A. B. (2012). Volontiranje studenata u Zagrebu u komparativnom kontekstu [Student Volunteering in Zagreb in a Comparative Context]. *Revija za socijalnu politiku, 19*(1), 25- 48.

Determinants of group cohesiveness in sports: Individual and group factors

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Abstract

Background: Most research on group cohesion in sports teams is based on the conceptual model proposed by Carron (1982). Carron identified some individual and group factors that contribute to the development of group cohesion in a sports team. In the context of this model, it is often found in the literature that anxiety and athletes' self-efficacy are significant individual factors, while communication among athletes and collective efficacy are significant group factors that predict group cohesion. Moreover, research has not shown consistent results in the relationship of the above-mentioned individual or group factors with group cohesion. The goal of this paper was to determine which factors, individual factors (anxiety and athletes' self-efficacy) or group factors (collective efficacy and communication), can predict group cohesion more accurately.

Methods: The research was conducted on a sample of handball players ($N = 117$) from the clubs in the City of Zagreb, aged between 15 and 30. Group cohesion was measured by the Group Environment Questionnaire

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(Carron, Widmeyer, & Brawley, 1985), anxiety was measured by the Sports Anxiety Scale-2 (Smith, Smol, Cumming, & Grossbard, 2006), self-efficacy by the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995), communication by the Scale of Effective Communication in Team Sports-2 (Sullivan & Short, 2011), and collective efficacy by the Collective Efficacy Questionnaire for Sports (Short, Sullivan, & Feltz, 2005).

Results: The results are analyzed using a hierarchical regression analysis and it is shown that collective efficacy and communication are significant group cohesion predictors, whereas higher collective efficacy and frequent forms of acceptance when communicating within the team contribute to stronger team cohesion. Individual factors are not shown to contribute significantly to group cohesion.

Conclusion: This research has implications for practice in the field of sports psychology in terms of increasing the quality of training for coaches and athletes as well as helping them to achieve their goals.

Keywords: group cohesion, self-efficacy, anxiety, collective efficacy, communication

Introduction

The most widely used and accepted definition of group cohesion is Carron's definition (1982, p. 124), which states that it is a "dynamic process that manifests itself in the tendency of a group to keep together and remain united in achieving its goals". Nowadays, the majority of authors accept and use this definition in their research (Carron, Bray, & Eys, 2002; Cota, Evans, Dion, Kilik, & Longman, 1995; Ntoumanis & Aggelonidis, 2004; Steca, Pala, Greco, Monzani, & D'addario, 2013). Carron (1982) also created a general conceptual model of group cohesion, in which he structured the factors contributing to group cohesion. The antecedent factors that contribute to group cohesion are divided into four categories and arranged hierarchically so that the category closer to group cohesion is more important, i.e., assuming that it is more important in the prediction of group cohesion (Carron, 1982). Thus, as the most general category, Carron identified environmental factors, followed by individual factors and leadership, and finally, group factors as the most important for group cohesion.

The importance of group cohesion is shared among many contexts, including sport. Although a large number of studies have explored the role of factors that could have an effect on the emergence, maintenance, and level of cohesion in sports groups, research has revealed very little about the way particular factors contribute to cohesion. Martens, Burton, Vealey, Bump, and Smith (1990) suggest that a sports competition is a situation in which individuals can perceive as threatening, which in turn can result in anxiety. Previous research, which was devoted to examining the relationship between group cohesion and

anxiety in athletes, found that higher group cohesion was associated with a lower level of anxiety (Borrego, Cid, & Silva, 2012; Eys, Hardy, Carron, & Beauchamp, 2003; Prapavessis & Carron, 1996). These researchers measured competitive state anxiety, as well as group cohesion on a sample of athletes from a variety of interactive sports (football, basketball, rugby, etc.).

Another individual factor from Carron's model (1982) that has not yet gained sufficient attention in group cohesion research (Leo, Sanchez, Sanchez, & Garcia Calvo, 2010) is the self-efficacy of athletes. *Self-efficacy* is closely related to the athletes' assessment of their own resources in a threatening situation, and this assessment influences the choice of behavior, effort, and persistence in such a situation (Bandura, 1986). The literature review shows that the only study that has explored the relationship between group cohesion and self-efficacy was a study conducted by Leo et al. (2010). In that study, it was shown that there was a significant relationship between stronger group cohesion and higher perceived self-efficacy in a sample of semi-professional football and basketball players. As is the case with anxiety, there is certainly a need for more studies that examine the relationship between group cohesion and perceived self-efficacy.

A great deal of attention has been given to the study of the relationship between group cohesion and various group factors of sports teams, for example, team stability, group norms, group orientations, and collective efficiency. The group factor of collective efficiency has been the primary focus of researchers for some time. Zaccaro, Blair, Peterson, and Zazanis (1995, p. 309) define *collective efficiency* as a "sense of collective ability shared by individuals in scheduling, aligning and integrating their resources into a successfully coordinated response to specific situational requirements". It is noted that this group construct is of great importance in interactive sports, such as handball, where players require higher levels of interaction and coordination (Gully, Incalcaterra, Joshi, & Beaubien, 2002). Concerning research on collective efficacy itself, a good part of such research found a correlation between highly perceived collective efficiency and stronger group cohesion (Paskevich, Dorsch, Brawley, & Widmeyer, 1999; Ramzaninezhad, Keshtan, Shahamat, & Kordshooli, 2009; Spink, 1990).

Unlike collective efficiency, the group factor of *communication* between members of sports teams is rarely examined in relation to group cohesion. Existing studies (Smith, Arthur, Hardy, Callow, & Williams, 2013; Widmeyer & Williams, 1991) show that stronger group cohesion is associated with more effective communication in a sports team. The limited amount of research on this subject is not justified since communication among members of the sports group lies at the core of the behavioral process in the team (Bradley, Baur, Ban-

ford, & Postlethwaite, 2013). Communication is the means that players use to coordinate their tasks and goals, as well as their social relationships within the team. Therefore, it is clear that there is a need for further research on the relationship between communication in sports teams and group cohesion.

As already mentioned above, Carron's model assumes that group factors are closer than individual factors in the hierarchical structure contributing to the explanation of group cohesion. Therefore, according to the model's assumptions, group factors have a greater predictive value in explaining group cohesion (Carron, 1982). However, the available literature generally lacks research on the comparative analysis of the contribution of these factors to group cohesion. The goal of this paper was to determine which factors – individual factors (anxiety and athletes' self-efficacy) or group factors (collective efficacy and communication) – can predict group cohesion more precisely. Based on the assumptions of Carron's model and the results of the previous research, the first hypothesis of this paper was that a lower level of anxiety and more pronounced perceived self-efficacy would predict stronger group cohesion of a sports team. The second hypothesis stated that more pronounced collective efficiency and better communication in a sports team would be significant predictors of stronger group cohesion. In accordance with the assumptions of the Carron's model (1982), the third hypothesis claimed that collective efficiency and communication among members (group factors) would have a greater contribution to stronger group cohesion than self-efficacy and the anxiety of athletes (individual factors).

Method

Participants

The research was conducted on a sample of 117 handball players (84 male) from five clubs in the City of Zagreb, aged between 15 and 30 years ($M = 19.23$, $SD = 3.6$). On average, the participants were in their teams for three years ($M = 3.24$; $SD = 3.27$). This study was intentionally conducted on a sample of handball players because handball is in the category of interactive sports where good interaction among the athletes as a means of achieving the desired outcome is of utmost importance.

Measures

Group cohesion was measured using the Group Environment Questionnaire (Carron, Widmeyer, & Brawley, 1985). The questionnaire contains 18

statements in which the participants self-assess the group coherence of the team on a nine-point scale ranging from 1 (*I completely disagree*) to 9 (*I completely agree*). The literature shows that the original four-factor structure of this questionnaire is rarely confirmed in research (Glavaš, Držaić, & Barić, 2018; Schutz, Eom, Smoll, & Smith, 1994; Sullivan, Short, & Cramer, 2002). In this study, the exploratory factor analysis using principal component analysis (PCA) did not produce an original factor solution as was proposed by Carron et al. (1985), but rather a one-factor solution, as in other studies (e.g., Glavaš et al., 2018). Therefore, the overall result deriving from the whole questionnaire was used in this paper. It is formed as a simple linear combination of participants' responses, whereby a higher result indicates stronger group cohesion of the team. Cronbach's alpha for this questionnaire was satisfactory ($\alpha = .82$).

Anxiety was measured using the Sport Anxiety Scale-2 (Smith, Smol, Cumming, & Grossbard, 2006), which measures the cognitive and bodily characteristics of anxiety in a sporting situation. The scale contains 15 statements on which participants evaluate their anxiety on a four-point scale (1 – *not at all*, 4 – *very much*). The scale consists of three subscales: *worry* and *concentration disruption* refer to the cognitive aspect of anxiety, while *somatic anxiety* refers to the physical aspect of anxiety. According to Smith et al. (2006), this instrument allows the formation of results as a total score on the scale. Thus, the overall result, which will be used in this paper, is formed as a simple linear combination of the participants' responses to all 15 statements. A higher score indicates a higher level of anxiety experienced by athletes. Since the measure for anxiety has not yet been applied to the Croatian population, the construct validity was investigated using the principal axis factoring method (PAF). Even though a four-factor solution was suggested, factor loadings were unclear. After running the analysis in which a three-factor solution was forced, two items that in the first analysis formed one factor had a projection on the first-factor worry. Therefore, the authors decided that the two mentioned items are going to be excluded ("My muscles feel shaky"; "My muscles feel tight because I am nervous"). Cronbach's internal consistency coefficient of the whole scale, after the previously mentioned items were deleted, was satisfactory ($\alpha = .87$).

Collective efficacy was measured by the Collective Efficacy Questionnaire for Sports (Short, Sullivan, & Feltz, 2005), which measures an individual's belief in his team's belief in achieving a particular goal. It consists of 20 statements in which participants evaluate their team's confidence on a 10-point scale (0 – *not certain*, 9 – *very confident*). According to the authors, the questionnaire consists of five subscales: ability, work, persistence, preparation, and unity. Short et al. (2005) state that the overall score on the questionnaire can be formed as a simple linear combination of participants' responses to all the statements in the questionnaire. A higher score indicates a more pronounced

level of the individual's belief that his team has a stronger conviction about its ability to achieve the desired results. Therefore, the overall result was used in data analysis. This instrument was never applied to the Croatian population and therefore the validity of the measure was examined using the factor analysis (PAF) method. The result of Cattell's scree test and the characteristic roots indicated a one-factor structure. Two items that showed saturation below 0.3 on this single factor were excluded ("Rate your team confidence, in terms of an upcoming game or competition, that your team has the ability to perform under pressure"; "Rate your team confidence, in terms of an upcoming game or competition, that your team has the ability to persist when obstacles are present"). In the current study, Cronbach's coefficient was $\alpha = .94$.

Effective communication between team members was measured by the Scale of Effective Communication in Team Sports-2 (Sullivan & Short, 2011). This scale consists of 15 statements to which participants indicate their answers on a seven-point scale (1 – *almost never*, 7 – *almost always*). According to the authors, the scale consists of four subscales: acceptance, uniqueness, positive conflict, and negative conflict. However, the results of the factor analysis (PCA) in this study showed three subscales. One of them is originally proposed uniqueness, second one was originally proposed negative conflict, while the third one we called acceptance and positive conflict, since statements that originally came under positive conflict were projected to acceptance. The result of each subscale was formed as a linear combination of the responses to the subscale statements. Cronbach's coefficients for the acceptance and positive conflict, uniqueness, and negative conflict subscales were satisfactory: $\alpha = .84$, $\alpha = .69$, $\alpha = .74$, respectively.

To measure *general self-efficacy*, the Croatian version (Ivanov & Penezić, 2002) of the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) was used. The scale measures a general and stable sense of perceived self-efficacy in coping with various stressful situations. The scale consists of 10 statements to which the participants respond on a 5-point scale (1 – *not at all true*, 5 – *exactly true*). The result is formed as a sum of the responses to all ten statements, whereby a higher result indicates a higher level of self-efficacy. Cronbach's coefficient indicates that the reliability of the scale was satisfactory ($\alpha = .84$).

In the statistical analysis, three variables were used as control variables: sex of the participant (male/female), age (in years), and the length of time as a member of the team (in years).

Procedure

This study was approved by the Ethics Committee of the Catholic University of Croatia. Informed written consent forms were collected from the partici-

pants, as well as informed consent forms signed by parents where applicable. The participants filled in the questionnaires in their respective clubs about 30 minutes before the training, and this took twenty minutes on average.

Results

Descriptive statistics between study variables are presented in Table 1. The participants achieved an average score on group cohesion and self-efficacy, above-average performance on collective performance, as well as in all subscales of communication in sports teams: uniqueness, acceptance and positive conflict, and negative conflict. In contrast, the participants reported a below-average level of anxiety.

Inter-correlations between the variables are shown in Table 2. As can be seen, the participants who reported stronger cohesiveness in the team were male and younger members. They also reported how their team had a more pronounced belief in its ability to achieve the desired results. The participants who reported a high level of team cohesion also reported higher levels of the communication of unique identity through nonverbal and verbal communication (uniqueness), as well as a higher level of the communication of appreciation (acceptance and positive conflict). Whenever the participants reported stronger cohesiveness, they also reported a lower level of emotional, personal,

Table 1. *Descriptive data for study variables*

	<i>n</i>	<i>M</i>	<i>SD</i>	Range	
				Actual	Possible
Group cohesiveness	117	110.47	23.46	41-153	17-153
Anxiety	117	22.71	6.15	13-49	13-52
Self-efficacy	116	38.91	5.70	28-50	10-50
Collective efficacy	117	129.98	29.26	39-180	0-180
Communication					
Uniqueness	116	16.55	3.57	7-21	3-21
Acceptance and Positive Conflict	116	31.98	8.13	10-49	7-49
Negative Conflict	116	14.29	3.71	5-21	3-21
Age	106	19.23	3.60	14-35	
Belonging to the team (in years)	117	3.24	3.27	0-13	

Table 2. *Inter-correlations for study variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Group cohesion	-	-.06	.08	.52**	.24**	.65**	-.20*	-.18*	-.24**	.02
2. Anxiety		-	-.12	-.14	-.10	-.23**	.04	.15*	-.09	.10
3. Self-efficacy			-	.20*	.19*	.05	.03	.01	.25**	-.05
4. Collective efficacy				-	.16*	.61**	-.23**	-.07	.08	-.07
5. Uniqueness ^a					-	.30**	.17*	-.21*	-.05	.29**
6. Acceptance and Positive Conflict ^a						-	-.15	-.06	-.18*	.16*
7. Negative Conflict ^a							-	.01	.14	.13
8. Sex ^b								-	.08	.06
9. Age									-	-.01
10. Belonging to the team										-

Note. * $p < .05$ ** $p < .01$; ^a - Communication Subscale; ^b Sex: Men-1, Women-2

and confrontational exchanges occurring during conflict within the team (negative conflict).

In order to respond to the research questions of this paper, a hierarchical regression analysis was carried out in three steps. The order of entering variables was consistent with the assumptions of the Carron's (1982) general conceptual model, which states that group factors derive from individual factors. For this reason, control variables were introduced in the first step (sex of the participant, age, and the length of time belonging to the team), the second step included two individual factors (anxiety and self-efficacy), and the third included group factors (collective efficiency, three subscales of communication).

After controlling variables in the first step of the analysis, the second step of the analysis did not show significance in predicting group cohesion

Table 3. Results of the hierarchical regression analysis of the contribution of group and individual factors in the explanation of group cohesion

Predictors	β	p	R^2
<i>first step: control variables</i>			
Sex ^a	-.16	.11	$R^2 = .054$ $F(3, 102) = 3.00$
Age	-.22 [*]	.02	
Belonging to the team	.03	.72	
<i>second step: individual factors</i>			
Sex ^a	-.15	.14	$R^2 = .056$ $F(5,100) = 13.83$ $\Delta R^2 = .002$
Age	-.26 ^{**}	.01	
Belonging to the team	.05	.60	
Anxiety	-.06	.56	
Self-efficacy	.13	.20	
<i>third step: group factors</i>			
Sex ^a	-.10	.15	$R^2 = .496$ $F(9, 96) = 11.07$ $\Delta R^2 = .440^{**}$
Age	-.15	.05	
Belonging to the team	-.04	.63	
Anxiety	.05	.52	
Self-efficacy	.03	.70	
Collective efficacy	.22 [*]	.03	
Uniqueness ^b	.03	.70	
Acceptance and Positive Conflict ^b	.51 ^{**}	.00	
Negative Conflict ^b	-.06	.42	

Note. * $p < .05$ ** $p < .01$; ^a Sex: Men-1, Women-2; ^b - Communication Subscale.

(see Table 3). The combination of group factors in the third step of the analysis was significant in the prediction of group cohesion. It was shown that more pronounced collective efficacy ($\beta = .22, p < .05$) and only one type of communication (i.e., acceptance and positive conflict; $\beta = .51, p < .01$) significantly predicted stronger group cohesion. As can be seen in Table 3, the proportion of the explained group cohesion significantly increased by 44% ($\Delta R^2 = .44$) with the introduction of group factors in the third step of the analysis.

Discussion

Based on the model proposed by Carron (1982) and the results of previous research (Borrego et al., 2012; Eys et al., 2003; Prapavessis & Carron, 1996), the first hypothesis of this paper was that individual factors, that is, a lower level of anxiety, as well as more pronounced self-efficacy would contribute to stronger group cohesion within the sports team. The results of this research have not shown a significant predictive value of individual factors to group cohesion. Accordingly, the results of this study are not in line with the first hypothesis. This might be the result of the different formulation of results on the instruments used. For instance, the aforementioned authors did not form an overall result of the Group Environment Questionnaire (Carron et al., 1985), as was the case in this research; rather they were investigating the correlation between anxiety and each dimension of that questionnaire. In those studies, a significant correlation was found between cognitive competitive anxiety and task cohesion but not a significant relationship with social cohesion (Eys et al., 2003; Prapavessis & Carron, 1996). Also, a different formulation of results was used on the instruments that measured anxiety in this study and previous studies. Earlier research used results formed in two dimensions of anxiety – cognitive and somatic anxiety (Eys et al., 2003; Prapavessis & Carron, 1996), while this study used an overall result on the instrument that measured anxiety. This might be the reason why a predictive value of anxiety to group cohesion was not found in this study.

Furthermore, the findings of the insignificant relationship between self-efficacy and group cohesion in this research may be explained by the applied self-efficacy measure. Namely, the measurement of self-efficacy used in this study is an instrument that measures general self-efficacy. Some authors argue that a person can have different levels of self-efficacy in different aspects of tasks and that measures which question more specific behaviors are more likely to predict them (Bandura, 1986; Schwarzer, Bäßler, Kwiatek, Schröder, & Zhang, 1997). Therefore, when an athlete estimates self-efficacy, it is possible that he

or she is thinking about situations that are not related to the effectiveness of performing sports tasks. It is thus possible that the results would be different from those using an instrument that measures self-efficacy related to tasks within the sports team. Further studies on this topic are needed.

The second hypothesis of this paper stated that a higher level of belief in the team's ability to achieve the desired result or goal would significantly predict stronger team cohesion. It was also assumed that more effective communication in the team would significantly predict stronger group cohesion. The results of this study were partially consistent with the assumptions of the model (Carron, 1982), as well as previous research that investigated the relationship between group cohesion with collective efficiency (Heuzé, Raimbault, & Fontayne, 2006; Ramzaninezhad et al., 2009) and communication (Sullivan & Feltz, 2003; Widmeyer & Williams, 1991). Namely, the results show that a higher level of collective efficiency significantly predicts stronger group cohesion as shown by the previous research. Placed in the context of sports, collective efficacy is important, especially when it comes to interactive sports, as teams with a higher level of collective efficiency can make more effort and persevere longer in tasks, which could lead to a performance that could achieve the desired goal. Some authors suggest that the predictability of team's beliefs, the ability to perform a certain sequence of actions is greater in sports in which there is a higher level of tasks in which teammates are interdependent (e.g., handball, volleyball, football, basketball).

Regarding communication, uniqueness and negative conflict were not significant predictors, while only the acceptance and positive conflict subscale (more frequent patterns of acceptance and constructive conflict resolution) proved to be a significant predictor of group cohesion. Sullivan and Feltz (2003) suggest that the explanation of the results lies in the instrumental nature of sports teams, that is, the authors state that communication is dependent on the context in which it is taking place. A sports environment is one of the contexts in which the core of communication is mostly related to tasks. So, in a situation where an athlete "shows a pattern of acceptance, he mostly supports his teammate to achieve success in a particular task" (Sullivan & Feltz, 2003, p. 1711). Also, patterns of unity and positive and negative conflict can be expressed by players as they communicate about the strategy of the game as part of a ritual in the game, as well as while communicating about personal matters (Sullivan & Feltz, 2003).

The literature review reveals a lack of research concerning which factors have a higher predictive value in explaining group cohesion. In accordance with Carron's model (1982), it was assumed that group factors would contribute more to group cohesion than individual factors. The obtained results are in

line with the third hypothesis, showing that individual factors do not make a significant contribution to group cohesion, whereas group factors have predictive importance in its explanation.

Like any other research, this one is also characterized by some limitations. First of all, there was no control over whether the participants completed the questionnaires before or after a competition, or what the outcome of the competition was. This means it is possible that the participants' responses were influenced by the competitive situation and that their evaluation at that point did not correspond to the evaluation they would have given had the context been different, that is to say, if they had not filled in the questionnaires before or after a competition. Apart from that, this was a cross-sectional research based on which no conclusions can be drawn on cause-and-effect relationships. In addition, a general self-efficacy measure was used instead of a specific self-efficacy measure for a sports environment, and, unlike in previous studies, general anxiety was measured instead of the specific dimensions of anxiety.

This research is characterized by numerous contributions. Most of the research in this area has been devoted to examining the relationship between only one to two individual (Leo et al., 2010; Prapavessis & Carron, 1996) or group factors (Paskevich et al., 1999; Sullivan et al., 2011) and cohesion. A small number of studies (Leo, Gonzales-Ponce, Sanchez-Miguel, Ivarsson, & Garcia-Calvo, 2015; Onag & Tepeci, 2014; Widmeyer & Williams, 1991) investigated simultaneously the relationship between individual and group factors with group cohesion. Therefore, the contribution of this research is that it is one of the few studies in which the relationship of group cohesion with a greater number of individual and group factors was studied at the same time. It is particularly valuable because it was, to the authors' knowledge, the first such research conducted in Croatia. A further contribution of this research is that it is the first on group cohesion to be carried out on a sample of handball players. Until now, research on group cohesion in the field of interactive sports has mainly been carried out in volleyball (Paskevich et al., 1999; Ramzaninezhad et al., 2009), basketball (Heuze et al., 2006; Prapavessis & Carron, 1996), football, and hockey players (Eys et al., 2003; Prapavessis & Carron, 1996). Future research will show if there are some differences between different group sports, perhaps a difference between coactive and interactive sports groups.

Conclusion

The results of this study have shown that collective efficacy and communication are significant group cohesion predictors, whereby a higher collective efficacy and frequent forms of acceptance when communicating within the team,

contribute to stronger team cohesion. Individual factors are not shown to contribute significantly to group cohesion. This research is a good starting point for further empirical work that will bring us closer to understanding the dynamics of sports groups. We also believe that the research results have implications for practice in the field of sports psychology in terms of increasing the quality of training for coaches and athletes, as well as helping them to achieve their goals.

References

- Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology, 4*(8), 359-373. doi: 10.1521/jscp.1986.4.3.359
- Borrego, C.C., Cid, L., & Silva, C. (2012). Relationship between group cohesion and anxiety in soccer. *Journal of Human Kinetics, 34*(1), 119-127. doi: 10.2478/v10078-012-0071-z
- Bradley, B.H., Baur, J.E., Banford, C.G., & Postlethwaite, B.E. (2013). Team players and collective performance: How agreeableness affects team performance over time. *Small Group Research, 44*(6), 680-711. doi: 10.1177/1046496413507609
- Carron, A.V. (1982). Cohesiveness in sport groups: Interpretations and considerations. *Journal of Sport Psychology, 4*(2), 123-138. doi: 10.1123/jsp.4.2.123
- Carron, A.V., Bray, S.R., & Eys, M.A. (2002). Team cohesion and team success in sport. *Journal of Sports Sciences, 20*(2), 119-126. doi: 10.1080/026404102317200828
- Carron, A.V., Widmeyer, W. N., & Brawley, L. R. (1985). The development of an instrument to assess cohesion in sport teams: The Group environment questionnaire. *Journal of Sport Psychology, 7*(3), 244-267. doi: 10.1123/jsp.7.3.244
- Cota, A.A., Evans, C.R., Dion, K.L., Kilik, L., & Longman, R.S. (1995). The structure of group cohesion. *Society for Personality and Social Psychology, 21*(6), 572-580. doi: 10.1177/0146167295216003
- Eys, M.A., Hardy, J., Carron, A.V., & Beauchamp, M.R. (2003). The relationship between task cohesion and competitive state anxiety. *Journal of Sport and Exercise Psychology, 25*(1), 66-76. doi: 10.1123/jsep.25.1.66
- Glavaš, D., Držaić, J., & Barić, R. (2018). *Psychometric validation of Group environment questionnaire: Group cohesion and team success in professional sport*. Manuscript submitted for publication.
- Gully, S.M., Incalcaterra, K.A., Joshi, A., & Beaubien, J.M. (2002). The impact of individual efficacy beliefs on group goal selection and group goal commitment. *Journal of Sports Sciences, 18*(6), 451-459. doi: 10.1080/02640410050074386
- Heuzé, J. P., Raimbault, N., & Fontayne, P. (2006). Relationships between cohesion, collective efficacy and performance in professional basketball teams: an examination of mediating effects. *Journal of Sports Sciences, 24*(1), 59-68. doi:10.1080/02640410500127736
- Ivanov, L., & Penezić, Z. (2002). Skala opće samoefikasnosti [General self-efficacy scale]. In K. Lacković Grgin, A. Proroković, V. Čubela, & Z. Penezić (Eds.), *Zbir-*

- ka psihologijskih skala i upitnika, Svezak 1 [Collection of Psychological Scales and Questionnaires, Vol. 1]* (pp. 6-7). Zadar: Filozofski fakultet.
- Leo, F.M., González-Ponce, I., Sánchez-Miguel, P.A., Ivarsson, A., & García-Calvo, T. (2015). Role ambiguity, role conflict, team conflict, cohesion and collective efficacy in sport teams: a multilevel analysis. *Psychology of Sport and Exercise, 20*, 60-66. doi: 10.1016/j.psychsport.2015.04.009
- Leo, F.M., Sanchez, P.A., Sanchez, D., & Garcia Calvo, T. (2010). Interactive effects of team cohesion on perceived efficacy in semi-professional sport. *Journal of Sports Science and Medicine, 9*(2), 320-325.
- Martens, R., Burton, D., Vealey, R.S., Bump, L.A., & Smith, D.E. (1990). The Competitive state anxiety inventory - 2 (CSAI-2). In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117-178). Champaign, IL: Human Kinetics.
- Ntoumanis, N., & Aggelonidis, Y. (2004). A psychometric evaluation of the Group environment questionnaire in a sample of elite and regional level Greek volleyball players. *European Physical Education Review, 10*(3), 261-278. doi:10.1177/1356336X04047126
- Onag, Z., & Tepeci, M. (2014). Team effectiveness in sport teams: the effects of team cohesion, intra team communication and team norms on team member satisfaction and intent to remain. *Social and Behavioral Sciences, 150*, 420-428. doi:10.1016/j.sbspro.2014.09.042
- Paskevich, D. M., Brawley, L. R., Dorsch, K. D., & Widmeyer, W. N. (1999). Relationship between collective efficacy and team cohesion: Conceptual and measurement issues. *Group Dynamics. Theory, Research, and Practice 3*(3), 210-222. doi:10.103/1089-2699.3.3.210
- Prapavessis, H., & Carron, A.V. (1996). The effect of group cohesion on competitive state anxiety. *Journal of Sport and Exercise Psychology, 18*(1), 64-74. doi:10.1123/jsep.18.1.64
- Ramzaninezhad, R., Keshtan, M.H., Shahamat, M.D., & Kordshooli, S.S. (2009). The relationship between collective efficacy, group cohesion and team performance in professional volleyball teams. *Brazilian Journal of Biomotricity, 3*(1), 31-39.
- Schutz, R. W., Eom, H. J., Smoll, F. L., & Smith, R. E. (1994.) Examination of the factorial validity of the Group environment questionnaire. *Research Quarterly for Exercise and Sport, 65*(3), 226-236. doi:10.1080/02701367.1994.10607623
- Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J.X. (1997). The assessment of optimistic self-beliefs: Comparison of the German, Spanish and Chinese versions of the General self-efficacy scale. *Applied Psychology: An International Review, 46*(1), 69-88. doi:10.1111/j.1464-0597.1997.tb01096.x
- Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S.Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-NELSON.
- Short, S.E., Sullivan, P., & Feltz, D.L. (2005). Development and preliminary validation of the Collective efficacy questionnaire for sports. *Measurement*

- in *Physical Education and Exercise Science*, 9(3), 181-202. doi:10.1207/s15327841mpee0903_3
- Smith, M.J., Arthur, C.A., Hardy, J., Callow, N., & Williams, D. (2013). Transformational leadership and task cohesion in sport: The mediating role of in-trateam communication. *Psychology of Sport and Exercise*, 14(2), 249-257. doi:10.1016/j.psychsport.2012.10.002
- Smith, R.E., Smoll, F.L., Cumming, S.P., & Grossbard, J.R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The Sport anxiety scale-2. *Journal of Sport and Exercise Psychology*, 28(4), 479-501. doi:10.1123/jsep.28.4.479
- Spink, K. S. (1990). Group cohesion and collective efficacy of volleyball teams. *Journal of Sport and Exercise Psychology*, 12(3), 301-311. doi:10.1123/jsep.12.3.301
- Steca, P., Pala, N.A., Greco, A., Monzani, D., & D'addario, M. (2013). A psychometric evaluation of the Group environment questionnaire in a sample of professional basketball and soccer players. *Perceptual and Motor Skills*, 116(1), 262-271. doi:10.2466/25.08.30.PMS.116.1.262-271
- Sullivan, P.J., & Feltz, D.L. (2003). The preliminary development of the Scale for effective communication in team sports (SECTS). *Journal of Applied Social Psychology*, 33(8), 1693-1715. doi:10.1111/j.1559-1816.2003.tb01970.x
- Sullivan, P.J., & Short, S.E. (2011). Further operationalization of intra-team communication in sports: An updated version of the Scale of effective communication in team sports (SECTS-2). *Journal of Applied Social Psychology*, 41(2), 471-487. doi:10.1111/j.1559-1816.2010.00722.x
- Sullivan, P.J., Short, S.E., & Cramer, K.M. (2002). Confirmatory factor analysis of the Group environment questionnaire with co-acting sports. *Perceptual and Motor Skills*, 94(1), 341-347. doi:10.2466/pms.2002.94.1.341
- Widmeyer, W.N., & Williams, J. (1991). Predicting cohesion in a coacting sport. *Small Group Research*, 22(4), 548-570. doi:10.1177/1046496491224007
- Zaccaro, S.J., Blair, V., Peterson, C., & Zazanis, M. (1995). Collective efficacy. In J. E. Maddux (Ed.), *Self-efficacy, adaptation and adjustment: Theory, research and application* (pp. 305-328). Boston: Springer.

Predictors of depressive symptoms during pregnancy

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Abstract

Background: Pregnancy is one of the most prominent changes for many women and for some it represents a period of elevated anxiety, stress, and depressive symptoms which create health risks for both women and their offspring. While the risk factors for postpartum depression have been extensively studied, the predictors of depression during pregnancy have been far less explored. Even though depression is recognized as an important health issue, it is still a relatively neglected component of pregnancy care. The aim of this research was twofold: (1) to examine the prevalence of depressive symptoms during pregnancy and (2) to investigate whether anxiety (general and pregnancy-specific), perceived stress, coping strategies, self-esteem, perceived social support, and sociodemographic and obstetric data were significant predictors of depression symptoms during pregnancy.

Method: Pregnant women ($N=310$) participated in the study in the 32nd week of pregnancy on average. They were approached at a prenatal clinic

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where they filled in the following questionnaires: the Edinburgh Postnatal Depression Scale (EPDS), a short version of the Depression, Anxiety and Stress Scales (DASS-21), the Pregnancy Concerns Scale (PCS) as a measure of pregnancy-specific anxiety, the Coping Orientation to Problems Experienced (COPE), the Rosenberg Self-Esteem Scale (RSES), the Social Support Appraisal Scale (SS-A) as a measure of social support from family and friends, the Perceived Support from Partner Scale (PSPS), and the sociodemographic and obstetric sheet.

Results: Results showed that 10-13% of the women had elevated depressive symptoms and the most important factor in predicting depressive symptoms during pregnancy was the higher levels of stress. Additional risk factors included state anxiety, avoidance as a style of coping with stress, low self-esteem, and a history of depression symptoms.

Conclusion: These findings have implications for the development of intervention programmes with the aim of identifying high-risk women and making their pregnancy and upcoming transition to motherhood a healthier and more positive life experience.

Keywords: depression, pregnancy, risk factors, stress, anxiety

Introduction

Pregnancy is a period of most profound changes for many women and for some, it represents a period of elevated anxiety, stress, and depression which can lead to substantial adverse outcomes (Dunkel Schetter & Tanner, 2012). Pregnancy is, therefore, no longer thought to be a protective factor for the occurrence of an affective illness in women (Wichman & Stern, 2015). On the contrary, it is considered as a major life event with various hormonal changes which can represent an increased vulnerability to depression (Bennett, Einarson, Taddio, Koren, & Einarson, 2004). Also, it could be viewed as a highly emotional state which may be a potent stressor (Bjelica, Četković, Trninić-Pjević, & Mladenović-Segedi, 2018) and provoke a relapse or new-onset depressive symptoms. A recent meta-analysis that included a total of 90 studies concluded that the aggregate prevalence of depression was around 14% for women in general (Lim et al., 2018) and another meta-analysis estimated the prevalence of elevated depressive symptoms in pregnancy from 7% to 13% (Bennett et al., 2004). A recent study on a sample of Croatian pregnant women found that almost half of the women who had elevated depression during pregnancy stayed depressed after birth (Nakić Radoš, Tadinac, & Herman, 2013a). Also, depression during pregnancy was a strong risk factor for postpartum depression (Lee et al., 2007; Leigh & Milgrom, 2008; Nakić Radoš, Herman, & Tadinac, 2015).

Numerous detrimental consequences of depression during pregnancy have been established. Women who were depressed during pregnancy were more likely to be more stressed, anxious, engaged in risk-taking, substance abuse,

poor health behaviors, and fewer visits to prenatal care clinics (Zuckerman, Amaro, Bauchner, & Cabral, 1989). Obstetrically, they have higher rates of cesarean delivery, preeclampsia (Bansil et al., 2010), report maximum labor pain expectancies (Čuržik & Jokić Begić, 2012), and pregnancy complications (Le Strat, Dubertret, & Le Foll, 2011). A review of recent research shows evidence that infants of depressed mothers are more likely to be delivered preterm, with low birth weight, slower growth rates, and are more likely to later have attentional, emotional, and behavioral problems (Field, 2011). A 26-year longitudinal study on prenatal depression demonstrated that exposure to maternal depression during pregnancy, but not after childbirth, increases offspring vulnerability to clinical depression in adulthood with child maltreatment as a mediating mechanism (Plant, Pariante, Sharp, & Pawlby, 2015). Their findings support the premise of “fetal programming”, which postulates that offspring exposure to an adverse intrauterine environment can result in changes in fetal brain development (Plant et al., 2015) and therefore create child vulnerability to affective disorders.

There are several important issues regarding perinatal depression. Firstly, the majority of research is focused primarily on postpartum depression leaving the issue of prenatal depression rather unexplored. Even though depression is recognized as an important health issue, it is still a relatively neglected component of prenatal care (Zeng, Cui, & Li, 2015). Additionally, it is often unrecognized given that some symptoms reflect typical changes during pregnancy, such as sleep or appetite disturbances, low energy, low libido, and so forth (Noble, 2005; Wichman, & Stern, 2015). Secondly, estimates of the prevalence of depression during pregnancy or prenatal depression vary widely (Bennett et al., 2004). A possible reason for that discrepancy is a variation of depression screening instruments with each including different symptoms and having different cut-off points to distinguish depressive from non-depressive women.

Furthermore, while the risk factors for postpartum depression have been extensively studied, the predictors of depression during pregnancy have received far less attention. However, identifying risk factors associated with prenatal depression could enable clinicians and other professionals to more easily and timely identify women at risk, optimize treatment, and form specific prevention strategies. According to an extensive review by Biaggi, Conroy, Pawlby, & Pariante (2016), some risk factors for prenatal depression are high anxiety and stress, low social support and self-esteem, history of abuse, personal history of mental illness, unplanned/unwanted pregnancy, single status, and low levels of education and income. On the other hand, findings are ambiguous when it comes to some sociodemographic and obstetric variables such as education (Bunevičius et al., 2009; Da Costa, Larouche, Dritsa, & Brender, 2000),

employment, and age (Biaggi et al., 2016). Also, parity and gravidity showed inconsistent results while only few studies examined family history of mental illness and partner employment in predicting prenatal depressiveness (Biaggi et al., 2016). Moreover, prenatal depression was usually examined as a risk factor for postnatal depression and there are not many studies that examined a broader range of potential risk factors for depression during pregnancy per se.

In order to broaden the understanding of prenatal depression, the aim of this study was to examine (1) the prevalence of depressive symptoms during pregnancy and (2) the predictors for depressive symptoms during the prenatal period. We hypothesized that higher levels of anxiety, stress, avoidance as a coping strategy, history of depressiveness, and prior psychiatric treatment would be risk factors, while self-esteem and perceived social support would be protective factors for depressive symptoms during pregnancy.

Method

Participants

A convenient sample of pregnant women ($N = 310$) participated in the study. The inclusion criterion was the age of ≥ 18 years and all majorly incomplete questionnaires were excluded from further analysis. The participants were on average 31.2 years old ($SD = 5.12$), the majority were married or cohabiting (96.8%), living in urban areas (83.2%), employed (78.7%), and reported an average socioeconomic status (59.0%). Over 10% reported a history of depressive symptoms that lasted longer than 2 weeks and 5.8% had been previously psychiatrically treated.

The women were on average in the 32nd week of pregnancy and the majority was in the third trimester (78.1%). More than half of the women (56.5%) reported having no children and the majority (66.8%) had planned the pregnancy. The full description of the sample is presented in Table 1.

Instruments

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) is a widely used 10-item self-report questionnaire that measures depressive symptoms in postpartum women, but it is also commonly used during pregnancy (Leigh & Milgrom, 2008; Nakić, 2011). It measures the severity of various depressive symptoms over the last week of gestation rated on a scale from 0 to 3 with a maximum score of 30. The questionnaire has shown good psychometric properties with .87 Cronbach's α internal consistency (Cox et al.,

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Table 1. Demographic, obstetric, and clinical characteristics of the sample (N=310)

	N (%)
Marital status	
married	249 (80.3%)
cohabiting	51 (16.5%)
single	10 (3.2%)
Women's education	
graduated from elementary school or less	4 (1.3%)
graduated from high school	110 (35.5%)
graduated from college or university	196 (63.2%)
Perceived socio-economic status	
below average	31 (10.0%)
average	183 (59.0%)
above average	96 (31.0%)
Employment	
employed	244 (78.7%)
non-employed	66 (21.3%)
Place of residence	
urban	258 (83.2%)
rural	52 (16.8%)
Previous depression symptoms	
no	199 (64.2%)
shorter than 2 weeks	79 (25.5%)
longer than 2 weeks	32 (10.3%)
Psychiatric treatment ¹	18 (5.8%)
Psychopharmacological treatment ¹	20 (6.5%)
Family history of psychiatric illness ¹	54 (17.4%)
Parity	
no children	175 (56.5%)
one child	87 (28.1%)
two or more children	48 (15.5%)
Stage of pregnancy	
1 st trimester	14 (4.5%)
2 nd trimester	54 (17.4%)
3 rd trimester	242 (78.1%)
	<i>M (SD)</i>
Age (years)	31.2 (5.1)
Gestational age (weeks)	32.3 (8.2)

Note: ¹ Percentage of "yes" responses

1987) and was validated in the Croatian perinatal population (Nakić Radoš, Tadinac, & Herman, 2013b). In this study, the α was .85.

The Depression, Anxiety, and Stress Scales (DASS; Lovibond & Lovibond, 1995) is a self-report that consists of 42 items on three subscales – depression, anxiety, and stress. The questionnaire excludes somatic items such as sleeping difficulties, lack of energy, and poor concentration which are not valid indicators in perinatal women (Meads & Ayers, 2011). In this study, a short 21-item version was used, with 7 items on each scale and a 4-point response ranging from 0 to 3 with a maximum score of 21. A higher score on these scales indicates higher levels of symptoms. The total result on each scale is multiplied by 2 in order to get the results that fit the given norms for the 42-item version. The DASS was previously translated into Croatian and validated in perinatal population (Reić Ercegovac & Penezić, 2012). In this study, Cronbach's α was .78, .88 and .78 for the depression, anxiety, and stress subscales, respectively.

The Pregnancy Concerns Scale (PCS; Nakić Radoš, Tadinac, & Herman, 2015) is a self-report scale that measures specific worries, fears, and concerns during pregnancy. The scale comprises 16 items and four subscales measuring concerns about fetal health, concerns about own health and childbirth, concerns about financial issues and close relations, and concerns about appearance. Each item is scored from 0 to 3, with the possible total score ranging from 0 to 48. A validation study of the scale showed good psychometric properties with Cronbach's α .80 (Nakić Radoš et al., 2015). In this study, α was .85.

The Coping Orientation to Problems Experienced (COPE; Carver, Scheier, & Weintraub, 1989) measures different ways people respond to stress through 71 items. In this study, a 15-item version was used to assess the different ways of coping through three subscales: problem-focused (6 items), emotion-focused (3 items), and avoidance coping (6 items) (Hudek-Knežević, Krapić, & Kardum, 2006). Participants respond to each item on a scale from 0 to 4. The Cronbach's α in this study was .67, .72 and .55, for problem-focused, emotion-focused, and avoidance coping, respectively.

The Rosenberg Self-esteem Scale (RSES; Rosenberg, 1965) is a 10-item measure of global self-esteem with 5 items regarding a positive and 5 items regarding a negative evaluation of self. Higher scores indicate higher self-esteem with the total score ranging from 0 to 40. In this study, Cronbach's α was .80.

Perceived Support from Partner Scale (PSPS; Nakić, 2011) is a short 5-item self-report that measures global relationship quality, emotional support from partner, confidence in partner, instrumental support, and reliance on one's partner (Nakić, 2011). The response is on a 5-point scale where higher numbers indicate higher support. In this study, Cronbach's α was .87.

The Social Support Appraisals Scale (SS-A; Vaux et al., 1986) measures the perception of social support provided by family, friends, and coworkers. In this research, subscales regarding support from family and friends (Tkalčić, 1998) were administered. Each subscale has 7 items with a 5-point answer format and a possible range from 7 to 35. The Cronbach's α was .95 and .91 for the subscales family and friends, respectively.

The Sociodemographic and obstetric sheet consisted of questions on demographic characteristics such as age, marital status (married/cohabiting/single), education level, and work status (employed full-time/employed part-time/unemployed) of both the woman and her partner, perceived socioeconomic status (measured on a 5-point scale ranging from below average to above average), and place of residence (rural/urban). The data on the history of depressive symptoms, family history of psychiatric illness, prior psychiatric and psychopharmacological treatment were also collected. Other obtained information contained obstetric data, such as parity, history of miscarriage, gestational age, and planning of current pregnancy.

Procedure

The research was approved by the Ethics Committee of Catholic University of Croatia and Ethics Committee of University Hospital Centre "Sisters of Mercy" in Zagreb, Croatia where the research was conducted. The participants were recruited at the prenatal clinic while waiting for their regular prenatal check-up. Before questionnaire administration, all the participants gave their signed informed consent. Data were collected from April to May 2017.

Statistical analysis

The distribution of variables was analyzed and all psychological variables were skewed. However, the index of skewness was not larger than 3 and the index of kurtosis was not larger than 10 for any of the variables, which was, accordingly to Kline (2011), appropriate for parametric analysis. Associations between depressive symptoms and sociodemographic, obstetric, and psychological variables were analyzed using the Pearson's correlations, Point-biserial, and Spearman's rank correlation coefficients, depending on what was appropriate. Finally, a multiple regression analysis was conducted in order to test the significant predictors of depressive symptoms. We took an empirically driven approach and entered only those variables that were significantly correlated. For all statistical analyses, we used IBM SPSS Statistics 21.0 for Windows.

Results

The average level of depression symptoms on the EPDS was 6.3 ($SD = 4.6$, range: 0-20), while on the DASS-21 it was 4.2 ($SD = 5.0$, range: 0-30). On the EPDS, 10.6% of the women scored above the proposed cut-off score of 13 and on the DASS-21 13.5% of the women scored above the proposed cut-off score. Of the women reporting depression symptoms on the DASS-21, 7.4% had mild depression symptoms, 4.5% moderate, 0.6% severe, and 1% reported extremely severe symptoms. Out of 33 women who scored above the cut-off on the EPDS (≥ 13), 12 reported a history of depressive mood (longer than 2 weeks) which makes 3.9% of the women with overlap of prior depressive symptoms and current symptoms. Also, it is important to note that 9 women (2.9%) reported having some sort of self-harming thoughts (item 10 on the EPDS).

Although it was not a part of the research aims, t-tests were computed in order to determine whether there was a significant difference in depression score between the women in the second and the third trimester (comparisons with the first trimester were not possible due to the low number of participants in the first trimester, only 4.5%). There was no difference between the women in the second and the third trimester neither in the EPDS score, $t(294) = 0.55$, $p = .581$, nor in the DASS-21 score, $t(294) = 0.66$, $p = .509$. Also, there was no difference in the prevalence of elevated depression symptoms between the second and the third trimester, neither on the EPDS nor on the DASS-21 (Table 2).

Before conducting a regression analysis, we examined the associations between sociodemographic, obstetric, and psychological variables, and depression on EPDS (Table 3). Out of sociodemographic variables, depression symptoms were significantly correlated with lower education level and unemployment of both partners, single status, and lower perceived socioeconomic

Table 2. Prevalence of scores above the cut-off points on the EPDS (≥ 13) and the DASS-21 (≥ 10) across different trimesters of pregnancy

	EPDS		DASS-21	
	n (%)		n (%)	
Total	33 (10.6)		42 (13.5)	
Trimester				
1 st trimester	0		1 (7.1)	
2 nd trimester	7 (13.0)	$\chi^2(1)=0.05$, $p=.819$	9 (16.7)	$\chi^2(1)=0.12$, $p=.657$
3 rd trimester	26 (10.7)		32 (13.2)	

Note: EPDS – Edinburgh Postnatal Depression Scale; DASS-21 – The Depression, Anxiety and Stress Scales.

Table 3. Correlation coefficients between sociodemographic, obstetric, and psychological variables with the EPDS score (N=310)

	EPDS score
Sociodemographic variables	
Age ^a	-.06
Education level - women ^b	-.18**
Education level - partner ^b	-.18**
Work status - women ^{1c}	.17**
Work status - partner ^{1c}	.12*
Perceived socioeconomic status ^b	-.13*
Marital status ^{2c}	.16**
History of psychopathology	
History of depressiveness ^{3b}	.46**
Psychiatric treatment ^{4c}	.22**
Psychopharmacological treatment ^{4c}	.20**
Family history of psychiatric illness ^{4c}	.07
Obstetric variables	
Parity ^b	.02
Planned pregnancy ^{4c}	-.19**
Wanted pregnancy ^{4c}	-.26**
Psychological variables	
Stress ^a	.71**
General anxiety ^a	.61**
Pregnancy- specific anxiety ^a	.52**
Problem- focused coping ^a	-.11
Emotion-focused coping ^a	.08
Avoidance coping ^a	.30**
Self-esteem ^a	-.47**
Social support from family ^a	-.19**
Social support from friends ^a	-.23*
Social support from partner ^a	-.33**

Note: *p < .05, **p < .01; ^a Pearson correlation coefficient, ^b Spearman rank correlation coefficient, ^c Point-biserial correlation coefficient. ¹Work status: 1 = employed, 2 = partially employed or unemployed; ²Marital status: 1 = married or cohabiting, 2 = single; ³History of depressiveness: 1 = no history, 2 = shorter than two weeks, 3 = longer than two weeks; ⁴Treatment, Family history, Planned/Wanted pregnancy: 1 = no, 2 = yes; EPDS - Edinburgh Postnatal Depression Scale.

status. The women with positive psychiatric history, in terms of having a history of psychiatric treatment, psychopharmacological treatment or history of depression symptoms had significantly higher levels of depression symptoms. Out of obstetric variables, the women with unplanned or unwanted pregnancy

reported higher levels of depression symptoms. Almost all psychological factors were significantly correlated with depressiveness. Higher levels of depression symptoms were related to higher levels of perceived stress, anxiety (both general and pregnancy-specific), avoidance as a coping strategy, and lower levels of self-esteem and social support (from all three sources; family, friends, and partner).

Table 4. Results of Multiple Regression Analysis with depression score on the EPDS as a criterion (N=310)

	<i>b</i>	<i>SE b</i>	β
Constant	8.53	3.73	
Sociodemographic variables			
Education level - women	0.13	0.21	.03
Education level - partner	-0.11	0.21	-.02
Work status - women ¹	0.51	0.45	.05
Work status - partner ¹	0.21	0.62	.01
Perceived socioeconomic status	0.13	0.27	.02
Marital status ²	-0.55	1.06	-.02
History of psychopathology			
History of depressiveness ³	0.78	0.33	.12*
Psychiatric treatment ⁴	-1.98	1.65	-.10
Psychopharmacological treatment ⁴	0.46	1.56	.02
Obstetric variables			
Planned pregnancy ⁴	0.05	0.39	.01
Wanted pregnancy ⁴	-1.49	1.28	-.05
Psychological variables			
Stress	0.23	0.03	.42**
General anxiety	0.10	0.04	.14*
Pregnancy specific anxiety	0.05	0.03	.08
Avoidance coping	0.12	0.06	.09*
Self-esteem	-0.14	0.04	-.16**
Social support from family	0.03	0.05	.02
Social support from friends	-0.05	0.06	-.04
Social support from partner	-0.11	0.07	-.06
$R^2 = .604$			
$F(19, 290) = 23.28, p < .001$			

Note: * $p < .05$, ** $p < .01$; ¹ Work status: 1= employed, 2= partially employed or unemployed; ² Marital status: 1 = married or cohabiting, 2 = single; ³History of depressiveness: 1= no history, 2= shorter than two weeks, 3= longer than two weeks; ⁴ Treatment, Planned/Wanted pregnancy: 1= no, 2 = yes; EPDS - Edinburgh Postnatal Depression Scale.

Finally, we conducted multiple regression analyses with depression score on the EPDS as the criterion, and sociodemographic, obstetric, and psychological variables as predictors (Table 4). Firstly, the model was significant and explained 60.4% of the depression variance. Five variables emerged from the model as significant predictors of depression symptoms: stress, self-esteem, general anxiety, history of depressiveness, and avoidance. In other words, the pregnant women who reported higher levels of stress and anxiety, who had lower levels of self-esteem, who previously experienced period(s) of depressive symptoms, and used avoidance as a coping strategy reported higher levels of depression.

Discussion

Mental health during pregnancy is rather overseen due to a number of reasons. However, our findings suggest that prenatal depressiveness is an important issue with quite a substantial prevalence and clear risk factors. Considering the variation in estimates of prenatal depression throughout the literature, this study measured depressive symptoms with two different measures (the EPDS and DASS-21). According to the results, 10-13% of the sample in this study had elevated depressive symptoms. These findings are consistent with the prior research that reported a 7-13% prevalence of prenatal depression (Bennett et al., 2004). Also, it is important to note that the prevalence is quite similar to the prevalence of postpartum depression (O'Hara & Swain, 1996), which has been much more extensively studied. Surely, the use of a diagnostic interview, instead of screening measures, would find a lower prevalence (O'Hara & Swain, 1996). The prevalence of self-harming thoughts (2.9%) was similar to the 2.7% found in a recent research in Croatia, which also did not find a significant correlation between depressive symptoms and gestational week (Mikšić et al., 2018).

The multiple regression analysis showed that a large amount of the depression symptoms (60.4%) could be explained with five significant predictors: stress, general anxiety, low self-esteem, history of depressiveness, and avoidance as a coping strategy. We found, as hypothesized, that stress, anxiety, history of depressiveness, and avoidance as a coping mechanism were positive predictors of prenatal depression symptoms, while self-esteem was a negative predictor thereof. Contrary to our hypothesis, prior psychiatric treatment, pregnancy-specific anxiety, and social support were not significant predictors even though they were significantly correlated with depression score.

Overall, the most significant factor in predicting depressiveness during pregnancy was *perceived stress*. This finding is consistent with the literature (Bunevičius et al., 2009; Kinser et al., 2017), emphasizing the role of women's

perception of stress, not the number of stressors in developing depressive mood (Nakić, 2011). A widespread view is that environmental factors, such as stressful life events and complex genetic variations, act as important determinants of both susceptibility and resilience to major depressive disorders (Charney & Manji, 2004; Sun et al., 2015). In daily life, people are confronted with situations that demand adaptation, and when that adaptation is difficult or impossible, stress occurs (Mulder et al., 2002). Pregnant women are, however, confronted with other (possibly new to them) stress factors, such as physical and hormonal changes, pregnancy-specific anxiety, which can in combination with personal risk factors negatively affect the psychic well-being of the pregnant woman (Mulder et al., 2002). Da Costa et al. (2000) also found “hassles” or stress as the most important predictor of depressed mood during pregnancy, demonstrating that the experience of depression during pregnancy could be stress-related.

Additionally, our findings show that women who used *avoidance* instead of emotion- or problem-focused coping in dealing with stressful situations were more prone to depression symptoms during pregnancy. This supports the conclusion of prior research that the lack of adaptive coping mechanisms is associated with depression (symptoms) during pregnancy (Bennett et al., 2004; Da Costa et al., 2000; Zeng et al., 2015). Another study also reported that women whose coping was high in distancing, escape-avoidance, self-control, and confronting had a greater chance of becoming depressed (Faisal-Cury, Tedesco, Kahhale, Menezes, & Zugaib, 2004). The role of coping strategies in predicting depression during pregnancy is not surprising because less adaptive coping strategies such as avoidance have been associated with the risk of depression in postpartum, as well (Faisal-Cury et al., 2004; Nakić, 2011).

Also, as expected, *general anxiety* was another risk factor for depressive symptoms. Literature agrees that elevated anxiety is substantial during the prenatal period and is found to have a significant role in depressiveness during pregnancy (Biaggi et al., 2016; Da Costa et al. 2000; Leigh & Milgrom, 2008). In some studies, anxiety is an even stronger predictor of postpartum depression than depression during pregnancy (Nakić, 2011). Owing to these quite consistent findings regarding anxiety, Le Strat et al. (2011) suggest that symptoms of anxiety may be a core feature of depression during pregnancy and post-partum. Heron, O'Connor, Evans, Golding, and Glover (2004) suggested that anxiety may occur prior to depression as a result of changed physiological pathways or the psychological reactions of experiencing and failing in managing stress. These findings are in line with an integrative model by Ross, Sellers, Gilbert Evans, and Romach (2004), which suggests that the relationship between biological risk factors and depression is partially mediated by the association between

depression and anxiety, suggesting that symptoms of anxiety are important contributors to perinatal mood difficulties.

Our second hypothesis was partially confirmed: *Self-esteem* was a significant predictor of prenatal depressiveness, although perceived social support was not (from family, friends nor partner). Perceived social support was negatively skewed, with the majority of the sample reporting high social support, which could then explain why the social support was not a significant depression predictor. Nevertheless, it was, as expected, significantly correlated with depression score, as found in other studies (Reić Ercegovac & Penezić, 2011). On the other hand, self-esteem was found to be a predictive factor for prenatal depression symptoms, suggesting that pregnant women with low self-esteem are ill-equipped to face the vast challenges and stressors of pregnancy and, in turn, are more prone to anxiety and depressive symptoms throughout pregnancy (Lee et al., 2007).

History of depressiveness was another significant predictor which supports the role of personal predisposition in developing depression during pregnancy. It is important to state that it is non-clinical depressiveness that women were asked about, but it can be an indicator of a tendency for depressive reactions to stressors (Nakić, 2011). Many studies detected this variable as a predictor of prenatal (Bunevičius et al., 2009, Kinser et al., 2017) and postnatal depression (Leigh & Milgrom, 2008).

The results of this study should be taken with certain limitations. Firstly, it is important to note that the sample was recruited from one hospital which might limit the generalisability of our results, and also the prevalence estimates in this study must be viewed with caution due to unequal sample sizes of women in the first, the second, and the third trimester. The majority were in the third trimester with only a small portion of women in the first trimester. Also, it is important to keep in mind that, similar to other research (Ross, Campbell, Dennis, & Robertson Blackmore, 2006), the majority of the sample was from urban areas, married or cohabiting, employed, and with average socioeconomic status. Thus, the findings of this research may not relate to single, unemployed women of low socioeconomic status, living in rural areas. Future studies should make an effort to recruit women underrepresented in the current body of research. Furthermore, all the questionnaires were self-reports and the study did not include a clinical interview in order to confirm the diagnosis of a depressive disorder. It is important to emphasize that self-report measures serve only as a screening tool, not a diagnostic one. However, research in the postnatal period showed that even maternal depression not reaching the level of clinical diagnosis has an impact on child behavioral development (Moehler et al., 2007). Additionally, we have to point out the cross-sectional nature of

this study design without the possibility of establishing the cause-effect relationship. As depressive symptoms might fluctuate over pregnancy (Bennett et al., 2004; Lee et al., 2007), research with repeated measures design has to be applied. Due to stress being the leading risk factor in this study, future research should also explore resilience to stress and various protective factors associated with it in order to gain a comprehensive view of depression during pregnancy. A longitudinal study would be of great value to track the changes, development, and duration of depressive symptoms through different trimesters.

Conclusion

Our findings correspond to the contextual model of Leigh and Millgrom (2008) which highlights the importance of antenatal stressors, personal resources, and predisposing factors in the development and maintenance of perinatal depression and parenting stress. Overall, based on our findings, we propose a conclusion that depressiveness during pregnancy occurs through a few key risk factors that make women especially vulnerable. We suggest that the state of pregnancy, being highly stressful and anxiety-provoking, in a combination with weaker personal resources (less adaptive coping skills and poor self-esteem) contribute to depression symptoms during pregnancy. A problematic issue indicated by a systematic review is that three in four pregnant women who were diagnosed with prenatal depression were not treated, while over 50% of women with depression were not even identified or diagnosed (Bennett et al., 2004). This raises the concern and an imperative that effort must be made towards promoting multiple screenings for an early recognition of depressive women during pregnancy. Screening should be then accompanied by treatment options and prevention strategies which could alleviate different short- and long-term complications associated with prenatal depression both for the mothers and their offspring. Intervention and treatment should focus on promoting active coping strategies, as well as strengthening self-esteem to improve dealing with problems and stress during that challenging period of life and making the pregnancy and upcoming transition to motherhood a healthier and more positive life experience.

References

- Bansil, P., Kuklina, E. V., Meikle, S. F., Posner, S. F., Kourtis, A. P., Ellington, S. R., & Jamieson, D. J. (2010). Maternal and fetal outcomes among women with depression. *Journal of Women's Health, 19*(2), 329-334. doi: 10.1089/jwh.2009.1387.

- Bennett, H. A., Einarson, A., Taddio, A., Koren, G., & Einarson, T. R. (2004). Prevalence of depression during pregnancy: systematic review. *Obstetrics and Gynecology*, 103(4), 698-709. doi: 10.1097/01.AOG.0000116689.75396.5f.
- Biaggi, A., Conroy, S., Pawlby, S., & Pariante, C. M. (2016). Identifying the women at risk of antenatal anxiety and depression: A systematic review. *Journal of Affective Disorders*, 191, 62-77. doi: 10.1016/j.jad.2015.11.014.
- Bjelica, A., Četković, N., Trninić-Pjević, A., & Mladenović-Segedi, LJ. (2018). The phenomenon of pregnancy- a psychological view. *Ginekologia Polska*, 89(2), 102-106. doi: 10.5603/GP.a2018.0017.
- Bunevičius, R., Kusminskas, L., Bunevičius, A., Nadisauskiene, R. J., Jurenienė, K., & Pop, V. (2009). Psychosocial risk factors for depression during pregnancy. *Acta Obstetrica et Gynecologica*, 88(5), 599–605. DOI: 10.1080/00016340902846049.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing Coping Strategies: A Theoretically Based Approach. *Journal of Personality and Social Psychology*, 56(2), 267-283. doi: 10.1037/0022-3514.56.2.267.
- Charney, D. S., & Manji, H. K. (2004). Life stress, genes and depression: Multiple pathways lead to increased risk and new opportunities for intervention. *Science Signaling*, 225, 1-11. doi: 10.1126/stke.2252004re5.
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh postnatal depression scale. *British Journal of Psychiatry*, 150(6), 782-786. doi: 10.1192/bjp.150.6.782.
- Čuržik, D., & Jokić Begić, N. (2012). The utility of BDI-II in assessment of pre- and postpartum depression symptoms and their relation to labor pain. *Psychiatria Danubina*, 24(2), 167-174.
- Da Costa, D., Larouche, J., Dritsa, M., & Brender, W. (2000). Psychosocial correlates of prepartum and postpartum depressed mood. *Journal of Affective Disorders*, 59(1), 31-40. doi: 10.1016/S0165-0327(99)00128-7.
- Dunkel Schetter, C., & Tanner, L. (2012). Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Current Opinion in Psychiatry*, 25(2), 141-148. doi: 10.1097/YCO.0b013e3283503680.
- Faisal-Cury, A., Tedesco, J. J. A., Kahhale, S., Menezes, P. R., & Zugaib, M. (2004). Postpartum depression: in relation to life events and patterns of coping. *Archives of Women's Mental Health*, 7(2), 123-131. doi: 10.1007/s00737-003-0038-0.
- Field, T. (2011). Prenatal depression effects on early development: A review. *Infant Behavior & Development*, 34(1), 1–14. doi: 10.1016/j.infbeh.2010.09.008.
- Heron, J., O'Connor, T. G., Evans, J., Golding, J., & Glover, V. (2004). The course of anxiety and depression through pregnancy and postpartum in a community sample. *Journal of Affective Disorders*, 80(1), 65-73. doi: 10.1016/j.jad.2003.08.004.
- Hudek-Knežević, J., Krapić, N., & Kardum, I. (2006). Burnout in dispositional context: The role of personality traits, social support and coping styles. *Review of Psychology*, 13(2), 65-73.

- Kline, R. B. (2011). *Methodology in the Social Sciences. Principles and practice of structural equation modeling (3rd ed.)*. New York, NY, US: Guilford Press.
- Kinser, P. A., Thacker, L. R., Lapato, D., Wagner, S., Roberson-Nay, R., Jobe-Shields, L., Amstadter, A., & York, T. P. (2017). Depressive symptom prevalence and predictors in the first half of pregnancy. *Journal of Women's Health, 27*(3), 369-376. doi: 10.1089/jwh.2017.6426,
- Le Strat, Y., Dubertret, C., & Le Foll, B. (2011). Prevalence and correlates of major depressive episode in pregnant and postpartum women in the United States. *Journal of Affective Disorders, 135*(1-3), 128-138, doi: 10.1016/j.jad.2011.07.004.
- Lee, A. M., Lam, S. K., Sze Mun Lau, S. M., Chong, C. S., Chui, H. W., & Fong, D. Y. (2007). Prevalence, course, and risk factors for antenatal anxiety and depression. *Obstetrics and Gynecology, 110*(5), 1102-1112. doi: 10.1097/01.AOG.0000287065.59491.70.
- Leigh, B., & Milgrom, J. (2008). Risk factors for antenatal depression, postnatal depression and parenting stress. *BioMed Central Psychiatry, 8*(24), doi: 10.1186/1471-244X-8-24.
- Lim, G. Y., Tam, W. W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of depression in the community from 30 countries between 1994 and 2014. *Scientific Reports, 8*(2861), 1-10. doi:10.1038/s41598-018-21243-x.
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression, Anxiety, Stress Scales (DASS) with the Beck Depression and Anxiety inventories. *Behaviour Research and Therapy, 33*(3), 335-343. doi: 10.1016/0005-7967(94)00075-U.
- Meads, R., & Ayers, S. (2011). Anxiety measures validated in perinatal populations: A systematic review. *Journal of Affective Disorders, 133*(1-2), 1-15. doi: 10.1016/j.jad.2010.10.009.
- Mikšić, Š., Miškulin, M. Juranić, B., Rakošec, Ž., Včev, A., & Degmečić, D. (2018). Depression and suicidality during pregnancy. *Psychiatria Danubina, 30*(1), 85-90. doi: 10.24869/psyd.2018.85.
- Moehler, E., Kagan, J., Parzer, P., Brunner, R., Reck, C., Wiebel, A., Poustka, L., & Resch, F. (2007). Childhood behavioral inhibition and maternal symptoms of depression. *Psychopathology, 40*(6), 446-452. doi: 10.1159/000107429.
- Mulder, E. J. H., Robles de Medina, P. G., Huizink, A. C., Van der Bergh, B. R. H., Buitelaar, J. K., & Visser, G. H. A. (2002). Prenatal maternal stress: effects on pregnancy and the (unborn) child. *Early Human Development, 70*(1-2), 3-14. doi: 10.1016/S0378-3782(02)00075-0.
- Nakić, S. (2011). *Prediktori razvoja poslijeporođajne depresije* [Predictors of postpartum depression]. (Unpublished doctoral dissertation). Zagreb: Faculty of Humanities and Social Sciences, University of Zagreb.
- Nakić Radoš, S., Herman, R., & Tadinac, M. (2015). Is the Predictability of New-Onset Postpartum Depression Better During Pregnancy or in the Early Postpartum Period? A Prospective Study in Croatian Women. *Health Care for Women International, 37*(1), 23-44. doi: 10.1080/07399332.2014.992522.

- Nakić Radoš, S., Tadinac, M., & Herman, R. (2013a). Prevalence of depression during pregnancy and postpartum in a sample of Croatian women. *Klinička psihologija*, 6(1-2), 79-93.
- Nakić Radoš, S., Tadinac, M., & Herman, R. (2013b). Validation study of the Croatian version of the Edinburgh Postnatal Depression Scale (EPDS). *Suvremena psihologija*, 16(2), 203-218.
- Nakić Radoš, S., Tadinac, M., & Herman, R. (2015). Development and validation of Pregnancy Concerns Scale. *Klinička psihologija*, 8(2), 151-166.
- Noble, R. E. (2005). Depression in women. *Metabolism Clinical and Experimental*, 54(1), 49-52. doi: 10.1016/j.metabol.2005.01.014.
- O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression – a meta-analysis. *International Review of Psychiatry*, 8(1), 37-54. doi: 10.3109/09540269609037816.
- Plant, D. T., Pariante, C. M., Sharp, D., & Pawlby, S. (2015). Maternal depression during pregnancy and offspring depression in adulthood: role of child maltreatment. *British Journal of Psychiatry*, 207, 213–220. doi: 10.1192/bjp.bp.114.156620.
- Reić Ercegovac, I., & Penezić, Z. (2012). Skala depresivnosti, anksioznosti i stresa [Depression, Anxiety, and Stress Scale]. In A. Proroković, V. Čubela Adorić, Z. Penezić and I. Tucak Junaković (Eds.), *Zbirka psihologijskih skala i upitnika [Collection of Psychological Scales and Questionnaires]* (Vol. 6), (pp. 15-22). Zadar: University of Zadar.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press. doi: 10.1515/9781400876136.
- Ross, L. E., Campbell, V. L. S., Dennis, C.-L., & Robertson Blackmore, E. (2006). Demographic characteristics of participants in studies of risk factors, prevention, and treatment of postpartum depression. *The Canadian Journal of Psychiatry*, 51(1), 704-710. doi: 10.1177/070674370605101107.
- Ross, L. E., Sellers, E. M., Gilbert Evans, S. E., & Romach, M. K. (2004). Mood changes during pregnancy and the postpartum period: development of a biopsychosocial model. *Acta Psychiatrica Scandinavica*, 109(6), 457-466. doi: 10.1111/j.1600-0047.2004.00296.x.
- Sun, H., Damez-Werno, D. M., Scobie, K. N., Shao, N. Y., Dias, C., Rabkin, J., ... Nestler, E. J. (2015). ACF chromatin-remodeling complex mediates stress-induced depressive-like behavior. *Nature Medicine*, 21(10), 1146-1153. doi: 10.1038/nm.3939.
- Tkalčić, M. (1998). *Psihoneuroimunološki aspekti bolesti alopecija areata* [Psychoneurobiological aspects of alopecia areata disease]. (Unpublished doctoral dissertation). Zagreb: Faculty of Humanities and Social Sciences, University of Zagreb.
- Vaux, A., Phillips, J., Holly, L., Thompson, B., Williams, D., & Stewart, D. (1986). The social support appraisals (SS-A) scale: Studies of reliability and validity. *American Journal of community psychology*, 14(2), 195-219. doi: 10.1007/BF00911821.

- Wichman, C. L., & Stern, T. (2015). Diagnosing and treating depression during pregnancy. *The Primary Care Companion for CNS Disorders*, 17(2). doi: 10.4088/PCC.15f01776.
- Zeng, Y., Cui, Y., & Li, J. (2015) Prevalence and predictors of antenatal depressive symptoms among Chinese women in their third trimester: a cross-sectional survey. *BioMed Central Psychiatry*, 15(66). doi: 10.1186/s12888-015-0452-7.
- Zuckerman, B., Amaro, H., Bauchner, H., & Cabral, H. (1989). Depressive symptoms during pregnancy: Relationship to poor health behaviors. *American Journal of Obstetrics & Gynecology*, 160, 1107–1111. doi: 10.1016/0002-9378(89)90170-1.

Body image satisfaction, perfectionism, and eating disorder symptoms in pregnant women

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Abstract

Background and aims: Different psychological determinants play a role in the development of disordered eating attitudes, among which are self-esteem, body image dissatisfaction, perfectionism, depressiveness, and anxiety. However, previous studies have rarely been focused on eating disorder symptoms in pregnant women whose body image changes during pregnancy. Therefore, the goal of this study was to examine the occurrence of eating disorder symptoms in pregnant women and to examine whether they could be predicted by body image satisfaction, self-esteem and perfectionism, after controlling for body mass index (BMI), gestational weight gain, depression, and anxiety symptoms.

Method: In a cross-sectional study, 285 pregnant women anonymously filled in questionnaires measuring eating disorder symptoms (Eating Attitudes Test, Adolescent Dieting Scale), perfectionism (Positive and Negative Perfectionism Scale), self-esteem (Rosenberg Self-Esteem Scale), body image satisfaction (Body Areas Satisfaction Scale), depression symptoms (Edinburgh

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Postnatal Depression Scale), and anxiety (subscale anxiety from Depression, Anxiety, and Stress Scale).

Results: Between 1-3% of the pregnant women reported extreme symptoms of eating disorders. Out of the whole sample, in 27.1% the physician prescribed a diet, mainly due to gestational diabetes. However, out of the women who were not prescribed a diet, 21.7% reported moderate to extreme dieting. A hierarchical regression analysis showed that eating disorder symptoms could be predicted by a higher body mass index, higher positive perfectionism, and anxiety. Anxiety had a differential role in predicting dieting behavior in the women who were prescribed a diet and the ones who were not.

Conclusion: To conclude, a notable proportion of the women report risky eating behaviors and attitudes which should be screened for as an integral part of standard prenatal care.

Keywords: pregnancy, eating disorders, dieting, body image satisfaction, perfectionism, anxiety

Introduction

Many young women are dissatisfied with their body shape and weight and attempt to modify their bodies by dieting and exercising. The ideal physical appearance nowadays implies a thin woman's body, while emphasizing its importance leads to dissatisfaction with the body, low self-esteem, and use of various strategies to achieve such a look (Fairbrun, 1990; Forbes et al., 2005). As many as 80% of girls are dissatisfied with the appearance and show a desire for weight loss (Trivunčić, 1998). One in two female students believes that her ideal weight is on average 3 to 4 kilograms lower than the current weight (Gladović, 1999). As a result, between 40% and 50% of high school girls and female students are dieting (Pokrajac-Bulian, Mohorić, & Đurović, 2007; Rukavina, 2002). The most extreme variations in eating attitudes, such as frequent dieting, binge eating or vomiting, were reported in as many as 7.7% of high-school girls. These negative attitudes towards eating and dieting can ultimately lead to eating disorders (Pokrajac-Bulian et al., 2007).

The lifetime prevalence of all eating disorders is approximately 5% (Hudson, Hiripi, Pope, & Kessler, 2007). Psychological factors in the development of eating disorders have been given great attention and it has been established that different psychological determinants play a role in their development, among which are body image dissatisfaction, self-esteem, perfectionism, depression, and anxiety (Novković, 2003).

The body image represents the mental image of a person's own physical appearance, its evaluation, and the impact of these perceptions and attitudes on behavior (Pokrajac-Bulian, Živčić Bećirević, Vukmanović, & Forbes, 2007). Dissatisfaction with the body can range from a slight dissatisfaction with spe-

cific parts of the body to the extreme disparaging looks (Ambrosi-Randić, 2004). Self-esteem is one of the psychological factors which may affect the formation and/or maintenance of eating disorders and is commonly used to refer to the global self-evaluation. Low self-esteem is a feature that is present in people with eating disorders. Among women with a diagnosed eating disorder, the perception of body weight and body satisfaction was more disturbed in the ones with low self-esteem than by those with high self-esteem (Ambrosi-Randić, 2004). In contrast, high self-esteem reduces pressures from the environment to achieve slimness and preoccupation with the physical appearance in students (Phan & Tylka, 2006).

Just as self-esteem, perfectionism is often examined in the context of eating disorders. Perfectionism is an aspiration for flawlessness in different aspects of own life (Flett & Hewitt, 2002). Women with eating disorders generally show a greater need to present themselves with the image of perfection and avoid revealing their imperfections to others (Vulić-Prtorić & Cifrek-Kolarić, 2011). Perfectionism is a multidimensional construct that can be manifested in both adaptive and maladaptive traits (Greblo, 2012). Terry-Short, Owens, Slade, and Dewey (1995) distinguish between the positive motivation that lies behind perfectionist behavior, which is driven by a desire to achieve success, and the negative, which is driven by a desire to avoid failure.

In women, the perception of own body changes as the phases of puberty, pregnancy, and menopause progress, due to structural, functional, and hormonal changes (Ambrosi-Randić, 2004). Pregnancy is a period in which a woman experiences profound physical, physiological, and psychosocial changes. Also, a pregnant woman experiences substantial alterations in the form and weight of her body over a short period of time. Although these changes are a natural part of pregnancy, pregnant women experience conflicts with their values and concepts of beauty and sensuality, which can affect their attitudes about their own bodies. Also, pregnant women are in conflict between personal concern for their appearance and maternal concern for the fetal health (Chang, Chao, & Kenney, 2006). Scarce literature shows that pregnant women may feel thicker and less attractive (Fox & Yamaguchi, 1997; Goodwin, Astbury, & McMeeken, 2000). The body image is quite stable during pregnancy, showing that those women who had some concerns about the appearance at the beginning of pregnancy remained concerned throughout the pregnancy (Duncombe, Wertheim, Skouteris, & Kelly, 2008). Body dissatisfaction in pregnancy is associated, among other things, with a number of factors including the importance of body image and eating restraint (Duncombe et al., 2008; Fuller-Tyszkiewicz et al., 2013).

Despite the fact that the body image of pregnant women has attracted the attention of today's researchers, there is a lack of research exploring the specific

impact of pregnancy on body image and eating disorders. Studies focusing on eating disorders during pregnancy were mainly considering this as a maternal characteristic with respect to the obstetrical and neonatal outcome, showing that women with eating disorders were at greater risk for giving birth to a newborn with lower birth weight or microcephaly, while women with bulimia nervosa were, additionally, at a higher risk of miscarriage (Koubaa, Hällström, Lindholm, & Hirschberg, 2005; Micali, Simonoff, & Treasure, 2007). On the other hand, a prospective study showed that the majority of women with eating disorders had no complications during pregnancy and childbirth. However, those women who had active symptoms of anorexia or bulimia nervosa during pregnancy had a higher rate of cesarean section and postpartum depression (Franko et al., 2001). Given that up to 5% of pregnant women have broadly defined eating disorders (Bulik et al., 2007), it is important to understand eating attitudes and risky behavior in pregnant women and their contributing factors. However, these have been rarely addressed so far. Given that anxiety and depression are quite prevalent during pregnancy, with the rate of 12-25% (Bennett, Einarson, Taddio, Koren, & Einarson, 2004; Giardinelli et al., 2012), and that anxiety and depression have been related to eating pathology (Kaye, 2008; Szmuckler, 1987), it is necessary to control them when examining predictors of eating disorder symptoms. Furthermore, given that a physician, based on medical indications, may prescribe pregnant women a diet, it is important to examine the predictors of eating disorder symptoms separately in women on a prescribed and non-prescribed diet.

Therefore, the aim of this study was twofold: 1) to examine the prevalence of eating disorder symptoms in pregnant women and 2) to examine whether eating disorder symptoms could be predicted by body image satisfaction, self-esteem, and perfectionism, after controlling for depressiveness, anxiety, BMI, and gestational weight gain, in women on a prescribed and non-prescribed diet. We could not set a specific hypothesis regarding women on a prescribed diet. However, we hypothesized that eating disorder symptoms in pregnant women who were not on a prescribed diet could be predicted, as in general population of women, by body image dissatisfaction, low self-esteem, and high perfectionism.

Method

Participants

Out of the 285 pregnant women, aged from 18 to 46 years ($M = 31.29$, $SD = 5.14$), the majority was married and had graduated from college or university. The majority was in the third trimester, with average gestation age of 32.5

weeks ($SD = 8.0$). Out of the whole sample, 27.4% were prescribed a diet by a physician/obstetrician and 23.9% had gestational diabetes. Previous psychiatric treatment was reported by 6.3% of the women, among whom three women

Table 1. Sociodemographic and obstetric data of the sample ($N=285$)

	<i>n</i> (%)
Marital status	
married	229 (80.3%)
cohabiting	47 (16.5%)
single	9 (3.2%)
Education	
graduated from elementary school	3 (1.1%)
graduated from secondary school	97 (34.0%)
graduated from college	37 (13.0%)
graduated from university	148 (51.9%)
Perceived socio-economic status	
below average	26 (9.1%)
average	169 (59.3%)
above average	90 (31.6%)
Employment status	
employed full-time	223 (78.2%)
employed part-time	20 (7.0%)
unemployed	42 (14.8%)
Place of residence	
village	44 (15.4%)
a town (up to 100 000 inhabitants)	66 (23.2 %)
a city over 100 000 inhabitants	175 (61.4%)
Previous psychiatric treatment ¹	18 (6.3 %)
Psychopharmacological treatment ¹	20 (7.0 %)
Family history of psychiatric illness ¹	55 (19.3 %)
Parity	
primiparous	158 (55.4%)
multiparous	127 (44.6 %)
Stage of pregnancy	
1 st trimester	12 (4.2%)
2 nd trimester	48 (16.8 %)
3 rd trimester	225 (78.9 %)
Diet prescribed by physician ¹	78 (27.4%)
Gestational diabetes ¹	68 (23.9%)

Note: ¹ Percentage of "yes"-responses

(1.0%) reported eating disorder. A complete description of the sample characteristics is shown in Table 1.

Instruments

The Eating Attitudes Test (EAT; Garner & Garfinkel, 1979) is a 40-item questionnaire and the most commonly used measure of eating disorder symptoms. In this study, a shorter version, EAT-26, was used (Garner, Olmsted, Bohr, & Garfinkel, 1982). Participants respond using a 6-point scale, where the most extreme answer (*always*) gets 3 points, *very often* gets 2, *often* gets 1 point, and answers *sometimes*, *rarely*, and *never* get 0. A total score is the sum of all items with a range from 0 to 78, whereby a higher score indicates pathological eating attitudes or behavior. It consists of three subscales: dieting (example item: "Feel extremely guilty after eating"), bulimia and food preoccupation (example item: "Have the impulse to vomit after meals"), and oral control (example item: "Avoid eating when I am hungry"). The EAT was validated in Croatian population with high reliability and the same three-factor structure (Ambrosi-Randić & Pokrajac Bulian, 2005). In the current study, the reliability of the internal consistency measured as Cronbach's α was .70.

The Adolescent Dieting Scale (ADS; Patton et al., 1997; adapted by Ambrosi-Randić, 2001) was used to assess dieting. The 8-item scale assesses three typical dieting strategies: counting calories, reducing the amount of food, and skipping meals (example item "Do you try to leave food at meal times in order to avoid putting on weight?"). A response is rated on a 4-degree scale ranging from 0 (*rarely* or *never*) to 3 (*almost always*), and the total score range is from 0 to 24. Dieting categories can be determined, where 15 to 24 points represents extreme diet, 7 to 14 moderate, 1 to 6 minimum, and 0 points a non-diet. In the current study, Cronbach's α was .82.

The Body Areas Satisfaction Scale (BASS; Winstead & Cash, 1984; a modified version by Ambrosi-Randić, 1994) measures satisfaction with different parts of the body, including face parts, hair, lower, middle, and upper body parts, muscular tension, body weight, body height, and overall body appearance. The task of a participant is to report satisfaction on a 5-degree scale, from *very dissatisfied* (1) to *very satisfied* (5). The score ranges from 14 to 70, whereby a higher score indicates greater satisfaction with the body. In the current study, Cronbach's α was 0.92.

The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) measures global value orientation towards oneself. It consists of 10 statements, five in a positive and five in a negative direction (example item: "On the whole, I am satisfied

with myself"). The total score is determined by summing the 5-degree scale estimation scores (0 = *strongly disagree*, 4 = *strongly agree*), with the total range from 0 to 40, whereby a higher score reflects higher levels of self-esteem. The Cronbach's α ranged from .81 to .84 in the Croatian samples (Bezinović, 1988; Tkalčić, 1990). In this study, α was 0.81.

The Positive and Negative Perfectionism Scale (PNPS; Terry-Short et al., 1995) contains 40 items, whereby 20 refer to positive and 20 to negative perfectionism (example item: "I set impossibly high standards for myself"). The task of the participants was to report agreement with each statement on a 5-degree scale (from 1 = *disagree* to 5 = *completely agree*). The theoretical range of results for both subscales is from 20 to 100. The scale was translated into Croatian with high Cronbach's α of .79 and .90 for positive and negative perfectionism, respectively (Kapetanović, 2008). In this study, Cronbach's α was .89 and .90 for positive and negative perfectionism, respectively.

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) measures the depressive symptoms of women after childbirth and is also validated for use in pregnancy (Su et al., 2007). On a 10-item scale, participants estimate the severity of symptoms in the previous week on a scale from 0 to 3, with a total score ranging from 0 to 30, whereby a higher score indicates higher depression (example item: "I have been so unhappy that I have been crying", *yes, most of the time; yes, quite often; only occasionally; no, never*). The scale does not include somatic symptoms that could overlap with normal physical changes during pregnancy but assesses the cognitive and behavioral symptoms of depression and anxiety (Matthey, Fisher, & Rowe, 2013). The scale was translated into Croatian and validated (Nakić Radoš, Tadinac, & Herman, 2013). The Cronbach's α on this sample was .85.

The Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) comprises 42 items that assess the level of depression, anxiety, and stress. The DASS-21 is a shorter version, in which three subscales are described by seven items, and a higher score on each subscale indicates higher levels of symptoms. For the purpose of this research, only the anxiety subscale was used (example item: "I felt scared without any good reason"). The participant's task was to respond on a scale from 0 (*never*) to 3 (*almost always*) to the frequency of the symptoms in the previous week. In this study, Cronbach's α for anxiety subscale was .92.

The general information sheet comprised questions on sociodemographic data (age, marital status, educational level, perceived socio-economic status, place of residence, and employment status), previous psychiatric and psychopharmacological treatments, and obstetric variables (parity, gestational age,

weight and height, gestational weight gain, diet prescribed by physician, gestational diabetes). The BMI before pregnancy was calculated.

Procedure

The cross-sectional study is part of a larger study conducted at the Department of Obstetrics and Gynecology, University Hospital Centre "Sisters of Mercy" in Zagreb. The study was approved by the Ethics Committees of the Catholic University of Croatia and University Hospital Centre "Sisters of Mercy", respectively. Before signing the informed consent, the purpose of the research was explained to the participants. They completed the questionnaires anonymously while waiting for their regular prenatal check-up. The study was conducted in April and May 2017.

Results

Descriptive data of the EAT-26 and ADS score show a low occurrence of eating disorder symptoms among the pregnant women on average (Table 2). However, 2.8% of the pregnant women scored above the cut-off score on the EAT-26 and 1.1% reported extreme dieting on the ADS. Still, the majority of the women reported minimal dieting on the ADS (74.8%) and one in four women reported intermediate diet (24.4%). Furthermore, due to the fact that 27% of the women

Table 2. *Descriptive analysis of eating disorder symptoms and other psychological variables in pregnant women (N=285)*

	No of items	Score range	α	Min	Max	<i>M</i>	<i>SD</i>
Eating Attitude Test (EAT)	26	0-78	.70	2	27	7.5	4.5
Adolescent Dieting Scale (ADS)	8	0-24	.82	0	18	4.3	3.6
Body Image Satisfaction	14	14-70	.92	16	75	58.0	9.3
Self-esteem	10	0-40	.81	16	40	31.2	5.3
Positive Perfectionism	20	20-100	.89	39	98	72.9	10.2
Negative Perfectionism	20	20-100	.90	19	83	50.4	11.4
Depressiveness	10	0-30	.85	0	20	6.1	4.6
Anxiety	7	0-21	.92	0	15	3.2	3.4

reported that their physician prescribed them a diet, which was similar to the percentage of the women who were intermediate or extreme dieting, we wanted to examine the overlap between these women. Out of 207 women who were

Table 3. Pearson's correlation coefficients between sociodemographic, obstetric, and psychological variables with the EAT-26 and ADS

	EAT-26	ADS
Sociodemographic		
Age	-.02	.16**
Education level ¹	.09	.08
Work status ²	.05	-.01
Perceived socioeconomic status ³	.03	.05
Marital status ⁴	.01	-.01
Place of residence ⁵	.02	.09
History of psychopathology		
Depressiveness > 2 weeks	.06	.11
Psychiatric treatment ⁷	.02	.13*
Psychopharmacological treatment ⁷	-.00	.17*
Family history of psychiatric illness ⁷	.06	.02
Obstetric		
Parity ⁶	-.01	.07
Planned pregnancy ⁷	.05	.03
Gestational diabetes ⁷	.07	.13*
Insulin intake ⁷	.04	-.01
Diet prescribed by physician ⁷	.09	.15*
Body Mass Index (kg/m ²)	-.03	.29**
Gestational Weight Gain (kg)	-.02	-.07
Psychological variables		
Body image satisfaction	.07	-.14*
Self-esteem	.01	-.03
Positive perfectionism	.34**	.26**
Negative perfectionism	.18**	.17**
Depression	.04	.11
Anxiety	.05	.16**

Note: * $p < .05$, ** $p < .01$; ¹ Educational level: 1=graduated from elementary school, 2=graduated from secondary school, 3=graduated from college, 4=graduated from university; ²Work status: 1=regularly employed, 2=partially employed, 3=unemployed; ³ Perceived socioeconomic status: 1=below average, 2=average, 3=above average; ⁴ Marital status: 1=married, 2=cohabiting, 3=single; ⁵Place of residence: 1=village, 2=a town (up to 100 000 inhabitants), 3=a city over 100 000 inhabitants; ⁶Parity: 1=primiparous, 2=multiparous; ⁷1=no, 2=yes.

not prescribed a diet by their physician, there were 45 women, or 21.7%, who reported symptoms of an eating disorder (43 women with intermediate and 2 women with extreme dieting).

Next, the correlations between sociodemographic, obstetric, and psychological variables with eating disorder symptoms were examined (Table 3). Older age, previous psychiatric or psychopharmacological treatment, higher BMI, and prescription of a diet by a physician were significantly related to dieting reported on the ADS. Of the psychological variables, higher levels of positive perfectionism, negative perfectionism and anxiety, and lower levels of body image satisfaction were related to higher levels of eating disorder symptoms.

Table 4. Results of the multiple regression analysis with the EAT-26 as the criterion in pregnant women on prescribed (N=78) and non-prescribed diet (N=207)

	Prescribed diet (N = 78)			Non-prescribed diet (N = 207)		
	<i>b</i>	<i>SE b</i>	β	<i>b</i>	<i>SE b</i>	β
Step 1						
Constant	5.77	3.43		10.62	2.20	
Body Mass Index (kg/m ²)	0.11	0.12	.13	-0.17	0.09	-.13
Gestational Weight Gain (kg)	0.06	0.09	.09	-0.02	0.05	-.03
Depressiveness	-0.01	0.15	-.01	0.02	0.09	.02
Anxiety	-0.29	0.21	-.21	0.18	0.11	.14
	<i>R</i> ² = .047 <i>F</i> = 0.91; <i>p</i> = .465			<i>R</i> ² = .036 <i>F</i> = 1.86; <i>p</i> = .120		
Step 2						
Constant	-11.41	7.07		-0.62	4.64	
Body Mass Index (kg/m ²)	-0.01	0.11	-.01	-0.17	0.09	-.14
Gestational Weight Gain (kg)	0.03	0.08	.05	-0.02	0.05	-.03
Depressiveness	0.02	0.14	.02	-0.02	0.09	-.02
Anxiety	-0.37	0.19	-.26	0.17	0.11	.13
Body Image Satisfaction	0.07	0.05	.15	0.02	0.04	.04
Self-esteem	0.04	0.11	.04	0.00	0.07	.00
Positive Perfectionism	0.18	0.05	.44**	0.11	0.04	.24**
Negative Perfectionism	0.04	0.06	.11	0.05	0.07	.12
	$\Delta R^2 = .243$ <i>F</i> = 5.88; <i>p</i> = .000 <i>R</i> ² = .290 <i>F</i> = 3.52; <i>p</i> = .002			$\Delta R^2 = .091$ <i>F</i> = 5.14; <i>p</i> = .001 <i>R</i> ² = .127 <i>F</i> = 3.58; <i>p</i> = .001		

Note: **p* < .05, ***p* < .01.

Finally, a hierarchical regression analysis was carried out to examine whether eating disorder symptoms in the pregnant women could be predicted by body image satisfaction, self-esteem, and perfectionism, after controlling for anxiety, depression, BMI, and gestational weight gain. Given that the correlational analysis showed that women who were prescribed a diet by their physician reported a higher score on dieting and that there were pregnant women who were not prescribed a diet but were dieting anyway, we performed separate regression analyses for the women on a prescribed and non-prescribed diet. Also, we repeated the analysis using the EAT-26 (Table 4) and ADS as the criterion (Table 5). Using the EAT-26 as a measure of eating disorder symptoms, it was established that higher perfectionism was a positive predictor in both groups.

Table 5. Results of the multiple regression analysis with the ADS as the criterion in pregnant women on prescribed (N=78) and non-prescribed diet (N=207)

	Prescribed diet (N=78)			Non-prescribed diet (N=207)		
	<i>b</i>	<i>SE b</i>	β	<i>b</i>	<i>SE b</i>	β
Step 1						
Constant	-2.70	2.60		-1.09	1.70	
Body Mass Index (kg/m ²)	0.32	0.09	.44**	0.19	0.07	.19**
Gestational Weight Gain (kg)	0.06	0.07	.11	-0.00	0.04	-.01
Depressiveness	0.10	0.11	.12	-0.02	0.07	-.03
Anxiety	-0.32	0.16	-.27	0.27	0.09	.26**
	$R^2 = .186$ $F = 4.17; p = .004$			$R^2 = .105$ $F = 5.92; p = .000$		
Step 2						
Constant	-11.88	5.87		-5.50	3.64	
Body Mass Index (kg/m ²)	0.28	0.09	.38**	0.17	0.07	.16*
Gestational Weight Gain (kg)	0.06	0.07	.11	-0.00	0.04	-.00
Depressiveness	0.08	0.12	.10	-0.05	0.07	-.07
Anxiety	-0.38	0.16	-.33*	0.26	0.09	.25**
Body Image Satisfaction	-0.01	0.04	-.03	-0.05	0.03	-.12
Self-esteem	0.08	0.09	.12	0.04	0.06	.07
Positive Perfectionism	0.07	0.04	.20	0.07	0.03	.19*
Negative Perfectionism	0.06	0.05	.19	0.02	0.03	.07
	$\Delta R^2 = .086$ $F = 2.03; p = .099$ $R^2 = .272$ $F = 3.22; p = .004$			$\Delta R^2 = .061$ $F = 3.60; p = .007$ $R^2 = .166$ $F = 4.91; p = .000$		

Note: * $p < .05$, ** $p < .01$.

However, an interesting pattern was observed when the ADS was used as a measure of eating disorder symptoms. In both groups, the symptoms could be predicted by higher BMI and anxiety. However, anxiety had a differential role in prediction for the prescribed and non-prescribed diet group. Namely, in the non-prescribed diet group, higher levels of anxiety predicted more dieting. On the other hand, in the prescribed diet group, lower levels of anxiety predicted more dieting. These predictors accounted for the significant amount of eating disorder symptoms variance, with the somewhat lower percentage of variance explained in the non-prescribed diet group (12.7%-16.6%) than in the prescribed diet group (27.2%-29.0%).

Discussion

Given that the previous research has given very little attention to eating disorders symptoms during pregnancy, the aim of this study was to examine their occurrence and predictors. Owing to the lack of research exploring the disordered eating attitudes in pregnant women, we could not predict the occurrence of these attitudes and behaviors in this specific situation. However, the results showed a low occurrence of extreme eating disorder symptoms among the pregnant women (1-3%), with the majority of the women reporting minimal dieting. One in four women were prescribed a diet by their physician or obstetrician, mainly as a way of controlling gestational diabetes. However, a result which should raise a concern was that 22% of the women who were not prescribed a diet by a physician were dieting anyway. This result emphasizes the importance of nutritional and psychological assessment of women during pregnancy when screening for eating disorder symptoms should be applied. Dieting during pregnancy is sometimes necessary and considered a desirable health behavior for the neonatal outcome. On the other hand, when dieting is not under expert control and when women themselves engage in different dieting behaviors, it can have detrimental effects, being a risk factor for neural tube defect, miscarriage, lower birth weight, and cesarean section (Carmichael, Shaw, Schaffer, Laurent, & Selvin, 2003; Franko et al., 2001; Koubaa et al., 2005; Micali et al., 2007).

Furthermore, based on the literature in general, we hypothesized that body image dissatisfaction, low self-esteem, and high perfectionism would be significant predictors of disordered eating attitudes in pregnant women (Novković, 2003). This hypothesis was partially supported by the results. Namely, lower body image satisfaction was related to higher levels of dieting. However, after controlling for BMI and anxiety, it was no longer a significant predictor, nor was self-esteem. On the other hand, in line with the expectations, perfectionism was

a significant predictor of dieting. There are a number of studies that indicate the association between perfectionism and eating disorders, showing that both dimensions of perfectionism, the adaptive and non-adaptive, were positively associated with eating disorders (Davis, 1997). However, in this study, positive perfectionism, but not the negative perfectionism, was a significant predictor of eating disorder symptoms. Although positive and negative perfectionism are in low positive association (Lauri Korajlija, 2005; Terry-Short et al., 1995), these traits can act independently (Molnar, 2006). Also, it is important to emphasize that, in this study, positive perfectionism was a significant predictor of eating disorder symptoms in both women who have been prescribed diet and women who have not. Positive perfectionism has, in its core, a positive motivation as striving for success (Terry-Short et al., 1995) and can be seen as a preferred feature in the healthcare setting. Namely, these women could find it easier to maintain a diet, which is beneficial when a diet is a part of prescribed prenatal care. However, dieting in the group of women who have not been prescribed a diet was also predicted by positive perfectionism, which is in line with the notion that both positive and negative perfectionism can be maladaptive in the context of eating disorders (Bardone-Cone et al., 2007).

An interesting result of this study was the importance of anxiety role in the dieting behavior during pregnancy. Considering that eating pathology has the purpose of emotion regulation, it was justified to examine the role of anxiety in eating disorder symptoms (Heatherton & Baumeister, 1991). Namely, in our study anxiety predicted dieting both in the women on a prescribed and non-prescribed diet, but with a different direction. In the women on a prescribed diet, lower levels of anxiety predicted higher adherence to dieting, while in the women on a non-prescribed diet, higher levels of anxiety predicted higher levels of dieting. Although the cross-sectional design cannot explain the cause-effect relationship, we may speculate that the women with a diet prescription who exhibited more dieting felt less anxious because they followed their obstetrician's advice and promoted good prenatal health behavior. On the other hand, the women without the necessity to follow a medical diet during pregnancy were driven by higher levels of anxiety in their dieting behavior. This is consistent with previous studies showing a relationship between eating disorder and anxiety. One in two women with anorexia nervosa also have co-morbid at least one anxiety disorder, which mostly has the onset before anorexia (Kaye, 2008). Similarly to this, in patients with bulimia nervosa, there is also a history of anxiety disorders where in most cases anxiety disorders preceded the bulimia (Bulik et al., 1996).

Several limitations of the study should be addressed. First of all, this was a cross-sectional study with self-evaluation questionnaires and a diagnostic in-

terview was not administered, which should be included in order to establish the presence of an eating disorder based on diagnostic criteria. Furthermore, the sample was not equally represented in all trimesters and the majority was in the third trimester of the pregnancy. Since a previous study showed that body image dissatisfaction is more pronounced in the first and the second trimesters of the pregnancy (Skouteris, Carr, Wertheim, Paxton, & Duncombe, 2005), future studies should follow women prospectively throughout the pregnancy. Finally, the timing of the study could have affected the results. Namely, the study was conducted in April and May, preceding the summer, a period when women pay somewhat more attention to their body and dieting. Also, future studies should investigate whether the increased dieting during pregnancy is a normative behavior with a goal of providing healthy food and adequate nutrition for the own and fetal health or if it presents the risk of a newly-onset eating disorder during pregnancy.

To conclude, the majority of the pregnant women do not report disordered eating attitudes nor engage in the extreme dieting. However, a small proportion of the women (1-3%) report risky eating attitudes and behaviors which can be predicted by positive perfectionism, body mass index, and anxiety. What is worrying is that about 20% of the pregnant women who were not prescribed a diet by their physician engage in dieting and risky behavior. Bulik et al. (2007) point out that pregnancy is an opportunity for women with eating disorders to confront their problems and decrease their bulimic behavior, just as women in pregnancy quit smoking or cut down on alcohol intake. However, for other women, it is a time of vulnerability, especially the time for binge eating, driven by the interplay of neurobiological and psychological factors. Also, Davies and Wardle (1994) showed that, although pregnant women had fewer dietary restraints than non-pregnant women, they retained the same body size ideals as non-pregnant women. Therefore, screening for risky eating habits and dieting should be a part of the standard prenatal care. Pregnant women should be offered nutritional advice and psychological support in order to detect and prevent psychopathology, with the view to ensure optimal maternal and child health (Meireles, Neves, Carvalho, & Ferreira, 2017). Standard prenatal care should be accompanied by education and counseling about a healthy lifestyle during pregnancy and postpartum focused on achieving the desired body image rather than the desired weight.

References

- Ambrosi-Randić, N. (1994). Validation of body image construct in 19-year-old men. (Unpublished master thesis). Zagreb: University of Zagreb.

- Ambrosi-Randić, N. (2001). Učestalost i korelati provođenja dijetе u adolescenciji [Frequency and correlates of dieting in adolescence]. *Društvena istraživanja*, 10(1), 415-430.
- Ambrosi-Randić, N. (2004). *Razvoj poremećaja hranjenja* [Development of eating disorders]. Jastrebarsko: Naklada Slap.
- Ambrosi-Randić, N., & Pokrajac-Bulian, A. (2005). Psychometric properties of the eating attitudes test and children's eating attitudes test in Croatia. *Eating and Weight Disorders*, 10, e76–e82. doi:10.1007/BF03327495
- Bennett, H. A., Einarson, A., Taddio, A., Koren, G., & Einarson, T. R. (2004). Prevalence of depression during pregnancy: systematic review. *Obstetrics & Gynecology*, 103(4), 698-709. doi:10.1097/01.AOG.0000116689.75396.5f
- Bezinović, P. (1988). *Samopercepcija osobne kompetentnosti kao dimenzija vrednovanja vlastitog ja* [Self-perception of personal competency as a dimension of self-evaluation]. (Unpublished doctoral dissertation). Zagreb: Faculty of Humanities and Social Sciences.
- Bardone-Cone, A. M., Wonderlich, S. A., Frost, R. O., Bulik, C. M., Mitchell, J. E., Uppala, S., & Simonich, H. (2007). Perfectionism and eating disorders: Current status and future directions. *Clinical Psychology Review*, 27(3), 384-405. doi:10.1016/j.cpr.2006.12.005
- Bulik, C.M., Sullivan, P.F., & Joyce, P.R. (1996). The significance of a history of childhood sexual abuse in bulimia nervosa. *Journal of Clinical and Forensic Medicine*, 3, 187.
- Bulik, C. M., Von Holle, A., Hamer, R., Berg, C. K., Torgersen, L., Magnus, P., ... & Reichborn-Kjennerud, T. (2007). Patterns of remission, continuation and incidence of broadly defined eating disorders during early pregnancy in the Norwegian Mother and Child Cohort Study (MoBa). *Psychological Medicine*, 37(8), 1109-1118. doi:10.1017/S0033291707000724
- Carmichael, S. L., Shaw, G. M., Schaffer, D. M., Laurent, C., & Selvin, S. (2003). Dieting behaviors and risk of neural tube defects. *American Journal of Epidemiology*, 158(12), 1127-1131. doi: 10.1093/aje/kwg286
- Chang, S.-R., Chao, Y.-M., & Kenney, N. J. (2006). I am a woman and I'm pregnant: Body image of women in Taiwan during the third trimester of pregnancy. *Birth*, 33(2), 147–153. doi:10.1111/j.0730-7659.2006.00087.x
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh postnatal depression scale. *British Journal of Psychiatry*, 150, 782-786. doi:10.1192/bjp.150.6.782
- Davies, K., & Wardle, J. (1994). Body image and dieting in pregnancy. *Journal of Psychosomatic Research*, 38(8), 787-799. doi:10.1016/0022-3999(94)90067-1
- Davis, C. (1997). Normal and neurotic perfectionism in eating disorders: An interactive model. *International Journal of Eating Disorders*, 22, 421–426. doi:10.1002/(SICI)1098-108X(199712)22:4<3C421::AID-EAT7%3E3.0.CO;2-O
- Duncombe, D., Wertheim, E. H., Skouteris, H., Paxton, S.J., & Kelly, L. (2008). How well do women adapt to changes in their body size and shape across the course of pregnancy. *Journal of Health Psychology*, 13(4), 503-515. doi:10.1177/1359105308088521

- Fairburn, C. G., & Welch, S. L. (1990). The impact of pregnancy on eating habits and attitudes to shape and weight. *International Journal of Eating Disorders*, 9(2), 153-160. doi:10.1002/1098-108X(199003)9:2%3C153::AID-EAT2260090204%3E3.0.CO;2-8
- Flett, G. L., & Hewitt, P. L. (2002). *Perfectionism: Theory, research, and treatment*. Washington: American Psychological Association.
- Forbes, G. B., Adam-Curtis, L., Jobe, R. L., White, K. B., Revak, J., Živčić-Bećirević, I., Pokrajac-Bulian, A. (2005). Body dissatisfaction in college women and their mothers: Cohort effects, developmental effects, and the influences of body size, sexism, and the thin body ideal. *Sex Roles*, 53, 281-298. doi:10.1007/s11199-005-5686-2
- Fox, P., & Yamaguchi, C. (1997). Body image change in pregnancy: A comparison of normal weight and overweight primigravidas. *Birth*, 24(1), 35-40. doi:10.1111/j.1523-536X.1997.00035.pp.x
- Franko, D. L., Blais, M. A., Becker, A. E., Delinsky, S. S., Greenwood, D. N., Flores, A. T., ... & Herzog, D. B. (2001). Pregnancy complications and neonatal outcomes in women with eating disorders. *American Journal of Psychiatry*, 158(9), 1461-1466. doi:10.1176/appi.ajp.158.9.1461
- Fuller-Tyszkiewicz, M., Skouteris, H., Watson, B.E., & Hill, B. (2013). Body dissatisfaction during pregnancy: a systematic review of cross-sectional and prospective correlates. *Journal of Health Psychology*, 18(11), 1411-1421. doi:10.1177/1359105312462437
- Garner, D. M., & Garfinkel, P. E. (1979). The Eating Attitudes Test: An index of the symptoms of anorexia nervosa. *Psychological Medicine*, 9, 273-279. doi:10.1017/S0033291700030762
- Garner, D. M., Olmsted, M. P, Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878. doi: 10.1017/S0033291700049163
- Giardinelli, L., Innocenti, A., Benni, L., Stefanini, M. C., Lino, G., Lunardi, C., Svelto, V., Afshar, S., Bovani, R., Castellini, G., & Faravelli, C. (2012). Depression and anxiety in perinatal period: prevalence and risk factors in an Italian sample. *Archives of Women's Mental Health*, 15, 21-30. doi:10.1007/s00737-011-0249-8
- Gladović, B. (1999). *Nezadovoljstvo vlastitim tjelesnim izgledom kod studenata i studentica [Body image dissatisfaction in male and female students]*. (Unpublished diploma thesis). Rijeka: University of Rijeka.
- Goodwin, A., Astbury, J., & McMeeken, J. (2000). Body image and psychological well-being in pregnancy: A comparison of exercisers and non-exercisers. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 40(4), 442-447. doi:10.1111/j.1479-828X.2000.tb01178.x
- Greblo, Z. (2012). Što se skriva iza pojma "perfekcionizam"? Povijest proučavanja i pregled različitih konceptualizacija perfekcionizma [What is hidden behind the term "perfectionism"? History of different conceptualisation of perfectionism]. *Psihologijske teme*, 21(1), 195-212.
- Heatherton, T. F., Baumeister, R. F. (1991). Binge eating as an escape from self-awareness. *Psychological Bulletin*, 110, 86-108.

- Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological psychiatry*, *61*(3), 348-358. doi:10.1016/j.biopsych.2006.03.040
- Kapetanović, A. (2008). *Samopoštovanje i perfekcionizam kod srednjoškolki i studentica [Self-esteem and perfectionism in female and male high-school students]*. (Unpublished diploma thesis). Zagreb: University of Zagreb.
- Kaye, W. (2008). Neurobiology of anorexia and bulimia nervosa. *Physiology and Behavior*, *94*, 121-135. doi:10.1016/j.physbeh.2007.11.037
- Kouba, S., Hällström, T., Lindholm, C., & Hirschberg, A. L. (2005). Pregnancy and neonatal outcomes in women with eating disorders. *Obstetrics & Gynecology*, *105*(2), 255-260. doi:10.1097/01.AOG.0000148265.90984.c3
- Lauri Korajlija, A. (2005). *Povezanost perfekcionizma i atribucijskog stila s depresivnošću i anksioznošću [Relationship between perfectionism and negative attributional style with depression and anxiety]*. (Unpublished master thesis). Zagreb: University of Zagreb.
- Leight, K. L., Fitelson, E. M., Weston, C. A., & Wisner, K. L. (2010). Childbirth and mental disorders. *International Review of Psychiatry*, *22*, 453-471. doi:10.3109/09540261.2010.514600
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales*. (2nd. Ed.). Sydney: Psychology Foundation.
- Matthey, S., Fisher, J., & Rowe, H. (2013). Using the Edinburgh postnatal depression scale to screen for anxiety disorders: Conceptual and methodological considerations. *Journal of Affective Disorders*, *146*(2), 224-230. doi:10.1016/j.jad.2012.09.009
- Meireles, J. F. F., Neves, C. M., Carvalho, P. H. B., & Ferreira, M. E. C. (2017). Body image, eating attitudes, depressive symptoms, self-esteem and anxiety in pregnant women of Juiz de Fora, Minas Gerais, Brazil. *Ciencia & Saúde Coletiva*, *22*(2), 437-445. doi:10.1590/1413-81232017222.23182015
- Micali, N., Simonoff, E., & Treasure, J. (2007). Risk of major adverse perinatal outcomes in women with eating disorders. *The British Journal of Psychiatry*, *190*(3), 255-259. doi:10.1192/bjp.bp.106.020768
- Molnar, M. (2006). *Povezanost perfekcionizma sa samopoštovanjem i zadovoljstvom kvalitetom života [Relationship between perfectionism, self-esteem, and satisfaction with life]*. (Unpublished diploma thesis). Zagreb: University of Zagreb.
- Nakić Radoš, S., Tadinac, M., & Herman, R. (2013b). Validation study of the Croatian version of the Edinburgh Postnatal Depression Scale (EPDS). *Suvremena psihologija*, *16*(2), 203-218.
- Novković, G. (2003). *Odrednice provođenja dijete kod adolescentica [Determinants of dieting in adolescents]*. (Unpublished diploma thesis). Zagreb: University of Zagreb
- Patton, G. C., Carlin, J. B., & Shao, Q. (1997). Adolescent dieting: Healthy weight control or borderline eating disorder? *Journal of Child Psychology and Psychiatry*, *38*, 299-306. doi:10.1111/j.1469-7610.1997.tb01514.x

- Phan, T., & Tylka, T. L. (2006). Exploring a model and moderators of disordered eating with Asian American college women. *Journal of Counseling Psychology, 53*(1), 36-47. doi:10.1037/0022-0167.53.1.36
- Pokrajac-Bulian, A., Mohorić, T., & Đurović, D. (2007). Odstupajuće navike hranjenja, nezadovoljstvo tijelom i učestalost provođenja dijete kod hrvatskih srednjoškolaca [Disturbed eating habits, body dissatisfaction, and dieting frequency in Croatian secondary school students]. *Psihologijske teme, 16*, 27-46.
- Pokrajac-Bulian, A., Živčić-Bećirević, I., Vukmanović, S., & Forbes, G. (2005). Nezadovoljstvo tjelesnim izgledom i navike hranjenja kod studentica i njihovih majki [Body dissatisfaction and eating habits in college student and their mothers]. *Psihologijske teme, 14*(1), 57-70.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rukavina, T. (2002). *Internalizacija ideala tjelesnoga izgleda, nezadovoljstvo tijelom i simptomi poremećaja hranjenja kod adolescenata* [Thin-ideal internalization, body dissatisfaction and symptoms of eating disorders in adolescents]. (Unpublished diploma thesis). Rijeka: University of Rijeka.
- Skouteris, H., Carr, R., Wertheim, E. H., Paxton, S. J., & Duncombe, D. (2005). A prospective study of factors that lead to body dissatisfaction during pregnancy. *Body Image, 2*, 347-361. doi:10.1016/j.bodyim.2005.09.002
- Su, K.-P., Chiu, T.-H., Huang, C.-L., Ho, M., Lee, C.-C., Wu, P.-L., . . . Pariente, C. M. (2007). Different cut-off points for different trimesters? The use of Edinburgh postnatal depression scale and Beck depression inventory to screen for depression in pregnant Taiwanese women. *General Hospital Psychiatry, 29*(5), 436-441. doi:10.1016/j.eurpsy.2007.01.1074
- Szmuckler, G. (1987). Some comments on the link between anorexia nervosa and affective disorder. *International Journal of Eating Disorders, 6*, 181-189.
- Terry-Short, L. A, Owens, R. G, Slade, P. D. and Dewey, M. E. (1995). Positive and negative Perfectionism. *Personality and Individual Differences, 18*(5), 663-668. doi:10.1016/0191-8869(94)00192-U
- Tkalčić, M. (1998). *Psihoneuroimunološki aspekti bolesti alopecija areata* [Psychoneurobiological aspects of alopecia areata disease]. (Unpublished doctoral dissertation). Zagreb: Faculty of Humanities and Social Sciences, University of Zagreb.
- Trivunčić, S. (1998). *Validacija inventara poremećaja hranjenja i Skale stavova prema hranjenju* [Validation of Eating Disorder Inventory and Eating Attitude Test]. (Unpublished diploma thesis). Rijeka: University of Rijeka.
- Vulić-Prtorić, A., & Cifrek-Kolarić, M. (2011). *Istraživanja u razvojnoj psihopatologiji* [Research in developmental psychopathology]. Jastrebarsko: Naklada Slap.
- Winstead, B. A., & Cash, T. F. (1984). *Reliability and validity of the Body-Self Relations Questionnaire: A new measure of body image*. New Orleans: Southeastern Psychological Association Convention.

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