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PERSONALITY TRAITS AS PREDICTORS OF DOMAIN SPECIFIC FLOW PRONENESS

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Abstract

To gain a full understanding of the factors predicting flow experience, it is important to consider personality and situational factors simultaneously. The aim of this study was to assess whether the association between personality traits and flow proneness differs across domains. Since there are some inconsistencies in findings related to which personality traits predict flow proneness, in this study we hypothesized that personality traits predict flow differently, depending on the domain in which it is experienced (studying, routine activities, leisure and playing an instrument). The participants were 165 students of the Academy of Music of the University of Zagreb, with a mean age of 20 years. Personality traits were measured by the International Personality Item Pool (IPIP50) and flow proneness in specific domains was measured with an adapted Swedish Flow Proneness Questionnaire. Hierarchical regression analysis showed that conscientiousness is the most consistent predictor of flow proneness, being a significant predictor of flow in all domains. It was the only significant predictor of flow in routine activities. Other significant personality predictors were emotional stability for flow during leisure and studying, extraversion for flow while studying, and intellect for flow during the playing of music. The study provides support for autotelic personality but also gives an insight into personality traits relevant for situation-specific flow proneness. While the hypothesis that different personality traits predict flow in different domains was supported, it was also found that conscientiousness is the most consistent predictor of flow in all situational settings.

Keywords: Big Five personality model, flow, students.

1. Introduction

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Flow is a state of intrinsic motivation in which a person is fully immersed in the task at hand for the sake of the activity itself (Csikszentmihalyi, 2000). Csikszentmihalyi coined the term flow while researching during the 1960s the creative process in artists. Artists would be totally immersed in their work, forgetting hunger and fatigue, but when the artwork was done, they would completely lose interest in it. This kind of activity is called *autotelic* (Greek: auto – self, thelos - goal) – the activity itself is intrinsically rewarding or self-rewarding. So, when in flow, a person is doing an activity for its own sake and not for an external reward.

In flow, during a state of high concentration on the task, consciousness is fully invested in the current activity, which leads to other commonly reported characteristics of flow: the merging of action and awareness, the loss of self-awareness, an altered sense of time, and a sense of control (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005; Nakamura & Csikszentmihalyi, 2002). The person is totally immersed in the activity that he or she is doing, so everything else, even the self, fails to enter awareness. The feeling of time passing by is lost, and minutes can seem like hours, or vice versa. Finally, the person has a feeling that he or she can control his or her actions, and adequately respond to whatever happens next.

It can even be said that a flow state makes life worth living (Csikszentmihalyi & Csikszentmihalyi, 2006). It is positively related to indicators of well-being, such as life satisfaction (Asakawa, 2010; Olčar, Rijavec, & Ljubin-Golub, 2019; Rijavec, Ljubin Golub, & Olčar, 2016), the greater satisfaction of basic psychological needs (Olčar, 2015), and psychological well-being (Asakawa, 2010; Rijavec, Ljubin Golub, Jurčec, & Olčar, 2017; Rijavec, Ljubin Golub, & Olčar, 2016). On the other hand, experiencing flow more often is negatively related to indicators of ill-being, such as anxiety (Asakawa, 2010), depressive symptoms (Mosing, Butković, & Ullen, 2018), and burnout (Mosing et al., 2018; Olčar, 2015; Rijavec et al., 2017).

1.1. Situational determinants of flow

A person can experience flow in all sorts of activities. The first studies on flow were done with ballerinas, artists, rock climbers, chess players and people engaged in similar activities (Csikszentmihalyi, 2000) and these are the activities that we usually associate with flow. However, later research showed that people experience flow even more during work (Csikszentmihalyi & LeFevre, 1989) or studying (Rijavec et al., 2016). Even routine activities such as cleaning, cooking or repair work can be a source of flow (Delle Fave, Massimini, & Bassi, 2011).

Flow usually happens in a situation where there are clear goals and immediate feedback, so the person knows exactly what to do next, and when there is a balance between skills and the perceived challenges of the task (Csikszentmihalyi et al. 2005; Fong, Zaleski, & Leach, 2015; Nakamura & Csikszentmihalyi, 2002). However, when the challenges are too great for a person’s skills, anxiety is experienced, while, on the other hand, when a person’s skills exceed those required for the perceived challenges, boredom is felt, and when the skills and challenges are both low, a person experiences apathy (Csikszentmihalyi, 1990).

1.2. Personality determinants through the lens of the Big Five model

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Flow experience is not affected only by situational factors. Research shows that some people are more prone to experience flow than others (Asakawa, 2010; Nakamura & Csikszentmihalyi, 2002). Csikszentmihalyi named this type of personality the *autotelic* personality. This refers to a person who "generally does things for their own sake, rather than in order to achieve some later external goal" (Csikszentmihalyi, 1997, p. 117). Autotelics tend to search more for new challenges, face these challenges more actively and are better at balancing challenges and skills (Chirico, Serino, Cipresso, Gaggioli, & Riva, 2015; Nakamura & Csiksentmihaly, 2002). According to Nakamura and Csiksentmihaly (2002), they are characterized by general curiosity and an interest in life, persistence, and low self-centredness. Csikszentmihalyi (1997) summarizes these qualities in the term "disinterested interest" – autotelic individuals are interested in the task because of the task itself, and not for some outside goal. It is a conjunction of *receptive* (e.g., openness and perceptiveness) and *active* qualities (e.g., engagement and persistence) (Baumann, 2012; Nakamura & Csiksentmihaly, 2002). Furthermore, according to Baumann (2012), autotelics have a high *need* (to achieve), and also the *ability* (through self-regulation) to experience flow.

Since the Big Five (BFM, Goldberg, 1999) and the Five Factor (FFM, Costa & McCrae, 1992) personality trait models are the most ubiquitous and widely accepted personality frameworks (Paunonen & Hong, 2015). These trait models provide a useful taxonomy for assessing personality, but also give psychologists a unified vocabulary for conversations about individual differences (Benet-Martínez et al., 2015). The BFM emanated from a lexical hypothesis and the FFM stems from a questionnaire approach. They both agree that individual differences are a function of five traits (i.e. extraversion, agreeableness, emotional stability/neuroticism, conscientiousness, and openness to experience or intellect). The only difference lies in how the fifth dimension is defined. In the BFM, the fifth trait is named intellect, and in the FFM it is named openness to experience. These two traits are similar but do not completely overlap. According to DeYoung (2015, p. 389), "Intellect reflects exploration through reasoning and learning of abstract knowledge, whereas openness reflects exploration through sensation and perception. Intellect relies primarily on logical operations and semantic memory, whereas openness relies on correlational pattern detection". Research on the BFM and FFM shows that these five traits are related to many important outcomes, such as school achievement (Poropat, 2009), work success (Judge & Zapata, 2015), and physical health and longevity (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007), to name a few.

So, looking through the lens of the Big Five / Five Factor model, Nakamura and Csikszentmihalyi's (2002) definition of *conjunction of receptive* (e.g., openness and perceptiveness) and *active qualities* (e.g., engagement and persistence) would mean that autotelics should score highly on traits of openness to experience and conscientiousness. Persons scoring high in openness to experience are usually curious, unconventional, artistic and liberal (Costa & McCrae, 1992; DeYoung, 2015). They are more open to experiences and knowledge outside their immediate domain and interest, so it is expected that this contributes to them investing their attention more intensely and more often, which again leads to more frequent flow experiences. The positive relationship between openness to experience and flow has been backed up by some studies (Bassi, Steca, Monzani, Greco, & Delle Fave, 2014; Hager, 2015; Tatalović Vorkapić & Gović, 2016; Ullén, Harmat, Thorell, & Madison, 2016). However, other studies found no significant relationship between these two constructs (Johnson, Keiser, Skarin, & Ross,

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2014; Ross & Keiser, 2014; Ullén et al., 2012; Zager Kocjan & Avsec, 2017). It should be added that all the addressed research assessed the relationship between the openness factor and flow, and in our study the intellect factor was measured. Based on the substantial similarity of these two factors (DeYoung, 2015), we expect intellect to show the same pattern of correlation as openness.

As already mentioned, the second trait that was expected to be related to flow is conscientiousness. Conscientious individuals are disciplined, achievement striving, industrious and responsible (Ross & Keiser, 2014). To experience flow, a person needs high skills which are adequate for the challenges. For a person to have highly developed skills, he or she must invest a considerable amount of time in activity, which is more likely for a conscientious individual (Kappe & van der Flier, 2010). This expectation has been backed up by research; most studies examining the relationship of the Big Five personality traits and flow found that conscientiousness is a strong predictor of flow (Johnson et al., 2014; Hager, 2015; Ross & Keiser, 2014; Tatalović Vorkapić & Gović, 2016; Ullén et al., 2012; Ullén et al., 2016).

On the other hand, research has found emotional stability (i.e. low neuroticism) to be one of the strongest predictors of flow (Heller, Bullerjahn, & von Georgi, 2015; Johnson et al., 2014; Hager, 2015; Ross & Keiser, 2014; Ullén et al., 2012; Ullén et al., 2016), even though it was not hypothesized by theory from the beginning (Csikszentmihalyi, 1997). Emotionally stable individuals are relaxed, secure, self-assured and balanced, while low scorers tend to be insecure, sensitive, excitable and irritable (Debusscher, Hofmans, & De Fruyt, 2014; De Raad & Schouwenburg, 1996). Emotional instability, which is typical of high neuroticism, makes it more difficult to concentrate intensely and for this reason is not conducive to experiencing a state of flow (Asakawa, 2010). Neurotic individuals are more focused on their emotions and cognitions, so this can interfere with attention (De Raad & Schouwenburg, 1996; Smillie, Yeo, Furnham, & Jackson, 2006). In addition, De Manzano and colleagues (2010) found that higher flow proneness is related to the greater availability of the dopamine D2-receptor – which in previous studies has been related to reduced impulsiveness (Lee et al., 2009), emotional stability and positive affect (Volkow et al., 2006). These are also traits that correlate with low neuroticism and high conscientiousness. Consequently, it can be expected that flow proneness will be related to high emotional stability and high conscientiousness.

Furthermore, although originally it was not expected by theory (Csikszentmihalyi, 1997) that extraversion would be related to flow, some studies found a positive relationship between extraversion and flow proneness (Heller et al., 2015; Johnson et al., 2014; Hager, 2015; Ross & Keiser, 2014; Tatalović Vorkapić & Gović, 2016; Ullén et al., 2016). Extroverts are sociable, impulsive, proactive, outgoing, gregarious and assertive (Wilt & Revelle, 2017). Research shows that they have increased reward sensitivity (Keiser & Ross, 2011), attach more importance to goals, have a more intense pursuit of goals and higher self-efficacy about achieving goals (Romero, Villar, Luengo, & Gómez-Fraguela, 2009) which should make them more eager to look for an internally pleasurable state such as flow (de Manzano, Theorell, Harmat, & Ullen, 2010).

The last of the Big Five traits is agreeableness. Agreeable people are trusting, tender minded, modest, cordial, flexible and tolerant (Ross & Keiser, 2014). For this personality trait, most studies have not found a significant relationship with flow proneness, which is also in line with the theory (Csikszentmihalyi, 1997). Still, there are studies by Ullén et al. (2016) and Zager Kocjan and Avsec

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(2017) which found a positive relationship between flow and agreeableness, while Ross and Keiser (2014) found a negative relationship. As the agreeableness trait mostly describes how we are perceived by other people, and flow is a state of deep concentration and immersion in a task, we expect these two constructs not to be related.

1.3. Current study

According to the interactionist view, a person's behaviour is a function of both the person and the situation (Emmons, Diener, & Larsen, 1985). Personality traits influence behaviour only in relevant situations (Kenrick & Funder, 1988), and according to the Trait Activation Theory (Tett & Guterman, 2000; Tett & Burnett, 2003) traits are expressed as responses to trait-relevant situational cues. Therefore, it is important to assess situational and personality determinants simultaneously. In this study, we attempt to investigate whether there are some situational differences in how personality traits predict flow proneness. Flow proneness was measured in typical students' activities: studying, leisure and routine activities (cooking, tidying up, and shopping). In addition, we also measured flow while playing music to assess if different personality traits are more relevant for flow proneness in that domain.

Since high conscientiousness and high emotional stability in the majority of studies have shown the strongest correlation with flow (e.g. Ullén et al., 2012; 2016), we expect that these traits will be related to flow in all inspected domains (H1). The intellect/openness trait reflects the tendency to seek and appreciate complex data, both sensory and abstract (DeYoung, 2015). We suppose that this trait will be important as a predictor of flow while studying and while playing an instrument because in these domains intellect/openness should be more relevant for experiencing flow. On the other hand, we suppose that this trait will not be a significant predictor of flow during routine activities and leisure (H2). Next, based on previous research which has shown that extraverted individuals show greater motivation for affiliation and agency (Depue & Morrone-Strupinsky, 2005) and have increased reward sensitivity (Keiser & Ross, 2011), we expect that they will experience greater flow in more achievement-oriented activities (studying and playing music), but not in less achievement-oriented activities (leisure and routine activities) (H3). Lastly, as most of the studies have found no significant relationship between flow and agreeableness, based on theory (Csikszentmihalyi, 1997) it can be expected that there would be no relationship between flow and agreeableness in any of the inspected domains (H4).

2. Research Methods

2.1. Participants and procedure

The participants were 165 students of the Academy of Music of the University of Zagreb. There were 49% males in the sample, with a mean age of 19.7 years (*SD* = 2.47; range: 16-36). The majority of students, 67.3%, study playing an instrument (e.g. piano, string instruments, wind instruments, percussion, etc.), 14% study music pedagogy, 8.8% study musicology, 5.5% study composition and music theory, and 4.4% study solo singing.

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The participants were recruited during a regular psychology class. Participation in the study was voluntary and anonymous and the respondents were informed that the collected data would be used only for scientific purposes.

2.2. Instruments

Personality traits were measured by the International Personality Item Pool (IPIP-50), which was developed by Goldberg (1999) and validated on a Croatian sample (Mlačić & Goldberg, 2007). The IPIP measures the Big Five personality dimensions (extraversion, agreeableness, conscientiousness, emotional stability and intellect). Each dimension is measured with 10 short statements, some of which are formulated positively and some negatively. Participants rate each item on a Likert-type scale, ranging from "1 - Very inaccurate for me" to "5 - Very accurate for me". In a study on a Croatian student population, Mlačić and Goldberg (2007) obtained the following coefficients of internal consistency (Cronbach's α): .87 for the extraversion, .79 for the agreeableness, .81 for the conscientiousness, .88 for the emotional stability and .79 for the intellect subscales.

Flow proneness in specific domains was measured with an adapted Swedish Flow Proneness Questionnaire (SFPQ) (Ullén et al., 2012). The original SFPQ measures how frequently the participant experiences flow during work, routine chores, and leisure time. As this research was conducted with music students, the scale was adapted for measuring flow proneness while studying theoretic materials and while playing an instrument, while flow proneness during work was not measured. The SFPQ consists of 7 items that are repeated to measure flow in every domain and with instructions that change to capture flow proneness in different domains, i.e. "When you do something in your leisure time / routine chores / studying / playing an instrument, how often does it happen that... you are bored?". Participants rate each item on a Likert-type scale, ranging from "1 - Never'' to "5 - Everyday, or almost every day". According to the authors "the items were chosen to capture the main dimensions of a flow experience" (Ullén et al. 2012, p. 169). General flow proneness was also calculated as the mean of all items. The SFPQ has already been used on a sample of Croatian university students and has shown adequate reliability (Rijavec et al., 2017). The coefficients of internal consistency (Cronbach's α) for this study vary from .74 for the studying subscale to .79 for the leisure subscale, and .84 for the average of all subscales.

Demographic variables consist of age, gender ("1" coded for male, "2" coded for female), and a self-reported grade point average (GPA). GPA in Croatia ranges from "1" (indicating failure) to "5" (indicating excellent performance). For the GPA, students were asked to give the GPA from their high school and from the previous semester at university (if applicable).

3. Results

Prior to conducting analysis, data were screened and it was ensured that the relevant assumptions for a hierarchical regression analysis were tested and met.

Firstly, Table 01 presents descriptive statistics and zero-order correlations for demographic variables, personality traits and flow in specific domains. It can be seen that conscientiousness is related

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to flow proneness in all domains and, on the other hand, that agreeableness is not related to flow proneness in any of the inspected domains. Emotional stability is related to flow in all inspected domains, except in flow during routine activities. Extraversion and intellect are related to flow while studying and playing music.

Table 01. Correlations and descriptive statistics for examined variables

	GPA	Personality traits					Flow				
		E	A	C	ES	I	F_S	F_R	F_L	F_PM	F_T
Age	-.34**	0.00	0.04	-0.07	0.05	-0.02	-0.03	-0.01	-0.02	-0.02	-0.03
Gender	.21**	-0.06	.32**	.19*	-.21**	0.06	-0.02	.16*	0.06	0.05	0.10
GPA		0.03	.20*	.30**	-0.06	0.15	.19*	0.03	0.03	0.07	0.12
E			.19*	-0.11	.27**	.33**	.31**	-0.14	-0.02	.17*	0.11
A				.16*	0.04	.16*	0.02	0.03	0.05	0.06	0.06
C					0.13	0.01	.27**	.35**	.26**	.28**	.43**
ES						0.09	.38**	0.08	.20*	.21**	.32**
I							.24**	-0.08	0.04	.21**	0.14
F_S								.17*	.19*	.41**	.65**
F_R									.36**	.20*	.67**
F_L										.33**	.69**
F_PM											.69**
M	4.30	33.05	38.81	35.07	31.12	37.56	3.53	3.69	4.14	4.09	3.87
SD	0.48	7.05	5.69	6.49	7.93	5.36	0.56	0.64	0.57	0.53	0.39
AR	2.9-5.0	16-48	23-50	17-49	12-49	23-48	1.29-4.57	1.43-5.00	2.71-5.00	2.57-5.00	2.82-4.79
MR	1-5	10 - 50					1 - 5				
α	N.A.	.82	.78	.80	.86	.84	.74	.78	.79	.76	.84

Note. GPA – Grade point average; E – Extraversion; A – Agreeableness; C - Conscientiousness; ES - Emotional stability; I – Intellect; F_S - Flow while studying; F_R - Flow during routine activities; F_L - Flow during leisure; F_PM - Flow while playing music; F_T – total flow; M – mean; SD – standard deviation; AR – actual range; MR – maximum range; α – Crombach alpha; $^{*}p<0.05$; $^{**}p<0.01$

Five hierarchical regression analyses with flow in different domains as a criterion variable and personality traits as predictors were preformed. Age, gender and GPA were controlled and entered in the first step of the analysis, and personality traits were entered as predictors in the second step. The results are presented in Table 02.

Firstly, the predictors of flow while studying were examined. In the first step of the analysis, the only significant predictor was the students' GPA ($\beta = 0.22$; $p < 0.01$), meaning that students with a higher GPA experience more frequent flow while studying. In the second step, personality traits were added to the model. Students that are more extraverted ($\beta = 0.24$; $p < 0.01$), more conscientious ($\beta = 0.24$; $p = 0.001$) and more emotionally stable ($\beta = 0.29$; $p < 0.001$) experience flow more often while studying. After adding personality factors as predictors, GPA ($\beta = 0.15$; p = n.s.) is no longer a significant predictor of flow proneness in studying. The whole model explains 31% of the variance of flow while studying, from which 26% of the variance is explained solely by personality traits.

In the model predicting flow during routine activities, gender was a significant predictor in the first step of analysis ($\beta = 0.16$; $p < 0.05$), i.e. female participants experience more flow during routine activities than male participants. However, when personality traits were added to the model, gender was no longer a significant predictor ($\beta = 0.14$; p = n.s); the only significant positive predictor of flow during

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routine activities was conscientiousness (β = 0.33; p < 0.001). The final model explains around 16% of the variance of flow proneness during routine activities, from which 13% of the variance is explained solely by personality traits.

Table 02. Hierarchical regression analysis with flow in different domains as criterion variable, and age, gender, GPA and personality traits as predictors

	Flow...									
	...while studying		**...during routine activities**		**...during leisure**		**...while playing music**		**total**	
	β	t	β	t	β	t	β	t	β	t
Step 1										
Age	0.04	0.52	0.01	0.14	-0.01	-0.13	0.01	0.14	0.02	0.25
Gender	-0.06	-0.79	0.16	2.02*	0.05	0.67	0.04	0.47	0.08	0.95
GPA	0.22	2.64**	0.00	0.02	0.02	0.21	0.07	0.82	0.11	1.33
	R=.20; R^2=.04; F(3/161)=2.38; p=.07		R=.16; R^2=.03 F(3/161)=1.41; p=.24		R=.06; R^2=.00; F(3/161)=0.22; p=.88		R=.08; R^2=.01 F(3/161)=0.37; p=.77		R=.14; R^2=.02; F(3/161)=1.11; p=.35	
Step 2										
Age	0.04	0.49	0.00	0.05	-0.03	-0.31	-0.01	-0.06	0.00	0.05
Gender	0.02	0.23	0.14	1.74	0.06	0.70	0.05	0.58	0.10	1.36
GPA	0.15	1.92	-0.07	-0.82	-0.05	-0.56	-0.03	-0.35	0.00	-0.03
E	0.24	3.24**	-0.09	-1.11	-0.05	-0.60	0.12	1.48	0.08	0.98
A	-0.13	-1.80	-0.03	-0.41	0.00	-0.04	-0.05	-0.56	-0.08	-1.06
C	0.24	3.29**	0.33	4.03**	0.23	2.77**	0.28	3.45**	0.40	5.38**
ES	0.29	3.95**	0.10	1.20	0.19	2.33*	0.14	1.78	0.26	3.57**
I	0.13	1.81	-0.06	-0.74	0.04	0.51	0.16	2.01*	0.09	1.27
	R=.55; R^2=.31; ΔR^2 =.26; F(8/156) = 8.59; p<.001		R=.40; R^2=.16; ΔR^2 =.13; F(8/156)=3.66; p=.001		R=.32; R^2=.10; ΔR^2 =.10; F(8/156)=2.23; p=.03		R=.40; R^2=.16; ΔR^2 =.15; F(8/156)=3.66; p=.001		R=.53; R^2=.28; ΔR^2 =.26; F(8/156)=7.66; p<.001	

Note. GPA – Grade point average; E – Extraversion; A – Agreeableness; C - Conscientiousness; ES - Emotional stability; I – Intellect; *p<0.05; **p<0.01.

For flow proneness during leisure, the only significant predictors were emotional stability (β = 0.19; p < 0.05) and conscientiousness (β = 0.23; p < 0.01). More conscientious and more emotionally stable participants are more prone to flow during leisure. Sociodemographic variables explain the zero variance of flow during leisure, so 10% of the variance of the criterion is explained only by personality factors.

Next, students who are more conscientious (β = 0.19; p = 0.01) and are higher on the intellect dimension (β = 0.19; p < 0.05) are more prone to flow while playing music. This model explains around 16% of the variance of flow proneness while playing music, from which 15% of the variance is explained solely by personality traits.

Finally, flow in general was assessed. It is an average of flow in all domains. None of the demographic variables significantly predicted general flow proneness. Students who are more conscientious (β = 0.40; p < 0.001) and more emotionally stable (β = 0.26; p < 0.001) are more prone to experiencing flow in general. This model explains around 28% of the variance of general flow proneness, from which 26% of the variance is explained solely by personality traits.

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4. Discussion

The aim of this study was to examine whether there are some specific patterns of how personality traits predict flow proneness in different domains (studying, routine activities, leisure and playing an instrument). It was expected that, due to the specifics of different domains, some traits would be better predictors of flow proneness in some domains. This was generally supported when only zero-order correlations are observed. However, when all variables are put together in hierarchical regression models, some expected predictors are no longer significant. In other words, the expected personality traits are related to flow as was hypothesized, but due to shared variance with other variables in the model, they are no longer significant predictors.

The hypothesis that conscientiousness will be significant predictor of flow in all domains was fully supported. As expected and in line with previous research (Ullén et al., 2012; 2016; Ross & Keiser, 2014), conscientiousness consistently significantly predicts flow in all inspected domains. Conscientiousness is "a spectrum of constructs that describe individual differences in the propensity to be self-controlled, responsible to others, hardworking, orderly, and rule abiding" (Roberts, Lejuez, Krueger, Richards, & Hill, 2014, p. 1315). To reach repeatedly a flow state, a person has to invest in their skills, so their skills match the level of the challenges. A typical example of this is playing an instrument. A person who is not conscientious and does not practise constantly will not be able to match the level of challenge that is constantly increasing. Both zero-order correlations and hierarchical regressions indicate that conscientious individuals are more prone to experience flow no matter what domain. As conscientious individuals are industrious, disciplined, and determined, it makes sense that they would reach a flow state more often.

However, hypothesis that high emotional stability will be positively related to flow in all domains has not been fully supported. Since flow is a state of deep concentration with full attention directed toward the task in hand, it was expected that emotional stability would be needed for this. Still, our study suggests that emotional stability is a significant predictor of flow only while studying and flow during leisure. From zero-order correlations, i.e. Table 01, it can be seen that emotional stability is significantly positively related to flow during music playing until all personality predictors are put together in the hierarchical regression model. Since this is a sample of Zagreb music academy students, all students are near the professional level and all of them experience flow very often during practice (M = 4.09; SD = 0.53). Therefore, as flow in playing music is so prominent in this sample and with this level of knowledge, it is possible that they experience flow while playing music, despite some of them having low emotional stability. Regarding flow during routine activities, research shows that neurotic people perform better when the stakes are not high (Debusscher et al., 2014). So, as routine tasks are not high-stakes activities, it is possible that high emotional stability is not needed to reach a state of flow.

Next, it was hypothesized that the trait of intellect would be positively related to flow while playing music and studying. The high scorers on the openness/intellect trait are imaginative, creative, and unconventional, they enjoy novelty and change, and have intellectual and artistic interests (DeYoung, 2015). Therefore, it was supposed that flow proneness would be related to intellect only while playing music and studying, but not during leisure and routine activities. Also, some previous research has shown a positive relationship between flow proneness and openness/intellect (Bassi et al., 2014; Hager, 2015;

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Tatalović Vorkapić & Gović, 2016; Ullén et al., 2016). This hypothesis was supported by zero-order correlations, but when all personality predictors are put together in the hierarchical regression model it was found that intellect was related to flow while playing music and not to flow while studying. We expected that intellect would be a predictor of flow while studying as the openness/intellect factor is positively related to deeper approaches to learning (Chamorro-Premuzic, & Furnham, 2009), learning motivation (Tempelaar, Gijselaers, van der Loeff, & Nijhuis, 2007), critical thinking (Bidjerano & Dai, 2007), working memory in fMRI scans (DeYoung, Shamosh, Green, Braver, & Gray, 2009) and fluid intelligence (Nusbaum & Silvia, 2011). This was supported by zero-order correlations ($r = .24$, $p < 0.05$), but in a hierarchical model with all variables, intellect was no longer significant predictor of flow while studying due to shared variance with other variables. Still, it can be seen that the intellect dimension is approaching the threshold of significance ($t = 1.81$, $p = 0.07$) in the model.

As expected, it was found that intellect is positively related to flow while playing music. Since the participants were all students of the music academy, we suppose these students practise playing music and singing for a few hours daily. Therefore, we assume that students higher on the intellect dimension, because of their tendency to appreciate complex patterns of information (DeYoung, 2015), can experience flow more often in this repetitive process. As expected, the intellect dimension is not related to proneness to experience flow in leisure and routine activities (i.e. cooking, cleaning, and shopping). Probably some other factors are more important to experience flow in those activities, while the tendency for higher cognitive exploration is not so important.

Next, because extraverts have increased reward sensitivity (Keiser & Ross, 2011), it was expected that extraverts would experience greater flow in activities that are usually more achievement oriented (studying and playing music), but not in less achievement-oriented activities (leisure and routine activities). Again, this hypothesis was supported by zero-order correlations, but when put in a hierarchical model, extraversion was still a significant predictor of flow while studying but no longer during the playing of music.

Lastly, according to theory (Csikszentmihalyi, 1997) and previous research, it was expected that agreeableness would not be a significant predictor of flow proneness in any of the inspected domains. This hypothesis was fully supported both by zero-order correlations and also by hierarchical models. Agreeableness is a trait that describes behaviour in social relations, while flow is a state of immersion in a task, so it is reasonable to expect that these two are not related. This is in line with most previous research (Johnson et al., 2014; Hager, 2015; Tatalović Vorkapić & Gović, 2016; Ullén et al., 2012).

4.1. Limitations and directions for future studies

It is important to consider the limitations of the study. This study is correlational, so it should be said that the direction of causal relationships can go both ways. For example, if concentration on and immersion in a task are easy for a person, this can support the finding of conscientiousness because the person wants to spend more time on the task. Next, to assess flow during the playing of an instrument, the study was conducted on a sample of music academy students. The downside of this is that the study is performed on a selected sample and perhaps not all correlations would be the same on a more diverse sample. In future, it would be worthwhile assessing these relationships on samples that include

participants with more diverse backgrounds. In addition, the category "flow during leisure" is very broad, so in future studies should be broken down into more specific categories, such as "flow during active leisure" and "flow during passive leisure", or "flow during sports", "flow during arts", etc.

5. Conclusion

The study provides support for autotelic personality but also gives an insight into personality traits relevant for specific flow proneness. While the hypothesis that personality traits predict flow proneness differently in different domains was supported, it was also found that conscientiousness is the most consistent predictor of flow in all situational settings. In addition, it was found that emotional stability was a significantly related to flow in emotionally loaded contexts (studying, leisure and playing music), extraversion is related to flow in contexts that are reward-oriented (studying and playing music) and intellect is related to flow in contexts where cognitive exploration of complex matter is important (studying and playing music). Also, as expected, agreeableness was not a significant predictor of flow proneness in any of the inspected domains.

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