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Validation of the new scale for measuring behaviors of Facebook users: Psycho-Social Aspects of Facebook Use (PSAFU)

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ABSTRACT

Facebook-related psychological phenomena attracted the great interest of researchers, but to date experiences of Facebook (FB) users were usually operationalized through few objective behavioral measures or through questionnaires which focused only on specific aspects of FB use. This study aimed to construct a comprehensive questionnaire which will capture deeper psychological processes that take place on FB. Through the EFA and CFA, we extracted five dimensions of FB behaviors: Compensatory use of FB, Self-presentation on FB, Socializing and seeking sexual partners through FB, FB addiction, and FB profile as the virtual self. Compensatory and addictive Facebook use is related to personality traits that indicate poor social adaptiveness, such as social anxiety, low conscientiousness, neuroticism, introversion, and low agreeableness, while Self-Presentation on FB further contributes to this maladaptive process. Seeking new friends and intimate partners through Facebook is related to sensation seeking and social anxiety. Realistic virtual representation of one's personality on Facebook is characteristic of individuals who are socially anxious and open to experiences. The scale Psycho-Social Aspects of Facebook Use (PSAFU) covers the wide range of psychological FB phenomena and should be used by researchers interested in a detailed examination of FB users' experiences.

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1. Introduction

Internet, with its diverse apps, went a long way from being just a helpful tool in many activities, to being an essential part of our lives. Social networks (or social networking sites, abbr. SNS) are the on-line services that became so popular, that nowadays it is hard to imagine how would life look like without them. Emergence of smartphones enabled constant accessibility and omnipresence of SNS. All of this resulted in SNS being, not some "separate universe" parallel to our real life, but inseparable part of our lives: they are interlaced with our private life, relationship, friendships, job, school, hobbies, everything. Social networking site Facebook (abbr. FB), with 1.32 billion monthly active users as of June 30, 2014 (Facebook, 2014), is considered to be the largest and fastest growing networked community on the Internet.

In Serbia, where current study was conducted, FB is by far the most popular SNS. Internet web statistics survey carried out in 2012

showed that FB penetration rate in Serbia is 46.8%, which is higher than European Union average (38%) ("Internet World Stats – Usage and population statistics", 2013). In the first years, FB users in Serbia were predominantly students and young adults. Although there are no empirical data of FB penetration rate in the period after 2012, it is our subjective insight that in the most recent period FB became even more popular, somewhat among middle-aged people, but especially among teenagers and even children of primary school age.

Due to its popularity and general pervasiveness in everyday life, in Serbia and in the entire world, FB has become a significant factor that influences our psychological and social functioning. The aim of this study was the construction and validation of the new questionnaire for measuring psycho-social aspects of FB use. Specifically, we wanted to create a new questionnaire, explore its latent structure, and to examine to which extent are FB-related experiences determined by users' personality. Regarding the relations between psycho-social aspects of FB use and personality traits, we started with two alternative presumptions. On one hand, FB behaviors can be understood as manifestations of established personality traits in a specific virtual surrounding, which could lead to moderate correlations between the two. On the other hand, virtual surrounding of

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FB offers possibility for identity exploration and experimentation (Valkenburg, Schouten, & Peter, 2005), where users can be what they are not in the “real” world. In such a case, users' behaviors and experiences on FB would not be influenced by their personality traits to a great extent, which might lead to low to insignificant relations between these constructs.

1.1. Social phenomena on social networking sites

Many social phenomena from the “real” world, such as relationship formation and maintenance, self-disclosure, self-presentation, and identity exploration, found its place and its specific form on Facebook. An “online-to-offline trend” of relationship formation implies the observed tendency of finding new friends on the Internet (e.g. Facebook) and transferring the friendship from online to offline surrounding (McKenna, Green, & Gleason, 2002).

There are three important differences of online as compared to offline communication, which greatly influence users' social behavior on the internet: a) greater anonymity, b) reduced importance of and pressure coming from physical appearance, and c) greater control over the course of communication, meaning that person has more time to shape messages and self-presentations (McKenna & Bargh, 2000).

In such an environment where individuals feel protected, self-disclosure and communication are easier. Online self-disclosure is particularly comfortable for persons who feel discomfort in offline communication, such as introverted, socially anxious or shy individuals (Amichai-Hamburger & Vinitzky, 2010; Ebeling-Witte, Frank, & Lester, 2007; Hamburger & Ben-Artzi, 2000; McCord, Rodebaugh, & Levinson, 2014; Sheldon, 2008; Valkenburg et al., 2005; Weidman et al., 2012; Yen et al., 2012). This hypothesis is known as “compensation theory” or Poor-Gets-Richer (Kraut et al., 2002; Valkenburg et al., 2005) and it predicts that individuals who experience difficulties in offline interactions would have the most benefit from the use of SNS.

On the other hand, Rich-Gets-Richer theory predicts extraverts will also benefit from SNS, because the internet is just another platform for communication with friends and contacts made offline (Kraut et al., 2002; Valkenburg et al., 2005). As well as for the compensation theory, there is a substantial literature that supports this hypothesis. Research has shown that extroverts have more friends online than introverts (Amichai-Hamburger & Vinitzky, 2010), are more likely to use SNS for communication (Ryan & Xenos, 2011; Wang, Jackson, Zhang, & Su, 2012), and are also more active on SNS (Michikyan, Subrahmanyam, & Dennis, 2014).

Since the literature provides evidence for both theories, Moore and McElroy (2012) concluded that extroverts and introverts have different motives for SNS use. Extroversion and openness are related to socializing pattern of FB use, while individuals with low agreeableness and emotional stability use FB for socializing in lieu of real life socializing (Kuo & Tang, 2014). In accordance with this, extroverts and individuals with high self-esteem are more popular on FB, while introverts and individuals with low self-esteem are less popular in “real” world, but put more effort into being popular online (Zywica & Danowski, 2008).

The anonymity of the internet surrounding gives opportunity for identity exploration (Valkenburg et al., 2005) and research shows that on SNS people tend to express their ideal or possible selves (Manago, Graham, Greenfield, & Salimkhan, 2008). However, their identities are not explicitly stated, but rather implicitly shown through wall posts, photos, groups users belong, things they like, etc. (Zhao, Grasmuck, & Martin, 2008). Nevertheless, the research shows that the majority of people on SNS tend to present their real selves (Back et al., 2010) and their true selves – the qualities they

currently possesses, but do not normally express to others (Seidman, 2014).

When it comes to personality characteristics of online self-presenters, the research indicated that neuroticism is related to idealized and false self-presentation and that introverts more often explore different identities (Michikyan, Subrahmanyam, et al., 2014) and show more private information and photos online (Amichai-Hamburger & Vinitzky, 2010). Contrary to this, Ong found that extraverts are more active self-presenters than introverts in online setting (Ong et al., 2011).

1.2. Internet and Facebook addiction

Availability and advantages of online communication contributed to the emergence of internet addiction which is usually described through symptoms of excessive internet use, loss of control over the time user spends online, and consequently, diverse problematic outcomes that negatively affect users (offline) life (Young, 1998b).

Kardefelt-Winther (2014) suggests that people go online to escape real life problems which could lead to negative outcomes. He states that internet has compensatory function for some individuals, meaning that they react to different life difficulties by turning to the internet. For example, individuals who lack social stimulation due to social anxiety or shyness may turn to SNS because there they feel protected. Therefore, according to Kardefelt-Winther and his *compensatory internet use theory*, excessive internet use is only the consequence – not the cause, of other problems.

Today, internet addiction is predominantly related to social aspects of its use (Fioravanti, Dèttore, & Casale, 2012). Constant raise of popularity of Facebook, on one hand, and increasing number of people with symptoms of internet addiction, on the other, led to an increased interest of researchers for specific form of internet addiction – FB addiction (Kuss & Griffiths, 2011). Research carried out on representative sample of FB users from Serbia showed that addictive FB use is related to lower self-esteem, lower general self-efficacy, and introversion (Milošević-Đorđević & Žeželj, 2014). Time spent on SNS, which is one of the most common symptoms of addictive use of SNS, correlates positively with neuroticism and loneliness, and negatively with conscientiousness (Ryan & Xenos, 2011). The study of McCord and associates (McCord et al., 2014) showed that social anxiety does not directly influence the intensity of FB use, but more probably results in it indirectly – depending on the motivation for FB use, which supports hypotheses of compensatory internet use theory (Kardefelt-Winther, 2014). Also, Sheldon (2008) found that individuals, who feel anxiety and fear in face-to-face interaction, use FB to feel less lonely, but have fewer Facebook friends. There is one more personality trait that was found to relate to internet addiction. Lavin and colleagues (Lavin, Marvin, McLaren, Nola, & Scott, 1999) found that sensation-seeking is negatively related to internet addiction. However, results of Lin and Tsai (2002) are quite the opposite, showing a positive correlation between these phenomena.

1.3. Measuring Facebook behaviors

Despite the variability of FB behaviors and deep psychological implications that FB has for peoples' lives, majority of research operationalized FB use through few self-reported or objectively registered indicators, such as number of friends, how many hours per day person spends on FB, frequency of wall posts or the number of photos (Amichai-Hamburger & Vinitzky, 2010; Eftekhari, Fullwood, & Morris, 2014; Kuo & Tang, 2014; Martin, Bailey, Cicero, & Kerns, 2012; Moore & McElroy, 2012; Ong et al., 2011;

Ryan & Xenos, 2011; Skues, Williams, & Wise, 2012). There are also studies that used questionnaire measures of FB behavior (Aladwani, 2014; Carpenter, Green, & LaFlam, 2011; Ellison, Steinfield, & Lampe, 2007; McCord et al., 2014; Michikyan, Subrahmanyam, et al., 2014; Muscanell & Guadagno, 2012; Park, Lee, & Kim, 2012; Ross et al., 2009; Wang et al., 2012; Weidman et al., 2012), but even in many of these studies indicators stayed “at the surface”, measuring usually the frequency of use of different apps within FB. Instruments that tried to capture internal processes such as emotions, motives, thoughts, and self-conceptions related to experiences on FB, are somewhat rare. Aside from scales that measure the frequency and intensity of FB use and its apps, we found five scales that capture different aspects of deeper psychological processes aroused by FB.

One of the most popular instruments is Ross's (Ross et al., 2009) extended version of Ellison's (Ellison et al., 2007) questionnaire. This instrument includes a number of Likert-scale attitudinal questions which try to capture the extent to which a person is emotionally connected to Facebook (e.g. “I feel out of touch when I haven't logged onto Facebook for a while”) and the extent to which Facebook is integrated into person's daily activities (e.g. “Facebook is part of my everyday activity”) (Ellison et al., 2007).

Michikyan, Dennis, and Subrahmanyam (2014) constructed 17-item Self-Presentation on Facebook Questionnaire (SPFBQ) which measures five different aspects of online self-presentation: real self (e.g. “The way I present myself on Facebook is how I am in real life”), ideal self (e.g. “I post things on my Facebook to show aspects of who I want to be”), false self – deception (e.g. “I sometimes try to be someone other than my true self on Facebook”), false self – exploration (e.g. “On Facebook I can try-out many aspects of who I am much more than I can in real life”), and false self – impress/compare (e.g. “I try to impress others with the photos I post of myself on my Facebook profile” and “I compare myself to others on Facebook”).

Facebook–Social Interaction Anxiety Scale – F–SIAS (McCord et al., 2014) is a seven-item scale designed to measure anxiety experienced while using the social interaction features of FB (e.g. “I have difficulty coming up with what to say in a status update”). The Facebook and Internet Usage Questionnaire (Levinson, Fernandez, Rodebaugh, Menatti, Weeks, in preparation, according to Weidman et al., 2012) operationalizes two dimensions of compensatory FB and internet use: internet use as a positive substitute for face-to-face interactions (IUQ-Pos; e.g. “My interactions on the Internet have led me to feel more confident and comfortable when interacting with people face to face”) and internet use as avoidance of face-to-face interactions (IUQ-Avoid; e.g. “Spending time on the Internet makes it easier for me to avoid interacting with people face to face”).

Starting from the theory of consumption values, Aladwani (2014) constructed Gravitating towards Facebook (GoToFB) questionnaire which focused on reasons for FB use. Aladwani's analyses resulted in eight dimensions – reasons for FB use: connecting, sharing, relaxing, branding, organizing, monitoring, expressing, and learning, which may be seen as motivational in its nature.

The scale Virtual Behaviors on Social Networks (VBSN; Bodroža, Popov, & Poljak, 2009) covers social and psychological phenomena on SNS. Scale measures six aspects of the SNS use: addiction, alienation, socialization, self-presentation, virtual self, and negative attitude towards SNS. The aim of these authors was to measure behaviors on different SNS. Unfortunately, it seemed to be the biggest problem of the scale as well, because SNS are often very different, contain different apps and, thus, provoke different behaviors. On one hand, items measuring users' behaviors which are general enough to be registered in users of wide range of SNS, led to a loss of many subtle and specific psychological processes. On the

other hand, some items failed to measure behaviors at the general level and went into details that were specific for only one SNS, but not applicable to the other (e.g. item “I'm glad when someone places me among the ‘top friends’” is relevant only for MySpace users).

Measuring different aspects of FB use separately doesn't offer an insight into their mutual relationships and dynamics. Most instruments described here stay narrow in focus and, thus, cannot offer deep and comprehensive insight into psychological phenomena that happen on Facebook. For example, Ross's instrument (Ellison et al., 2007; Ross et al., 2009) measures general involvement on FB, but doesn't go into more subtle processes such as socialization, addiction, self-presentation on FB, etc. Although Michikyan's scale SPFB (Michikyan, Dennis, et al., 2014) very thoroughly covers the topic of self-presentation on FB, it doesn't cover other relevant psychological processes such as socializing on FB. It is the same case with McCord's F-SIAS scale (McCord et al., 2014) which focuses solely on maladaptive and compensatory processes closely related to social anxiety expressed on FB. The aim of the development of GoToFB scale (Aladwani, 2014) was to cover wide range of motives for FB use and to explain the reasons for involvement in FB. Some subscales of GoToFB refer to socialization, self-presentation, and reduction of anxiety through FB use, but the items don't deal with users' emotions and motives in these processes (e.g. why do they socialize, self-present, etc. on FB or how do they feel when doing so). Finally, VBSN scale (Bodroža et al., 2009) grasps wide range of psycho-social processes which take place on FB, but wanting to be general enough to encompass many different SNS, in some aspects stays at the surface of these phenomena.

1.4. Focus of the present study

Our review of the literature indicated that all existing questionnaires for measuring psychological phenomena happening on FB are somewhat fragmented, i.e. they are focused only on specific aspects of FB use or on the processes that are on the surface of the phenomena, or in some cases deal with the topic on a too general level. Therefore, we conducted this study with the aim to construct a questionnaire that will in a more comprehensive manner capture, not only objective behaviors on FB, but also deeper psychological processes that arise during, after, or as a consequence of FB use. In that sense, our conceptualization of FB use is trait-like and includes one's motives, thoughts, feelings, and behavioral tendencies (McCrae & John, 1992). Having an instrument which includes wider range of FB phenomena will also show the relations and dynamics between different aspects of FB use.

The first aim of this study was to construct the questionnaire for measuring socio-psychological aspects of FB use and to examine its latent structure. The second aim was to examine relationship of obtained dimensions of FB use with personality traits.

2. Method

2.1. Participants and procedure

The total sample of 804 FB users was gathered during December, 2012. Collection of the data was done in two phases and, accordingly, there are two subsamples. In the phase one, FB users were invited to fill in an online questionnaire through the FB page named. “The research on behaviors of Facebook users”. The first subsample of 445 respondents was gathered by the snowball sampling technique. They were informed about the aim of the research, the anonymity issues, asked to fill in the questionnaire, and invite their FB friends to participate in the research. Only fully completed questionnaires were recorded in the base. The average

age of participants from the first subsample was 26.95 years ($SD = 6.35$, ranging from 15 to 62 years); 79.1% of the sample were females. University students (39.6%) and employed persons (41.1%) make the majority of the sample, whereas others are unemployed (15.7%), secondary school students (2.7%) or retired (0.9%). Around 36.2% completed secondary school, 39.6% of participants have bachelor degree, 22.0% have master degree or PhD, and 2.2% finished only elementary school. In average, participants use FB 4.76 years (the length of use ranges from 1 to 6 years); they have from 10 to 4500 friends (465 in average); half of the sample uses FB 1–3 h a day, 27% less than an hour, 15% 3–5 h and only 8% more than 5 h.

For the second phase, 359 students of the University of Novi Sad who had FB profile answered the questionnaire. They agreed to participate voluntarily and anonymously as part of the course requirements. Females made the majority of the sample (79.4%), and the average age of this sample was 21.29 years ($SD = 2.96$, ranging from 18 to 44 years). Student sample uses FB in average 4.23 years (range is from 1 to 6 years) and have from 1 to 3000 friends (497 friends in average). Again, half of the student sample uses FB 1–3 h a day, while 35% use it less than one hour, 11% 3–5 h, and only 3% more than 5 h a day.

2.2. Measures

Psycho-Social Aspects of Facebook Use (PSAFU). The development of PSAFU scale was motivated by our previous work (Bodroža et al., 2009) in which we tried to construct the scale that will operationalize users' behaviors on different SNS. One of the problems that we faced was that the items in such a scale needed to be very general and couldn't tap into subtle psychological processes, because social networks are quite different. Thus, we decided to focus solely on behaviors on FB which is by far the most popular SNS in Europe and North America.

Our goal was to cover a wide range of FB behaviors and their deeper psychological causes or consequences such as emotions and motives. Specifically, we wanted to grasp the processes of self-disclosure, self-presentation, relationship formation and development, self-identification with FB profile, discovering real and ideal self on FB, compensation of feelings of inadequacy through communication on FB, different symptoms and causes of FB addiction, etc.

The development of the new scale was done in several phases. First, selected items from VBSN scale (Bodroža et al., 2009), which were applicable to FB use, were adapted to measure behaviors on FB. Additional items were created to cover phenomena that were not satisfyingly represented in the VBSN scale.¹ Some items from the Internet Addiction Test (Young, 1998a) and The Facebook Questionnaire (Ross et al., 2009) were also adapted. Then, we consulted several FB users on comprehensiveness of the item pool and they suggested several more topics to be included (e.g. additional aspects of self-presentation, overt and clandestine FB use, etc.). Based on these suggestions, we constructed additional items for behaviors that were not already covered. The result of this process was a preliminary version of the questionnaire *Psycho-Social Aspects of Facebook Use (PSAFU)* which consisted of 72 items with the 5-point Likert scale.

In order to measure personality correlates to psycho-social aspects of Facebook use, three scales were used: Big Five Inventory, Brief Sensation Seeking Scale and Fear of Negative Evaluation.

Big Five Inventory (BFI; John, Donahue, & Kentle, 1991) is a well validated measure of Big Five dimensions of personality: Extraversion, Neuroticism, Openness, Conscientiousness, and Agreeableness. The questionnaire consists of 44 items with 5-point Likert scale. The internal consistency of the subscales ranges from .74 to .81.

Brief Sensation Seeking Scale (BSSS; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002) is a shortened and adapted version of Form V of Sensation-Seeking Scale (SSS-V; Zuckerman, 2007; Zuckerman, Eysenck, & Eysenck, 1978). Sensation-seeking refers to "the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences" (Zuckerman, 1979, p.10). The scale consists of 8 items with 5-point Likert scale and has satisfactory internal consistency ($\alpha = .76$).

Fear of Negative Evaluation (FNE; Leary, 1983) is a shortened version of the FNE scale (Watson & Friend, 1969) which measures social anxiety and fear that others will evaluate one's person unfavorably. The scale consists of 12 items with 5-point Likert scale and has good internal consistency ($\alpha = .88$).

For all personality measures the scores were calculated as arithmetic means of the item responses.

2.3. Statistical analyses

To examine the latent structure of PSAFU scale, EFA (SPSS 17.0) and CFA (EQS 6.1) were used. EFA was carried out using Principal component analysis and the parallel analysis with 95% percentile criterion was performed in order to determine the optimal number of factors (Hayton, Allen, & Scarpello, 2004; Horn, 1965; Longman, Cota, Holden, & Fekken, 1989). Since we expected FB behaviors to be intertwined in complex psychological dynamics, extracted dimensions were rotated with Promax method to allow mutual correlations between the factors. In order to confirm the factor solution obtained by EFA, CFA with the following model fit criteria was used: root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) which should be smaller than .08 (Browne & Cudeck, 1993), Bentler's Comparative Fit Index (CFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI) which should be larger than .90 (Hu & Bentler, 1999) and Sattora–Bentler $\chi^2(S-B \chi^2)$, which should not be statistically significant. For further analyses, scores of PSAFU dimensions were calculated as means of representing items. Arithmetic means, standard deviations, and distribution measures – standardized Skewness and Kurtosis were analyzed for all extracted PSAFU dimensions. Finally, in order to assess the relationship between PSAFU dimensions and personality traits, regression analyses were carried out.

3. Results

3.1. Exploratory factor analysis

The responses of the first subsample ($N = 445$) were used for the EFA of PSAFU scale. In the iterative process of factor analyses, we sought for the acceptable and meaningful factorial structure. In these initial analyses, we discarded items with loadings lower than .40 or with cross-loadings. After this process, 43 items remained in the final analysis. Kaiser–Meyer–Olkin test indicated very good sampling adequacy ($KMO = .90$). Latent factors were extracted by principal components analysis and the optimal number of factors was determined by the parallel analysis with 95% percentile criterion. This criterion suggested the five-factor solution, which explained 46.53% of variance (Table 1). The extracted factors were rotated with Promax method.

¹ Some subscales of VBSN scale (e.g. Self-Presentation and Virtual Self) had somewhat low reliability. We constructed more items with similar content to overcome this problem in the new scale.

Table 1

Extracted principal components with Eigenvalues, percentage of explained variance, and parallel analysis criterion.

Component	Initial solution		Parallel analysis	
	% of variance explained	Eigenvalue	95th Percentile of random Eigenvalues	Rotated solution Eigenvalue
1	24.34	10.46797 ^a	1.72076	8.51
2	7.36	3.16302 ^a	1.63091	6.90
3	5.78	2.48529 ^a	1.56889	5.70
4	5.48	2.35667 ^a	1.52132	5.75
5	3.57	1.53405 ^a	1.47422	3.14
6	3.08	1.32515	1.43567	

^a Eigenvalue higher than 95th percentile of random Eigenvalues obtained in the parallel analysis.

The pattern matrix of extracted factors is presented in Table 2. The high score on the first factor characterizes persons who communicate easier through FB than in offline surrounding. These individuals feel more liked and accepted on FB than in real life, because they feel more secure and unencumbered by physical appearance. They feel more self-satisfied when on FB and experience depression symptoms when offline. This factor is named **Compensatory use of FB** (abbr. Compensation) because it describes the use of FB as a mean of compensation of personal insecurities and feelings of inadequacy.

The content of the second factor describes self-presentational concerns which are manifested through the choice of personal photos and timeline posts made to present one's ideal self or to make desired impression on others. Factor was interpreted as **Self-presentation on FB** (abbr. Self-presentation).

Items of the third factor describe active strivings to acquaint new friends, intimate and/or sexual partners through FB. When developing new friendships, person uses not only FB, but also other means of communication, such as Skype, SMS, and telephone. This factor was named **Socializing and seeking sexual partners through FB** (abbr. Socialization).

The fourth factor is saturated by indicators of **FB addiction**, such as prolonged time spent on FB and inability to control it despite all the efforts, losing sleep, and procrastination of important tasks and responsibilities (e.g. studying, job, etc.).

The fifth factor was named **FB profile as the virtual self** (abbr. Virtual self). This factor describes the feeling that FB profile is a realistic representation of one's personality and that it offers important and reliable information about oneself to others. Such a pattern is followed by the use of FB to maintain contact with friends from real life.

Extracted factors have low to moderate intercorrelations (Table 3). Internal consistency of factors ranges between .76 (for Virtual self) and .92 (for Compensation).

3.2. Confirmatory factor analysis

To confirm the latent structure of PSAFU scale, confirmatory factor analysis was conducted. The analyses were carried out on the second subsample – the sample of students (N = 359). Factor solutions with two to seven factors² were modeled to check if the 5-factor solution is the best representation of the structure of the data. Multivariate kurtosis (Mardia's coefficient) was over 7 (Bentler, 2006) and, therefore, robust method was used. In Table 4, the indicators of model fit are presented for all six models. Generally, all the tested models have a poor fit (Table 3). CFI, NFI, and NNFI are all below required criteria, but SRMR and RMSEA are satisfactory for almost all models but the two factor solution.

² Factor solutions were based on the results of the EFA carried out on the previous sample.

Model with 5 factors has the best model fit indices of all the tested solutions so we've continued to modify it in order to achieve a better fit.

To reach a better fit, all items with factor loadings below .5 were excluded. This has resulted in a far better model fit but has cut down the number of items to 26, from the initial 43 (Fig. 1). All relevant robust indices were satisfactory ($S-B \chi^2_{(289)} = 455.1568$, NFI = .831, NNFI = .921, RMSEA = .040 (.033–.047), SRMR = .049, CFI = .930).

Shortening the scale to meet the criteria in CFA resulted in significantly smaller number of items. In our opinion, short version of the scale, although psychometrically better than the long version, has somewhat less satisfying content validity. Some of the important and relevant indicators of FB users' experiences have been eliminated in CFA due to the lower factor loadings and in order to achieve better model fit. Thus, we decided to further analyze longer version of the questionnaire, having in mind that, even though it is less psychometrically sound, it has better content validity and can be very useful for the researchers who are interested to explore FB phenomena in more detail.

3.3. Descriptive statistics of PSAFU dimensions

Descriptive statistics of longer version of PSAFU subscales are presented in Table 5 for FB users subsample and student subsample. Additionally, distributions of all dimensions of PSAFU are presented on Fig. 2 (FB sample) and Fig. 3 (student sample). The values of standardized Skewness and Kurtosis on both samples show that the distribution of Compensation is peaked and positively skewed. That means that most users score low on this dimension, while only small number of participants score high on this dimension i.e. show supposedly maladaptive behaviors regarding compensation of personal inadequacies through the use of FB (see also Figs. 2 and 3). Self-presentation, Socialization, and FB Addiction also have positively skewed distributions, which also implies that users have somewhat lower scores.

3.4. Dimensions of Facebook use and personality traits

To explore relationship between FB use and personality, dimensions of PSAFU were regressed on personality traits. Regression analyses were carried out separately on the sample of FB users and students to cross-validate the results.³

³ Even though we've opted for the long version of the PSAFU scale, we analyzed relationship of short version of PSAFU scale with personality as well. The obtained regression coefficients showed almost identical pattern for both versions of the scale, which only further justifies our conclusion that both scales are equally efficient in measuring the phenomena of FB use. Those interested in the details of these analyses can contact the authors.

Table 2
Pattern matrix of PSAFU scale.

Item	Component				
	1	2	3	4	5
8. I have more fun socializing on Facebook than in the real life. ^a	.782				
10. I find it easier to communicate with people on Facebook than in face to face real settings. ^a	.778				
9. When I'm not on Facebook I withdraw into myself (i.e. I feel more depressed and indifferent).	.752				
34. I communicate more freely on Facebook than I do in real life. ^a	.747				
35. I find it easier to communicate on Facebook, because I don't have to think about how I look. ^a	.693				
32. On Facebook I feel more accepted and appreciated than in real life. ^a	.680				
31. On Facebook I feel less pressured to be what others want me to be. ^a	.666				
11. I sometimes feel like I live two lives – one real and one virtual. ^a	.629				
27. It happened to me when meeting in person people who I met and became close to on Facebook, to figure that in reality we had nothing in common. ^a	.572				
6. I have more fun chatting and exchanging different content (messages, photos, links, etc.) with people on the Facebook than in any other way.	.562				
30. I feel that on Facebook I can be whatever I want.	.515				
7. I am more satisfied with myself since I started using Facebook.	.501				
23. My Facebook friendships have made me feel better about myself.	.486				
41. I try to make a good impression on others by the things I post on my timeline. ^a		.809			
21. I care about the impression others form about me when they see my profile. ^a		.776			
42. Before I post anything on Facebook, I think about how others might perceive it. ^a		.755			
16. When I post information about myself on Facebook I think about how I would like others to perceive me. ^a		.738			
24. I try to present myself positively on my Facebook profile especially for those people who do not know me well. ^a		.720			
22. I pay a lot of attention to details of my Facebook profile, because I want to make a good impression on those who view it. ^a		.683			
43. I post different contents on Facebook (statuses, links, photographs, etc.) to attract the attention of others.		.615			
20. I only post on my profile photos in which I look attractive.		.581			
12. I have initiated live encounter with a person whom I have got to know through Facebook. ^a			.733		
37. Sometimes I communicate via phone, sms, skype, etc. with people who I first met on Facebook. ^a			.709		
13. I have met someone on Facebook who I have had or am still in a relationship with.			.678		
40. I have lascivious and sexy conversations on Facebook (on chat or public or private messages).			.673		
14. I like to flirt with people on Facebook. ^a			.632		
36. I spent time on Facebook chatting with persons who I do not know very well in real life. ^a			.577		
15. Facebook is for me a way to meet new and interesting people. ^a			.570		
26. People who have seen my photos on Facebook have told me that I am sexy.			.533		
28. I'm not interested in meeting new friends on Facebook.			–.507		
1. I often stay on Facebook longer than I originally intended.				.762	
4. I have tried many times to reduce the time I spend on Facebook but have never succeeded. ^a				.727	
2. I often put off my other obligations for the activities on Facebook (writing messages, browsing, posting links or photos, etc).				.671	
39. I often spend more than three hours continuously on Facebook. ^a				.663	
3. Some people from my surrounding have told me that I spend too much time on the Facebook. ^a				.639	
38. Sometimes I lose sleep because I stay long on the Facebook. ^a				.622	
5. I am able to resist the urge to check a message on Facebook even for a period of a few days.				–.454	
29. I often go on Facebook because I am bored.				.453	
25. My Facebook profile is a true reflection of myself. ^a					.671
17. When someone opens my Facebook profile, they can easily get the impression of what kind of person I am. ^a					.614
18. I feel that my Facebook profile is a very personal place. ^a					.541
33. I use Facebook to keep in touch with my old friends.					.529
19. I never miss replying to others' posts and messages on Facebook.					.465

^a Items that were kept in the short version of the scale obtained by CFA.

Table 3
Factor intercorrelations.

Component	1	2	3	4	5
1. Compensation	.918 ^a				
2. Self-presentation	.462	.917 ^a			
3. Socialization	.425	.255	.877 ^a		
4. FB Addiction	.432	.315	.303	.880 ^a	
5. Virtual Self	.248	.256	.197	.321	.760 ^a

^a Values on the diagonal are Cronbach's α coefficients.

Table 4
Indicators of confirmatory factor analyses for two-to seven-factor solutions.

Model	S–B χ^2 (df)	NFI	NNFI	CFI	RMSEA (90% CI)	SRMR
2 factors	2337.1318 (818)	.518	.599	.619	.072	.084
3 factors	1993.7726 (816)	.588	.688	.704	.063	.075
4 factors	1678.9804 (813)	.653	.770	.783	.055	.067
5 factors	1563.5281 (807)	.677	.797	.810	.051	.063
6 factors	1686.9114 (846)	.659	.778	.792	.053	.075
7 factors	1639.1139 (839)	.669	.787	.802	.052	.065

Bolded text should point out that the model with 5 factors has the best fit indices.

The most consistent predictor of all FB use dimensions is high Social Anxiety⁴ (Table 6). As for the rest of the personality traits, Compensation is related to Introversion and lower Agreeableness on both samples and Conscientiousness only on subsample of FB users. Significant predictors of FB Addiction, beside Social Anxiety, are higher Neuroticism and lower Conscientiousness, while Sensation Seeking predicts FB Addiction only on the student subsample.

The most inconsistent results, when the two subsamples are compared, are obtained for Self-presentation on FB. While among students only Social Anxiety predicts Self-presentation, on the sample of FB users, it is also predicted by higher Openness, lower Agreeableness and Neuroticism.⁵ The obtained differences are

⁴ When regressed on Social Anxiety, Neuroticism and Introversion (i.e. low Extraversion) explain only 20% of criterion variable, suggesting that these personality traits together are not completely redundant with the criterion variable. Thus, we decided to keep all of them in the analyses.

⁵ It is important to stress out that, when Pearson correlations are taken into account, Neuroticism is positively related to Self-presentation, which means that the negative β coefficient obtained in regression analysis is a suppression effect.

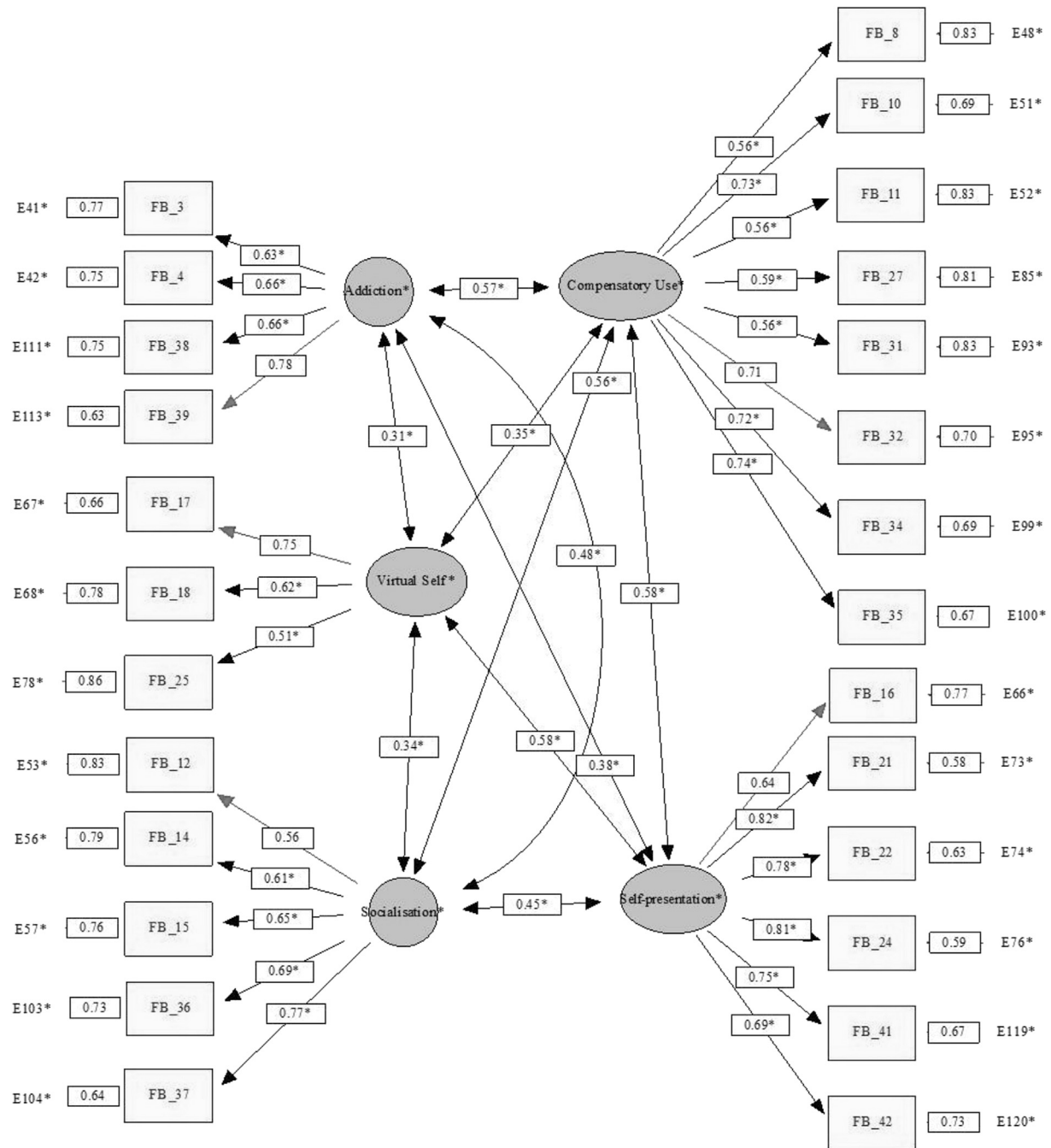


Fig. 1. The best model fit for five-factor solution. Description: Fig. 1 presents the optimal five-factor CFA model of the scale PSAFU. This is the CFA model with lower number of items, which obtained satisfying model fit indices.

Table 5
Descriptive statistics of PSAFU dimensions measured on two subsamples.

Subsample	PSAFU dimension	Min	Max	M	SD	Standard. Skewness	Standard. Kurtosis
FB subsample	Compensation	1.00	5.00	1.47	.59	19.33	30.36
	Self-Presentation	1.00	4.88	2.42	.94	3.61	-2.54
	Socialization	1.00	4.44	1.88	.75	9.14	2.59
	FB Addiction	1.00	5.00	2.45	.78	5.07	-.01
	Virtual self	1.00	5.00	3.15	.75	-1.45	-.60
Student subsample	Compensation	1.00	3.92	1.45	.53	14.17	14.30
	Self-Presentation	1.00	4.88	2.19	.89	4.64	-1.39
	Socialization	1.00	4.56	1.96	.74	6.91	1.53
	FB Addiction	1.00	4.75	2.27	.72	4.56	.52
	Virtual self	1.00	5.00	3.07	.75	-.58	-2.17

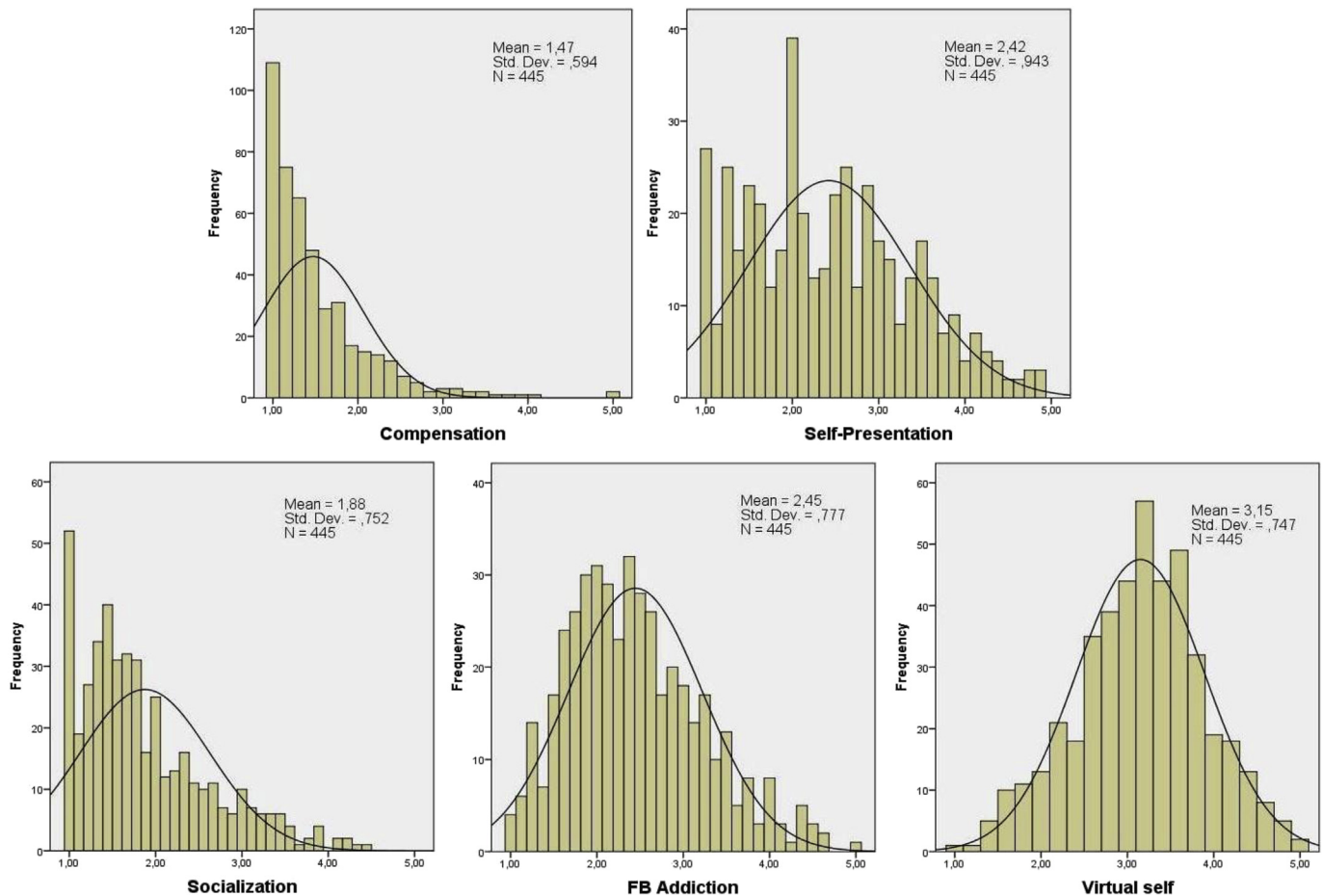


Fig. 2. The distribution of PSAFU dimensions on the sample of Facebook users. Description: Fig. 2 presents the distributions of five dimensions of PSAFU scale, which are obtained on the sample of Facebook users (N = 445).

probably due to some characteristics of these subsamples and should be further tested.

Besides Social Anxiety, Socialization on FB is on both samples predicted by higher Sensation Seeking, while Virtual Self is, only on the FB users subsample, also predicted by higher Openness.

4. Discussion

The results of this study indicate that scale Psycho-Social Aspects of Facebook Use is an internally valid measure of psychological aspects of FB use, which operationalizes users' experiences through five intercorrelated dimensions: Compensatory use of FB, Self-presentation on FB, Socializing and seeking sexual partners through FB, FB addiction, and FB profile as the virtual self. The five-dimensional structure of PSAFU was confirmed through Confirmatory Factor Analysis but the number of items was reduced from 43 to 26 to achieve adequate model fit indices. Although the short version of the questionnaire is more psychometrically sound, we encourage researchers interested in detailed examination of psycho-social aspects of FB use to use the long version as well.

Two dimensions – Compensatory use of FB and FB addiction, measure potentially maladaptive aspects of FB use, which correspond to the indicators of Internet addiction. Accordingly, the majority of the sample in our study gravitated toward lower scores on these subscales, while only smaller number showed pronounced symptoms of maladaptive FB use. Nevertheless, these subscales should not be used for diagnostic purposes. [Kardefelt-Winther](#)

(2014) suggested that compensatory function of internet can lead to addiction. Our results complement his conclusion by showing that compensation and addiction are interrelated processes. It is assumed that individuals who compensate their feelings of inadequacy on FB and at the same time show signs of prolonged and uncontrolled use of FB are under greater risk to experience detrimental consequences for their life functioning in the offline setting. Active self-presentation and socialization on FB are tightly related to addiction-like processes and behaviors, suggesting that the intensive use of FB as a substitute for real life social interactions may further deepen the addictive behavioral patterns.

The dimension Virtual self is the representation of person's real self on FB, which is followed by impression that FB profile has become an important aspect of one's personality. Low correlations of this dimension with other dimensions of FB use indicate that showing your real self on FB and communicating predominantly with the real-life friends, is largely independent of active striving to find new friends and make good impressions on them, as well as to compensate own insecurities in online communication.

Generally, the relations between FB use and personality showed that excessive use of FB, especially it's compensational, self-presentational, socializing and addictive aspects, is characteristic of individuals with fear of negative evaluation i.e. social anxiety. Our results support earlier findings which showed that among personality traits conscientiousness is one of the most important predictors of both Facebook and internet addiction ([Andreassen et al., 2013](#); [Andreassen, Torsheim, Brunborg, & Pallesen, 2012](#);

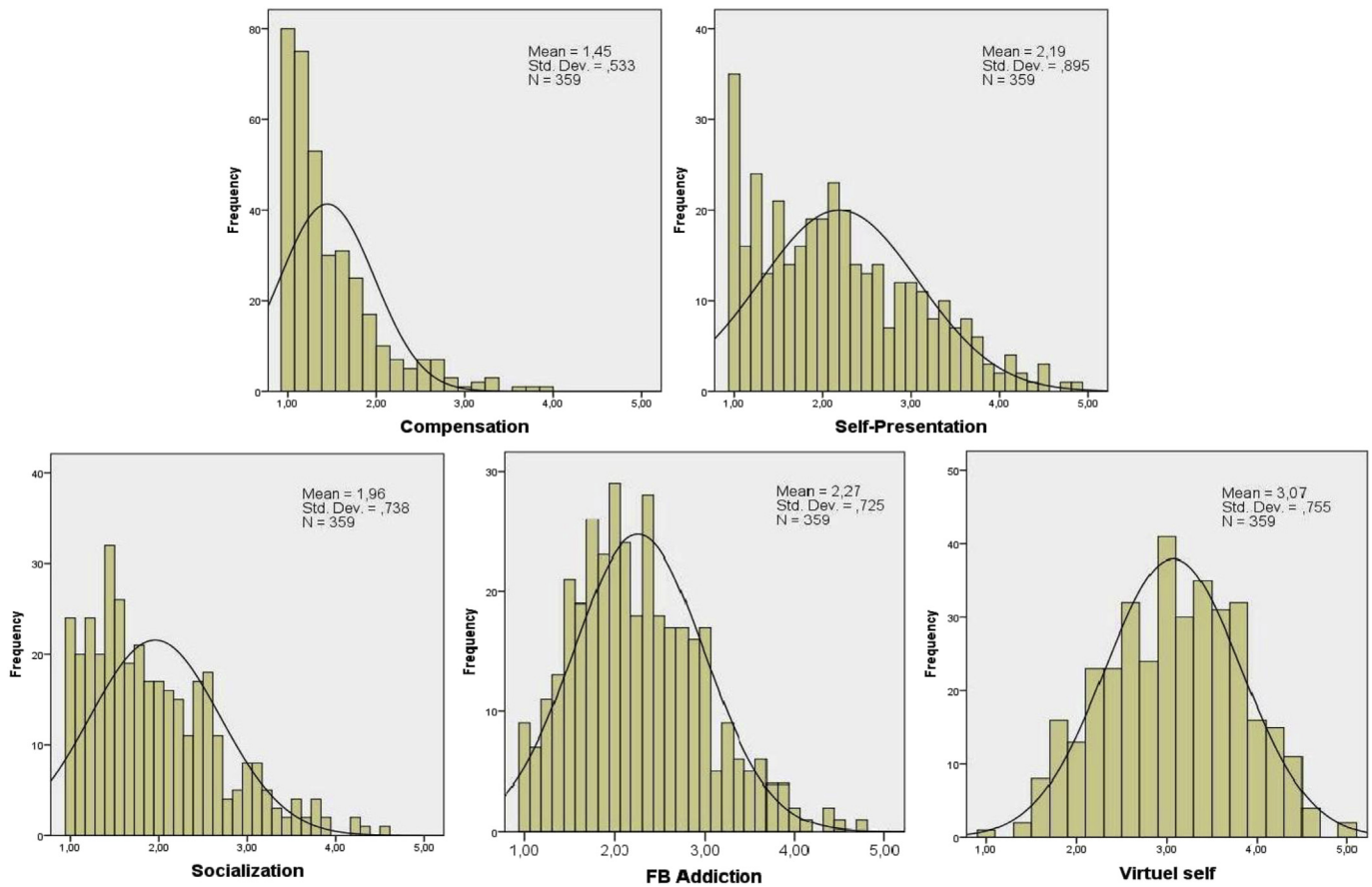


Fig. 3. The distribution of PSAFU dimensions on the sample of students. Description: Fig. 3 presents the distributions of five dimensions of PSAFU scale, which are obtained on the sample of students who have Facebook profile (N = 359).

Çelik, Atak, & Başal, 2013; Kuss, van Rooij, Shorter, Griffiths, & van de Mheen, 2013). Previous research already confirmed that security, control over the communication process, and lack of information about physical appearance (McKenna & Bargh, 2000) make FB an appealing setting for individuals with high social anxiety, emotional reactivity, introversion and poor social adjustment (Amichai-Hamburger & Vinitzky, 2010; Ebeling-Witte et al., 2007; Hamburger & Ben-Artzi, 2000; McCord et al., 2014; Sheldon, 2008; Valkenburg et al., 2005; Weidman et al., 2012; Yen et al., 2012). This is probably because in a protected environment such as FB, these individuals can make desired impressions and feel socially accepted. Thus, our results largely support the compensation

theory (Kraut et al., 2002; Valkenburg et al., 2005), and they also complement these findings by indicating that FB addiction and compensation, when taken together, are behavioral patterns characteristic for individuals with high social anxiety, low conscientiousness and agreeableness, high neuroticism, as well as introversion. This study found only limited support for the result of Lin and Tsai (2002), who showed that excessive and addictive use of FB is characteristic of sensation-seekers.

Interestingly, out of five dimensions of FB use, Social Anxiety most strongly predicts Self-presentation on FB. It seems that possibility of strengthening and enhancing the self in online communication is very appealing for individuals who experience problems

Table 6
Regression model with personality traits predicting long version of PSAFU dimensions on two subsamples.

Criterion	Subsample	R ²	β						
			N	E	O	A	C	Social anxiety	Sensation seeking
Compensation	FB users	.174	-.017	-.114*	.088	-.159**	-.139**	.255**	.010
	student	.221	-.028	-.178**	-.044	-.130*	-.046	.323**	.088
Self-Presentation	FB users	.328	-.102*	.028	.160**	-.150**	-.038	.586**	-.036
	student	.314	-.056	.000	.055	-.094	-.017	.565**	.069
Socialization	FB users	.071	.044	.027	.076	-.004	-.057	.118*	.192**
	student	.071	-.048	.052	-.016	-.051	-.053	.202**	.154**
FB Addiction	FB users	.184	.176**	.069	.037	-.014	-.235**	.191**	.058
	student	.154	.119*	.069	-.081	-.035	-.213**	.177**	.127*
Virtual Self	FB users	.082	.036	.089	.178**	.018	.082	.198**	.015
	student	.060	-.010	.027	.048	.085	.052	.204**	.079

*Significant at the $p \leq .05$ level.

**Significant at the $p \leq .01$ level.

in communication in offline setting. Self-presentation was also found to be characteristic of individuals with low Agreeableness and Neuroticism, and higher Openness. Although relationship between Self-presentation and Neuroticism in regression analysis is negative, their Pearson correlation is positive. This suppression effect indicates that, when Social Anxiety and other personality characteristics are controlled, impression management activities on FB require some emotional stability. Openness for new ideas and experiences enables self-presenting individuals to experiment with different identities. It's important to mention that some of the results described here were obtained only on a wider sample of FB users, while there seem to be some specificities of student population which prevent us from drawing a more general conclusion regarding the relationship between FB use and personality. Nevertheless, having in mind that wider FB sample better represents the population of FB users (with wider age range and some other characteristics), we expect these findings to be supported in future studies.

Zero correlation between Extraversion and Socialization on FB supports neither Rich-Gets-Richer, nor Poor-Gets-Richer hypothesis (Kraut et al., 2002; Valkenburg et al., 2005). However, these findings might actually mean that both hypotheses are sustainable. Introverts and extroverts may both be attracted to the possibility of making new friendships online (leading to the zero correlation with the measure of FB socialization), but for different reasons. For former, FB is a secure surrounding where their poor social functioning can be mitigated. For latter, FB is only another place where they can meet new people and satisfy their need for social interactions. Hence, consistent with the conclusions of Moore and McElroy (2012), when analyzing relationship between the measures of socialization on FB and in real life, we recommend taking into account the motivation for online socialization. Although not related to Extraversion, Socialization on FB is related to higher Sensation-seeking, indicating that individuals, with pronounced need for novelty, use FB to enrich their social connections.

When it comes to personality correlates of Virtual self, our analyses showed that individuals who are socially anxious and, to some extent, open to experiences are more open to accept Facebook profile as a part of their identity and the medium for transmission of personal information to others. Nevertheless, having in mind that we found significantly positive relationship between Openness and Virtual Self only on sample of FB users and not on student sample, this result should be further tested.

Finally, it is interesting that correlations between dimensions of psycho-social aspects of Facebook use and personality traits are only low to moderate. There are few possible explanations for these correlations not being higher than that. First, some other factors might influence behaviors on Facebook, such as self-concept, personal values, motivation, etc. Second, Facebook may be a safe surrounding for experimenting with identities. People may feel free to explore behaviors and identities they usually restrain to show among people from "real" life. Another possible (and quite probable) explanation is that users' behaviors and experiences on FB are much narrower in scope than their behaviors and experiences in offline setting (which are encompassed by Big five and other personality traits), and, therefore, cannot be expected to correlate with them to a greater extent.

4.1. Limitations and future directions

Important limitation of this study is the convenient and dominantly female sample, which limits generalization of the findings to a wider (especially male) population. Future studies should aim at more representative research sample. Although we don't expect that psycho-social aspects of FB use in Serbia are different than in

other countries, very important step in the validation of this instrument is the examination of its cultural universality. Some relations between behaviors on FB and personality, which showed inconsistent results on two samples in our study, should be further tested. Also, other correlates of psycho-social aspects of FB use, such as other personality traits, personal values, motivation or self-concept dimensions, would be relevant to examine.

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