



## Addicted to Facebook? Relationship between Facebook Addiction Disorder, duration of Facebook use and narcissism in an inpatient sample



Julia Brailovskaia<sup>a,\*</sup>, Jürgen Margraf<sup>a</sup>, Volker Köllner<sup>b</sup>

<sup>a</sup> Mental Health Research and Treatment Center, Ruhr-Universität Bochum, Massenbergstr. 9-13, 44787 Bochum, Germany

<sup>b</sup> Department of Psychosomatic Medicine, Rehabilitation Center Seehof, Federal German Pension Agency, and Psychosomatic Rehabilitation Research Group, Charité – Universitätsmedizin Berlin, Germany

### ARTICLE INFO

#### Keywords:

Facebook Addiction Disorder (FAD)  
Duration of Facebook use  
Narcissism  
Inpatients

### ABSTRACT

The present study explored the Facebook Addiction Disorder (FAD) in an inpatient sample in Germany. Of the 112 Facebook users (71.4% women; age(years):  $M(SD) = 49.43(9.17)$ ), who were patients of a psychosomatic rehabilitation clinic with affective disorders and anxiety disorders as most common diagnoses, 28.6% reached the critical polythetic cutoff score of FAD, 0.9% researched the critical monothetic cutoff score, and 86.6% had enhanced values of withdrawal symptoms due to Facebook use. The mean level of FAD was significantly higher in inpatients with week depression than in inpatients with moderate depression. In the whole sample, FAD was significantly positively linked to duration of Facebook use and the personality trait narcissism. Present results provide first evidence of FAD in a non-student inpatient sample. They contribute to the understanding of the development of FAD and demonstrate that addictive Facebook use may impact persons who suffer from mental disorders, especially when they have enhanced levels of the personality trait narcissism. Practical applications for research and clinical treatment, as well as limitations of present results are discussed.

### 1. Introduction

The social networking site (SNS) Facebook has currently over 2.3 billion members and over 1.5 billion daily users (Roth, 2018). While some members visit Facebook for only few minutes a week, other users spend up to several hours daily on the SNS (Ryan et al., 2014; Wegmann et al., 2015). Especially individuals with increased depression and anxiety symptoms, who often lack adequate strategies to cope with daily stress, often engage in intensive Facebook use to temporary escape from offline problems and to find relief (Green et al., 2016; McCord et al., 2014; Rosen et al., 2013; Ryan et al., 2014; Steers et al., 2014). The social interaction with online friends, who often provide supportive feedback, contributes to individual mood modification and enhances subjective well-being (Brailovskaia and Margraf, 2016; Gerson et al., 2016; Kim and Lee, 2011; Lin et al., 2014; Nabi et al., 2013; Vanman et al., 2018).

However, there is also a “dark side” to the positive experiences on Facebook (Fox and Moreland, 2015); excessive time spent on Facebook may negatively impact life satisfaction in the long-run (Hayes et al., 2015; Kalpidou et al., 2011; Kross et al., 2013; Tromholt, 2016) and can contribute to the development of a strong psychological need to stay permanently online, loss of control over the use, and pathological

unease when not on Facebook (Błachnio et al., 2016, 2015; Brailovskaia et al., 2018a, 2018b; Hong and Chiu, 2016; Muench et al., 2015; Ryan et al., 2014). This phenomenon has been called Facebook Addiction Disorder (FAD; Brailovskaia and Margraf, 2017) and is defined by six typical characteristics: salience (e.g., permanent thinking of Facebook), tolerance (e.g., increasing of Facebook use time to achieve previous positive using effect), mood modification (e.g., Facebook use for mood improvement), relapse (e.g., reverting to earlier use pattern after ineffective attempts of Facebook use reduction), withdrawal symptoms (e.g., becoming nervous without Facebook use), and conflict (e.g., intensive Facebook use causes interpersonal problems) (Andreassen et al., 2013, 2012; Wilson et al., 2010).

Previous cross-sectional studies found FAD to be significantly associated with variables of mental health and with personality traits. FAD was positively related to insomnia, depression, anxiety, and stress symptoms, as well as to different forms of addictive behavior. It was significantly negatively linked to resilience (“psychological stress-resistance”; see Masten, 2001) and physical activity (Andreassen et al., 2012; Brailovskaia et al., 2018b, 2018c; Frost and Rickwood, 2017; Koc and Gulyagci, 2013). Additionally, a recent longitudinal study indicated that daily stress positively predicted the level of FAD across a time span of one year (Brailovskaia et al., 2018c). Similar to

\* Corresponding author.

E-mail address: [Julia.Brailovskaia@rub.de](mailto:Julia.Brailovskaia@rub.de) (J. Brailovskaia).

problematic video gaming behavior (Hull et al., 2013; Wu et al., 2013), the level of subjective happiness and of flow (i.e., intensive enjoyment and pleasure due to which the specific activity is continued further and further) experienced while using Facebook were discussed to be positive predictors of FAD (Brailovskaia et al., 2018a, 2018b). While FAD was positively linked to the personality trait neuroticism, its association with the trait conscientiousness and self-esteem was negative (Marino et al., 2018). Considering results of several previous studies that demonstrated addictive social media use to be positively linked to “anxious” and “avoidant” attachment orientations and negatively linked to “secure” attachment orientation (Monacis et al., 2017a, 2017b; Sinatra et al., 2016), it seems reasonable to assume that similar associations may be found for addictive Facebook use.

Furthermore, it has been assumed that individuals with enhanced level of the personality trait narcissism are at specific risk to develop FAD (Błachnio and Przepiórka, 2018; Brailovskaia and Margraf, 2017; Brailovskaia et al., 2018b; Casale and Fioravanti, 2018). Narcissistic persons have a high need for attention and admiration. To satisfy this need, they tend to initiate many social relationships and to present themselves as charming and extraverted interaction partners (Campbell et al., 2006; 2002; Rohmann et al., 2010). As long as the relationship remains superficial, narcissists are able to keep up this positive impression. However, when the relationship has to be deepened – for example during treatment in a clinical setting – the narcissistic selfishness, low agreeableness, and tendency to manipulate other people become apparent and negatively influence the interaction process and its outcome (Paulhus, 2001). Therefore, patients with an increased level of the trait narcissism – regardless of their clinical diagnosis – are often described as difficult to treat due to lack of compliance, which negatively impacts their recovery process (Neumann, 2010).

Facebook offers its members various possibilities for self-presentation and initiation of superficial social relationships. Narcissistic individuals frequently take advantage of such opportunities. They spend excessive time on Facebook and engage in various interactions with their online friends, who often provide them positive feedback (e.g., positive comments, “Likes”) (Brailovskaia and Bierhoff, 2016, 2018; Brailovskaia and Margraf, 2018; Buffardi and Campbell, 2008; McKinney et al., 2012; Mehdizadeh, 2010; Ong et al., 2011; Ryan and Xenos, 2011). Such feedback is of significant importance for narcissistic users. It satisfies their need for attention and admiration, fosters their self-esteem, and also contributes to further excessive duration of Facebook use, which however enhances the risk to develop FAD (Błachnio and Przepiórka, 2018; Brailovskaia and Margraf, 2017; Brailovskaia et al., 2018b; Casale and Fioravanti, 2018).

Thus, it can be concluded that especially narcissistic individuals who spend excessive time on Facebook are at specific risk of developing FAD, which is inter alia positively linked to variables of negative mental health. However, considering that most available studies on FAD have been conducted with young student samples (e.g., Andreassen et al., 2012; Mehdizadeh, 2010; Phanathit et al., 2015; Pontes et al., 2016), the question arises whether this conclusion may also be generalized to other groups, specifically to clinical inpatients, who suffer from depression and anxiety symptoms and often tend to spend excessive time on Facebook to escape from negative mood and rumination (Frost and Rickwood, 2017; Ryan et al., 2014; te Wildt, 2018; Wegmann et al., 2015). If so, duration of Facebook use and FAD could be a specific risk factor for the mental health and recovery process of inpatients, especially those with a high level of narcissism, who often are difficult to treat. As a consequence, Facebook use and specifically FAD should be explicitly addressed during clinical treatment.

Based on these considerations and the fact that research evidence about the prevalence of FAD and its relationships in clinical inpatients is missing, the present study had two main aims: (1) to assess the prevalence of FAD in an inpatient sample to understand whether this phenomenon is relevant in this group; (2) to investigate the relationship between FAD, duration of Facebook use, and narcissism in this specific

sample. This is of particular interest, considering that previous studies discussed narcissism to be a transdiagnostic trait (Lawson et al., 2008; Miller et al., 2014), which saturates multiple forms of mental disorders (Rodríguez-Seijas et al., 2015) and may drive disorder persistence (Krueger and Eaton, 2015). Specifically, FAD was expected to be positively related to the duration of Facebook use (Hypothesis 1) and to the trait narcissism (Hypothesis 2).

Results may enable broader insights into FAD as a potential behavioral addiction. Furthermore, they may shed light on potential risk factors that negatively impact the treatment and the recovery process of inpatients, especially individuals with an enhanced level of narcissism.

## 2. Methods

### 2.1. Procedure and participants

The sample comprised 112 Facebook members (71.4% women; age (years):  $M(SD) = 49.43(9.17)$ , range: 20–65; employees: 100%; marital status: 38.4% unmarried, 45.5% married, 14.3% divorced, 1.8% widowed) who were inpatients at a large psychosomatic rehabilitation clinic in Germany, which mostly focuses on affective disorders and anxiety disorders. In the current sample, the most common diagnoses were affective disorders (56.3%, i.e., week depression: 24.1%, moderate depression: 32.2%) and anxiety disorders (18.8%). The diagnosis of 13.4% of the participants was somatic symptom disorder and 11.6% of the participants were diagnosed with adjustment disorder. Data were collected from April to June 2018 as part of a larger computer survey completed by all patients of the clinic within the first days after their admission as a part of diagnostic routine. Participants were properly instructed and gave written informed consent to participate. A priori conducted power analyses (G\*Power program, version 3.1) showed that the sample size was sufficient for valid results (power > 0.80,  $\alpha = 0.05$ , effect size  $f^2 = 0.15$ ).

### 2.2. Measures

First, participants were asked about the frequency of their general daily Internet use (1 = *less than once a day*, 6 = *ten times a day or more*), followed by the request to name all social platforms they are members on. Then, participants rated specific questions about their Facebook use.

#### 2.2.1. Facebook use duration

Two indicators of duration of Facebook use were aggregated: frequency of Facebook use (1 = *less than once a day*, 6 = *ten times a day or more*); duration of daily Facebook use (1 = *less than five minutes*, 7 = *more than 180 minutes*). A composite index of the two indicators was attained by computing the mean of the z-transformed indicators (correlation between the two indicators:  $r = 0.713$ ,  $p = 0.001$ ; internal reliability of the composite index: Cronbach's  $\alpha = 0.833$ ).

#### 2.2.2. Facebook Addiction Disorder (FAD)

FAD over a time frame of the last year was measured with the German version of the brief form of the Bergen Facebook Addiction Scale (BFAS; English language version: Andreassen et al., 2012; German language version: Brailovskaia and Margraf, 2017). It includes six items according to the six core addiction features (i.e., salience, tolerance, mood modification, relapse, withdrawal, conflict) rated on a 5-point Likert scale (1 = *very rarely*, 5 = *very often*; current reliability:  $\alpha = 0.723$ ) that were taken from the long 18-item version. The 6-item version of the BFAS has been found to have similar good psychometric properties as the long 18-item version (Andreassen et al., 2012; Pontes et al., 2016). Table 1 presents the six items of the brief BFAS. Andreassen et al. (2012) suggested two categorization approaches for problematic BFAS values: a more liberal approach concerning a polythetic scoring scheme (cutoff score:  $\geq 3$  on at least four of the six items),

**Table 1**  
Brief version of the Bergen Facebook Addiction Scale (BFAS; Andreassen et al., 2012).

	Item wording
Item 1 (“Salience”; Item 1 of 18-item version)	Spent a lot of time thinking about Facebook or planned use of Facebook?
Item 2 (“Tolerance”; Item 5 of 18-item version)	Felt an urge to use Facebook more and more?
Item 3 (“Mood modification”; Item 7 of 18-item version)	Used Facebook in order to forget about personal problems?
Item 4 (“Relapse”; Item 11 of 18-item version)	Tried to cut down on the use of Facebook without success?
Item 5 (“Withdrawal”; Item 13 of 18-item version)	Become restless or troubled if you have been prohibited from using Facebook?
Item 6 (“Conflict”; Item 16 of 18-item version)	Used Facebook so much that it has had a negative impact on your job/studies?

and a more conservative approach concerning a monothetic scoring scheme (cutoff score:  $\geq 3$  on all six items).

2.2.3. Narcissism

The trait narcissism was assessed with the brief *German Narcissistic Personality Inventory* (G-NPI-13; Brailovskaia et al., 2017) that includes 13 forced-choice format items (0 = low narcissism, e.g., “I am not particularly interested in looking at myself in the mirror”, 1 = high narcissism, e.g., “I like to look at myself in the mirror”; current reliability:  $\alpha = 0.661$ ).

2.3. Statistical analyses

Statistical analyses were conducted with the Statistical Package for the Social Sciences (SPSS) 24. Associations between the investigated variables were assessed with zero-order bivariate correlation analyses. Considering the different clinical diagnoses in the current sample, the level of the investigated variables was compared between different inpatient groups due to their diagnosis by calculating multivariate analyses of variance (MANOVA). Since Box’s tests were non-significant, Pillai’s trace was used as multivariate test.

3. Results

In general, the Internet was used by 51 (45.5%) participants less than once a day, by 28 (25%) participants once a day, by nine (8%) participants twice a day, by 18 (16.1%) participants three to five times a day, and by six (5.4%) participants five to eight times daily. All

participants used Facebook. Additionally, respectively four (3.6%) participants were members of the social platform Instagram or Xing. Table 2 presents descriptive statistics of the investigated Facebook use variables, FAD, and narcissism of the whole sample.

The critical cutoff score of FAD was reached by 32 (28.6%) participants due to the polythetic scoring, and by one (0.9%) participant due to the monothetic scoring. Item 5 (withdrawal) reached the most critical values, followed by Item 6 (conflicts; see Table 2). FAD was significantly positively correlated with duration of Facebook use ( $r = 0.451, p = 0.001$ ) and with narcissism ( $r = 0.209, p = 0.027$ ), which were significantly positively interrelated ( $r = 0.268, p = 0.004$ ).

In the next step, participants were divided into four groups corresponding to their diagnosis (i.e., affective disorders:  $N = 63$ , anxiety disorders:  $N = 21$ , somatic symptom disorder:  $N = 15$ , adjustment disorder:  $N = 13$ ). A MANOVA revealed no significant group differences (Pillai’s trace:  $V = 0.125, F(9,324) = 1.564, p = 0.125$ ) due to the level of FAD ( $F(3,108) = 1.145, p = 0.334$ ), duration of Facebook use ( $F(3,108) = 1.114, p = 0.347$ ) and narcissism ( $F(3,108) = 1.308, p = 0.275$ ).

A further MANOVA was calculated to compare the three investigated variables of participants who were diagnosed with week depression ( $N = 27$ ) and those participants who were diagnosed with moderate depression ( $N = 36$ ). The multivariate test became significant (Pillai’s trace:  $V = 0.126, F(3,59) = 2.846, p = 0.045$ , effect size:  $\eta_p^2 = 0.126$ ). While there were no significant group differences due to duration of Facebook use ( $F(1,61) = 3.681, p = 0.060$ ) and narcissism ( $F(1,61) = 0.083, p = 0.774$ ), FAD ( $F(1,61) = 7.708, p = 0.007$ ) was significantly higher in the group of participants with week depression

**Table 2**  
Descriptive statistics of narcissism, BFAS and Facebook use.

	N (%)	M (SD)	Min–Max	$\geq 3: N (%)$
G-NPI-13		2.24 (2.14)	0–8	
BFAS		15.68 (4.66)	6–26	
BFAS: Item 1 (“Salience”)		1.11 (4.11)	1–4	2 (1.8)
BFAS: Item 2 (“Tolerance”)		3.20 (1.56)	1–5	74 (66.1)
BFAS: Item 3 (“Mood modification”)		1.94 (1.30)	1–5	32 (28.6)
BFAS: Item 4 (“Relapse”)		1.85 (1.16)	1–5	26 (23.2)
BFAS: Item 5 (“Withdrawal”)		4.06 (1.20)	1–5	97 (86.6)
BFAS: Item 6 (“Conflict”)		3.53 (1.25)	1–5	87 (77.7)
<i>Frequency of Facebook use</i>				
(1) “less than once a day”	65 (58)			
(2) “once a day”	28 (25)			
(3) “twice a day”	11 (9.8)			
(4) “3–5 times a day”	7 (6.3)			
(5) “5–8 times a day”	1 (0.9)			
(6) “10 times a day or more”	–			
<i>Duration of daily Facebook use</i>				
(1) “less than 5 min”	80 (71.4)			
(2) “5–15 min”	16 (14.3)			
(3) “15–30 min”	9 (8)			
(4) “30–60 min”	7 (6.3)			
(5) “60–120 min”	–			
(6) “120–180 min”	–			
(7) “more than 180 min”	–			

Notes. N = 112; M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum; G-NPI = German Narcissistic Personality Inventory; BFAS = Bergen Facebook Addiction Scale.

(FAD:  $M = 16.96$ ,  $SD = 4.70$ , range: 9–26) than in the group of participants with moderate depression (FAD:  $M = 14.03$ ,  $SD = 3.69$ , range: 6–21). A separate analysis of both groups revealed that in the group with week depression the critical cutoff score of FAD was reached by 11 (9.8% of the whole sample) participants due to the polythetic scoring, and by one (0.9% of the whole sample) participant due to the monothetic scoring. In the group with moderate depression, the critical cutoff score of FAD was reached by 2 (1.8% of the whole sample) participants due to the polythetic scoring, and by no one due to the monothetic scoring.

#### 4. Discussion

The present study investigated for the first time addictive Facebook use and its relationships in an inpatient sample in Germany. Results reveal that FAD, which previously has only been investigated in student samples, seems to be an important issue to consider also for inpatients.

First, in the current inpatient sample, the mean FAD level and the number of participants who reached the critical cutoff score in accordance with the polythetic scoring defined by [Andreassen et al. \(2012\)](#) were remarkable higher than those found in student samples in Germany and Norway (FAD level:  $M = 8.98$ – $13.00$ ,  $SD = 3.64$ – $5.20$ ; polythetic scoring: 4.5% to 8.4%). The number of participants who reached the monothetic scoring was equally high in the previous samples and in the present sample. Note that all considered studies used the same instrument to assess FAD ([Andreassen et al., 2013](#); [Brailovskaia and Margraf, 2017](#); [Brailovskaia et al., 2018b](#)).

The comparison of inpatients with different diagnoses (i.e., affective disorders, anxiety disorders, somatic symptom disorder, adjustment disorder) revealed no significant differences of the mean FAD level. However, inpatients with week depression had significantly higher FAD values and reached the critical cutoff score more frequently than those with moderate depression. Thus, even though Facebook was used in both subgroups equally frequent, individuals with week depression seem to be at higher risk to develop FAD. This finding might partly be explained by the following considerations. Previous studies described intensive Facebook use to be positively linked to happiness and to the experience of flow ([Kaur et al., 2016](#); [Kim and Lee, 2011](#)) caused by the immersion in an attractive online world where a lot of positive feedback is available ([Brailovskaia et al., 2018a](#)). While persons with week depression may benefit from this offer, individuals with moderate depression seem to be too occupied with their negative cognitions to enjoy the benefits of the online world equally. They perceive less positive online feedback or misinterpret it, and therefore are not able to experience as much pleasure as other Facebook members. However, considering that subjective happiness and flow experience caused by Facebook use may contribute to the enhance of FAD ([Brailovskaia et al., 2018a, 2018b](#)), the inability to escape from the negative mood by Facebook activity might contribute to a lower FAD level of persons with moderate depression in comparison to those with week depression.

Furthermore, present results revealed that of the whole inpatient sample, 86.6% had enhanced values of withdrawal symptoms due to Facebook use. It seems reasonable to hypothesize that withdrawal symptoms measured by the BFAS show parallels to the withdrawal as one of the core symptoms of addictive disorders described in the Diagnostic and Statistical Manual of Mental Disorders (5th ed., DSM-5; [American Psychiatric Association, 2013](#)). Future studies should investigate whether similar psychophysiological processes are involved in both types of withdrawal. Note that increased level of withdrawal symptoms may negatively influence the physical and mental well-being of the inpatients and jeopardize their recovery process.

Furthermore, it is important to mention that 77.7% of the present participants reached enhanced values of the Item 6 (conflict). This finding emphasizes negative consequences of Facebook use ([Frost and Rickwood, 2017](#); [Kross et al., 2013](#)): significant interpersonal problems may occur especially for individuals who neglect their employment and

families which they are responsible for because of their excessive time on Facebook. It can be assumed that in the short run, the escape into the Facebook world may contribute to relief. However, in the long run, this self-regulation strategy seems to foster interpersonal conflicts on the basis of uncompleted tasks and feelings of individual overload and failure, which may enhance depression and anxiety symptoms ([Brailovskaia and Margraf, 2017](#); [Brailovskaia et al., 2018a](#)).

Second, as expected, FAD was positively linked to duration of Facebook use (confirmation of Hypothesis 1) and narcissism (confirmation of Hypothesis 2). Thus, considering present results and previous considerations on FAD (e.g., [Brailovskaia et al., 2018b](#)), it may be hypothesized that in the inpatient sample duration of Facebook use and FAD can negatively impact the recovery process and that inpatients with an enhanced level of narcissism are at specific risk for developing FAD.

Following considerations may partly explain these findings. Narcissistic individuals have a high need for attention and admiration that confirm the belief of their own grandiosity. To satisfy this need, they engage in many social interactions ([Miller and Campbell, 2008](#)). However, narcissists who suffer from increased level of negative mental health, for example depression or anxiety symptoms, feel overwhelmed and often are not able to maintain positive self-presentation in social interactions. This decreases the probability of receiving positive social feedback and negatively influences the narcissistic self-esteem ([Campbell et al., 2004](#)). On Facebook, the initiation and maintenance of superficial relationships is considerably easier than offline ([Buffardi and Campbell, 2008](#)). To protect their self-esteem, narcissistic individuals tend to use this alternative strategy excessively. They immerse into the online world which increases their risk of developing FAD ([Brailovskaia et al., 2018b](#)). Such behavior impedes the treatment of people in a clinical setting; they refuse to deal with the offline world where they do not believe to find the desired admiration.

Based on present results, it seems reasonable to assume that addictive Facebook use may have a negative impact on the recovery process of inpatients, especially those with a high level of the transdiagnostic personality trait narcissism. This aspect should be considered in the therapeutic process. Facebook use and its potential negative consequences ([Frost and Rickwood, 2017](#); [Kross et al., 2013](#); [Marino et al., 2018](#); [Sagioglou and Greitemeyer, 2014](#)), specifically the development of addictive tendencies ([Andreassen et al., 2012](#)), need to be addressed in the psychoeducation. Patients who tend to spend excessive time on Facebook to escape from daily stressors and to find relief should be advised to limit their Facebook activity. To support them, practical advice such as including “pop-up” messages or deploying an alarm clock to regulate usage time, and turning off notification prompts of the social platform, should be provided. Furthermore, alternative strategies for self-regulation to deal with negative feelings should be discussed and practiced. Such strategies may include increased physical activity, which has been previously found to mediate the link between daily stress and FAD, or mindfulness practice ([Brailovskaia et al., 2018a](#); [Brailovskaia et al., 2018c](#); [Frost and Rickwood, 2017](#); [Wegmann et al., 2015](#)). Furthermore, patients with enhanced depression and anxiety symptoms, low self-esteem, and/or “anxious” or “avoidant” attachment orientation, who often tend to use social media excessively to receive positive feedback ([Marino et al., 2018](#); [Monacis et al., 2017a, 2017b](#)), may especially benefit from a therapeutic (group) setting addressing the question how to obtain positive approval offline. The attention of narcissistic patients, who often search for admiration on Facebook, may be drawn to potential offline interactions where they could receive desired positive feedback.

Addressing addictive Facebook use in the clinical setting seems to be a promising approach to contribute to the recovery process of patients. Moreover, it may also have additional positive implications. Many inpatients have children who also often engage in intensive use of social platforms. Thus, after receiving psychoeducation in the clinic, patients may be more aware of problematic use and monitor more carefully

children's Facebook activity, engage in their media education, and involve them in alternative self-regulation strategies.

#### 4.1. Limitations and further research

Current results reveal that addictive Facebook use might be an important issue in the clinical context. The mean level of FAD did not differ between inpatients with different clinical diagnoses. However, the present sample was limited to only several diagnoses and each diagnosis was represented by only few individuals, except affective disorders. Therefore, future studies are advised to investigate whether current findings may be generalized to all inpatient groups or whether they apply only to patients with specific diagnoses. Considering that for example patients with schizophrenia often have problems with social behavior due to affect recognition deficits, deficits of communication and of ability to feel intimacy, as well as social aggressiveness (Buchsbau et al., 1980; Hooker and Park, 2002), it may be assumed that these individuals rather seldom use Facebook and therefore have a low risk to develop FAD.

Furthermore, considering that the current investigation was conducted with cross-sectional data, only hypothetical assumptions on causality can be drawn from present results. To enable causal statements, future studies are advised to replicate present findings by longitudinal prospective investigations. Additionally, the current sample comprised mostly female participants. Therefore, the replicability of present findings should be investigated in a more representative sample with an equal gender ratio.

Note that addictive Facebook use is a comparatively new phenomenon that is currently not defined as a formal psychiatric disorder in the DSM-5 (American Psychiatric Association, 2013). Similar to other forms of addictive media use (Griffiths et al., 2016), its recognition as a behavioral addiction is still a contentious issue (Carbonell and Panova, 2017). This depends inter alia on the current lack of an established definition of this phenomenon and of absence of a standardized instrument for its assessment. Longitudinal studies on stability of addictive Facebook use and on its functional and neural impairment are missing (Billieux et al., 2015; Carbonell and Panova, 2017). Additionally, despite the high popularity of the social platform Facebook and previous results that emphasized the negative impact of excessive Facebook use for mental health (Brailovskaia and Margraf, 2017; Kross et al., 2013; Ryan et al., 2014; Shakya and Christakis, 2017), it is still not clarified whether addictive Facebook use should be regarded exceptionally, or whether it should be subsumed as addictive SNSs use or as addictive media use.

These considerations and the current results, which demonstrate that addictive Facebook use may become a significant problem in the clinical setting, emphasize the strong necessity for further longitudinal experimental research on addictive Facebook use that focuses inter alia on its long-term consequences and on its neural basis. Previous studies found physiological functions, such as heart rate and blood pressure (Reed et al., 2017; Romano et al., 2017), as well as reduction of striatal D2 receptors (Kim et al., 2011) to be significantly linked to addictive Internet use. Probably, similar correlates may be identified for FAD.

In the current study, the brief version of BFAS was used to assess FAD. Results of a recent meta-analysis reported this instrument to be one of the most widely used measures to assess addictive Facebook use (Marino et al., 2018). Its brief version has been shown to have similarly good psychometric properties as the long version (Andreassen et al., 2013; Andreassen et al., 2012; Pontes et al., 2016). Nevertheless, when interpreting present findings, it should be considered that FAD was measured with only six items which might restrict the informative value of the results. Therefore, future studies are advised to supplement the short self-report measure by further longer instruments, as well as objective measures and behavior observations in experimental settings. Furthermore, in the present work, the critical cutoff was assessed following the categorization approach (polythetic scoring, monothetic

scoring) proposed by Andreassen et al. (2012). Other ways of categorization are surely possible (see Bányai et al., 2017). Thus, future research is needed to identify the most suitable approach concerning the critical cutoff level of addictive Facebook use.

To sum up, in the present study, for the first time, FAD has been investigated in a non-student inpatient sample. Results demonstrate that addictive Facebook use is not only a problem of mentally healthy students, but also may impact persons who suffer from mental disorders, especially with an enhanced level of narcissism. This emphasizes that FAD no longer constitutes a negligible phenomenon and that there is a huge need for further investigations on this addictive behavior.

#### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### Declarations of Interest

None.

#### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.01.016.

#### References

- American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. American Psychiatric Association, Washington, DC.
- Andreassen, C.S., Griffiths, M.D., Gjertsen, S.R., Krossbakken, E., Kvam, S., Pallesen, S., 2013. The relationships between behavioral addictions and the five-factor model of personality. *J. Behav. Addict.* 2 (2), 90–99.
- Andreassen, C.S., Torsheim, T., Brunborg, G.S., Pallesen, S., 2012. Development of a Facebook addiction scale. *Psychol. Rep.* 110 (2), 501–517.
- Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M.D., Andreassen, C.S., Demetrovics, Z., 2017. Problematic social media use: results from a large-scale nationally representative adolescent sample. *PLoS One* 12 (1), e0169839.
- Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., Heeren, A., 2015. Are we over-pathologizing everyday life? A tenable blueprint for behavioral addiction research. *J. Behav. Addict.* 4 (3), 119–123.
- Blachnio, A., Przepiórka, A., 2018. Facebook intrusion, fear of missing out, narcissism, and life satisfaction: a cross-sectional study. *Psychiatry Res.* 259, 514–519.
- Blachnio, A., Przepiórka, A., Pantic, I., 2016. Association between Facebook addiction, self-esteem and life satisfaction: a cross-sectional study. *Comput. Human Behav.* 55, 701–705.
- Blachnio, A., Przepiórka, A., Pantic, I., 2015. Internet use, Facebook intrusion, and depression: results of a cross-sectional study. *Eur. Psychiatry* 30 (6), 681–684.
- Brailovskaia, J., Bierhoff, H.-W., 2016. Cross-cultural narcissism on Facebook: relationship between self-presentation, social interaction and the open and covert narcissism on a social networking site in Germany and Russia. *Comput. Human Behav.* 55, 251–257.
- Brailovskaia, J., Bierhoff, H.-W., 2018. The narcissistic millennial generation: a study of personality traits and online behavior on Facebook. *J. Adult Dev.* 1–13. <https://doi.org/10.1007/s10804-018-9321-1>.
- Brailovskaia, J., Bierhoff, H.-W., Margraf, J., 2017. How to identify narcissism with 13 items? Validation of the German Narcissistic Personality Inventory-13 (G-NPI-13). Assessment 1–15. <https://doi.org/10.1177/1073191117740625>.
- Brailovskaia, J., Margraf, J., 2016. Comparing Facebook users and Facebook non-users: relationship between personality traits and mental health variables – an exploratory study. *PLoS One* 11 (12), e0166999.
- Brailovskaia, J., Margraf, J., 2017. Facebook Addiction Disorder (FAD) among German students – a longitudinal approach. *PLoS One* 12 (12), e0189719.
- Brailovskaia, J., Margraf, J., 2018. What does media use reveal about personality and mental health? An exploratory investigation among German students. *PLoS One* 13 (1), e0191810.
- Brailovskaia, J., Rohmann, E., Bierhoff, H.-W., Margraf, J., 2018a. The brave blue world: Facebook flow and Facebook Addiction Disorder (FAD). *PLoS One* 13 (7), e0201484.
- Brailovskaia, J., Schillack, H., Margraf, J., 2018b. Facebook Addiction Disorder (FAD) in Germany. *Cyberpsychol. Behav. Soc. Netw.* 21 (7), 450–456.
- Brailovskaia, J., Teismann, T., Margraf, J., 2018c. Physical activity mediates the association between daily stress and Facebook Addiction Disorder (FAD) – a longitudinal approach among German students. *Comput. Human Behav.* 86, 199–204.
- Buchsbau, M.S., Coursey, R.D., Murphy, D.L., 1980. Schizophrenia and platelet monoamine oxidase: research strategies. *Schizophr. Bull.* 6 (2), 375–384.
- Buffardi, L.E., Campbell, W.K., 2008. Narcissism and social networking web sites. *Pers.*

- Soc. Psychol. Bull. 34 (10), 1303–1314.
- Campbell, W.K., Bonacci, A.M., Shelton, J., Exline, J.J., Bushman, B.J., 2004. Psychological entitlement: interpersonal consequences and validation of a self-report measure. *J. Pers. Assess.* 83 (1), 29–45.
- Campbell, W.K., Brunell, A.B., Finkel, E.J., 2006. Narcissism, interpersonal self-regulation, and romantic relationships: an agency model approach. In: Vohs, K.D., Finkel, E.J. (Eds.), *Self and relationships: Connecting Intrapersonal and Interpersonal Processes*. Guilford Press, New York, pp. 57–83.
- Campbell, W.K., Rudich, E.A., Sedikides, C., 2002. Narcissism, self-esteem, and the positivity of self-views: two portraits of self-love. *Pers. Soc. Psychol. Bull.* 28 (3), 358–368.
- Carbonell, X., Panova, T., 2017. A critical consideration of social networking sites' addiction potential. *Addict. Res. Theory* 25 (1), 48–57.
- Casale, S., Fioravanti, G., 2018. Why narcissists are at risk for developing Facebook addiction: the need to be admired and the need to belong. *Addict. Behav.* 76, 312–318.
- Fox, J., Moreland, J.J., 2015. The dark side of social networking sites: an exploration of the relational and psychological stressors associated with Facebook use and affordances. *Comput. Human Behav.* 45, 168–176.
- Frost, R.L., Rickwood, D.J., 2017. A systematic review of the mental health outcomes associated with Facebook use. *Comput. Human Behav.* 76, 576–600.
- Gerson, J., Plagnol, A.C., Corr, P.J., 2016. Subjective well-being and social media use: do personality traits moderate the impact of social comparison on Facebook? *Comput. Human Behav.* 63, 813–822.
- Green, T., Wilhelmson, T., Wilmots, E., Dodd, B., Quinn, S., 2016. Social anxiety, attributes of online communication and self-disclosure across private and public Facebook communication. *Comput. Human Behav.* 58, 206–213.
- Griffiths, M.D., Van Rooij, A.J., Kardefelt-Winther, D., Starcevic, V., Király, O., Pallesen, S., Müller, K., Dreier, M., Carras, M., Prause, N., 2016. Working towards an international consensus on criteria for assessing internet gaming disorder: a critical commentary on Petry et al. (2014). *Addiction* 111 (1), 167–175.
- Hayes, M., van Stolk-Cooke, K., Muench, F., 2015. Understanding Facebook use and the psychological effects of use across generations. *Comput. Human Behav.* 49, 507–511.
- Hong, F.Y., Chiu, S.L., 2016. Factors influencing Facebook usage and Facebook addictive tendency in university students: the role of online psychological privacy and Facebook usage motivation. *Stress Health* 32 (2), 117–127.
- Hooker, C., Park, S., 2002. Emotion processing and its relationship to social functioning in schizophrenia patients. *Psychiatry Res.* 112 (1), 41–50.
- Hull, D.C., Williams, G.A., Griffiths, M.D., 2013. Video game characteristics, happiness and flow as predictors of addiction among video game players: a pilot study. *J. Behav. Addict.* 2 (3), 145–152.
- Kalpidou, M., Costin, D., Morris, J., 2011. The relationship between Facebook and the well-being of undergraduate college students. *Cyberpsychol. Behav. Soc. Netw.* 14 (4), 183–189.
- Kaur, P., Dhir, A., Chen, S., Rajala, R., 2016. Flow in context: development and validation of the flow experience instrument for social networking. *Comput. Human Behav.* 59, 358–367.
- Kim, J., Lee, J.E., 2011. The Facebook paths to happiness: effects of the number of Facebook friends and self-presentation on subjective well-being. *Cyberpsychol. Behav. Soc. Netw.* 14 (6), 359–364.
- Kim, S.H., Baik, S.-H., Park, C.S., Kim, S.J., Choi, S.W., Kim, S.E., 2011. Reduced striatal dopamine D2 receptors in people with Internet addiction. *Neuroreport* 22 (8), 407–411.
- Koc, M., Gulbagci, S., 2013. Facebook addiction among Turkish college students: the role of psychological health, demographic, and usage characteristics. *Cyberpsychol. Behav. Soc. Netw.* 16 (4), 279–284.
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D.S., Lin, N., Shablack, H., Jonides, J., Ybarra, O., 2013. Facebook use predicts declines in subjective well-being in young adults. *PLoS One* 8 (8), e69841.
- Krueger, R.F., Eaton, N.R., 2015. Transdiagnostic factors of mental disorders. *World Psychiatry* 14 (1), 27–29.
- Lawson, R., Waller, G., Sines, J., Meyer, C., 2008. Emotional awareness among eating-disordered patients: the role of narcissistic traits. *Eur. Eat. Disord. Rev.* 16 (1), 44–48.
- Lin, H., Tov, W., Qiu, L., 2014. Emotional disclosure on social networking sites: the role of network structure and psychological needs. *Comput. Human Behav.* 41, 342–350.
- Marino, C., Gini, G., Vieno, A., Spada, M.M., 2018. A comprehensive meta-analysis on problematic Facebook use. *Comput. Human Behav.* 83, 262–277.
- Masten, A.S., 2001. Ordinary magic. Resilience processes in development. *Am. Psychol.* 56 (3), 227–238.
- McCord, B., Rodebaugh, T.L., Levinson, C.A., 2014. Facebook: social uses and anxiety. *Comput. Human Behav.* 34, 23–27.
- McKinney, B.C., Kelly, L., Duran, R.L., 2012. Narcissism or openness? College students' use of Facebook and Twitter. *Commun. Res. Rep.* 29 (2), 108–118.
- Mehdizadeh, S., 2010. Self-presentation 2.0: narcissism and self-esteem on Facebook. *Cyberpsychol. Behav. Soc. Netw.* 13 (4), 357–364.
- Miller, J.D., Campbell, W.K., 2008. Comparing clinical and social-personality conceptualizations of narcissism. *J. Pers.* 76 (3), 449–476.
- Miller, J.D., McCain, J., Lynam, D.R., Few, L.R., Gentile, B., MacKillop, J., Campbell, W.K., 2014. A comparison of the criterion validity of popular measures of narcissism and narcissistic personality disorder via the use of expert ratings. *Psychol. Assess.* 26 (3), 958–969.
- Monacis, L., de Palo, V., Griffiths, M.D., Sinatra, M., 2017a. Exploring individual differences in online addictions: the role of identity and attachment. *Int. J. Ment. Health Addict.* 15 (4), 853–868.
- Monacis, L., De Palo, V., Griffiths, M.D., Sinatra, M., 2017b. Social networking addiction, attachment style, and validation of the Italian version of the Bergen social media addiction scale. *J. Behav. Addict.* 6 (2), 178–186.
- Muench, F., Hayes, M., Kuerbis, A., Shao, S., 2015. The independent relationship between trouble controlling Facebook use, time spent on the site and distress. *J. Behav. Addict.* 4 (3), 163–169.
- Nabi, R.L., Prestin, A., So, J., 2013. Facebook friends with (health) benefits? Exploring social network site use and perceptions of social support, stress, and well-being. *Cyberpsychol. Behav. Soc. Netw.* 16 (10), 721–727.
- Neumann, E., 2010. Offener und verdeckter Narzissmus. *Psychotherapeut* 55 (1), 21–28.
- Ong, E.Y., Ang, R.P., Ho, J.C., Lim, J.C., Goh, D.H., Lee, C.S., Chua, A.Y., 2011. Narcissism, extraversion and adolescents' self-presentation on Facebook. *Pers. Individ. Differ.* 50 (2), 180–185.
- Paulhus, D.L., 2001. Normal narcissism: two minimalist accounts. *Psychol. Inq.* 12 (4), 228–230.
- Phanasathit, M., Manwong, M., Hanprathet, N., Khumsri, J., Yingyeun, R., 2015. Validation of the Thai version of Bergen Facebook addiction scale (Thai-BFAS). *J. Med. Assoc. Thailand* 98 (2), 108–117.
- Pontes, H.M., Andreassen, C.S., Griffiths, M.D., 2016. Portuguese validation of the Bergen Facebook addiction scale: an empirical study. *Int. J. Ment. Health Addict.* 14 (6), 1062–1073.
- Reed, P., Romano, M., Re, F., Roaro, A., Osborne, L.A., Viganò, C., Truzoli, R., 2017. Differential physiological changes following internet exposure in higher and lower problematic internet users. *PLoS One* 12 (5), e0178480.
- Rodriguez-Seijas, C., Eaton, N.R., Krueger, R.F., 2015. How transdiagnostic factors of personality and psychopathology can inform clinical assessment and intervention. *J. Pers. Assess.* 97 (5), 425–435.
- Rohmann, E., Bierhoff, H.-W., Schmohr, M., 2010. Narcissism and perceived inequity in attractiveness in romantic relationships. *Eur. Psychol.* 16, 295–302.
- Romano, M., Roaro, A., Re, F., Osborne, L.A., Truzoli, R., Reed, P., 2017. Problematic internet users' skin conductance and anxiety increase after exposure to the internet. *Addict. Behav.* 75, 70–74.
- Rosen, L.D., Whaling, K., Rab, S., Carrier, L.M., Cheever, N.A., 2013. Is Facebook creating "Disorders"? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety. *Comput. Human Behav.* 29 (3), 1243–1254.
- Roth, P., 2018. Nutzerzahlen: Facebook, Instagram, Messenger und WhatsApp, Highlights, Umsätze, uvm (Stand November 2018), allfacebook.de. <https://allfacebook.de/toll/state-of-facebook> accessed 29 November 2018.
- Ryan, T., Chester, A., Reece, J., Xenos, S., 2014. The uses and abuses of Facebook: a review of Facebook addiction. *J. Behav. Addict.* 3 (3), 133–148.
- Ryan, T., Xenos, S., 2011. Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Comput. Human Behav.* 27 (5), 1658–1664.
- Sagioglou, C., Greitemeyer, T., 2014. Facebook's emotional consequences: why Facebook causes a decrease in mood and why people still use it. *Comput. Human Behav.* 35, 359–363.
- Shakya, H.B., Christakis, N.A., 2017. Association of Facebook use with compromised well-being: a longitudinal study. *Am. J. Epidemiol.* 185 (3), 203–211.
- Sinatra, M., de Palo, V., Contini, P., Volpicella, V., 2016. Identity styles and internet-related addictive behaviors in adolescents. *Turk. Online J. Educat. Technol.* 15, 1161–1165.
- Steers, M.-L.N., Wickham, R.E., Acitelli, L.K., 2014. Seeing everyone else's highlight reels: how Facebook usage is linked to depressive symptoms. *J. Soc. Clin. Psychol.* 33 (8), 701–731.
- te Wildt, B.T., 2018. Diagnostik und Therapie der Internetabhängigkeit. *Die Rehabil.* 57 (05), 321–333.
- Tromholt, M., 2016. The Facebook experiment: quitting Facebook leads to higher levels of well-being. *Cyberpsychol. Behav. Soc. Netw.* 19 (11), 661–666.
- Vanman, E.J., Baker, R., Tobin, S.J., 2018. The burden of online friends: the effects of giving up Facebook on stress and well-being. *J. Soc. Psychol.* 158 (4), 496–507.
- Wegmann, E., Stodt, B., Brand, M., 2015. Addictive use of social networking sites can be explained by the interaction of Internet use expectancies, Internet literacy, and psychopathological symptoms. *J. Behav. Addict.* 4 (3), 155–162.
- Wilson, K., Fornasier, S., White, K.M., 2010. Psychological predictors of young adults' use of social networking sites. *Cyberpsychol. Behav. Soc. Netw.* 13 (2), 173–177.
- Wu, T.-C., Scott, D., Yang, C.-C., 2013. Advanced or addicted? Exploring the relationship of recreation specialization to flow experiences and online game addiction. *Leis. Sci.* 35 (3), 203–217.