Research paper

Comparing mental health of Facebook users and Facebook non-users in an inpatient sample in Germany

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ABSTRACT

Background: The present study aimed to investigate differences in variables of positive mental health (PMH, i.e., emotional, psychological and social well-being) and negative mental health (NMH, i.e., somatoform complaints, depressiveness, social stress and insomnia) between clinical inpatients who use the social platform Facebook and those who do not use Facebook. Furthermore, the link between duration of daily Facebook use and mental health should be considered.
Methods: In two subsamples of inpatients of a psychosomatic rehabilitation clinic in Germany (Facebook users: $N = 336$, Facebook non-users: $N = 265$), use of Facebook, PMH and NMH were assessed via a computer survey.
Results: Facebook users had significantly higher values of three variables of NMH (i.e., depressiveness, social stress and insomnia), and significantly lower values of PMH than Facebook non-users. Duration of daily Facebook use was significantly negatively associated with PMH and significantly positively with all variables of NMH.
Limitations: Given the cross-sectional study design, current data do not imply causality.
Conclusion: Current results indicate that Facebook use is negatively associated with PMH and positively with NMH in clinical inpatients. Thus, future research should investigate whether and how Facebook use may have a negative effect on the recovery process of the inpatients.

1. Introduction

In the 21st century, use of social networking sites (SNSs) belongs to daily life of many people. With over 2.3 billion members and over 1.5 billion daily users, Facebook is currently the most popular SNS (Roth, 2019). Individuals who engage in sustained active social interaction on Facebook (e.g., posting status updates and comments in discussion groups) frequently receive social support from their online friends, which satisfies their need for belonging, and improves their mood (Ellison et al., 2011; Steinfield et al., 2008). It was hypothesized that this positive experience might contribute to individuals' mental health (Gerson et al., 2016; Moreno et al., 2011; Nadkarni and Hofmann, 2012). Accordingly, in a study from 2016, Facebook users were described to perceive more social support, to be happier, more satisfied with their life and less depressed than those who do not use Facebook (Brailovskaia and Margraf, 2016). Further research found online social interaction with Facebook friends to enhance life satisfaction and subjective happiness, and to decrease depression, anxiety and stress symptoms (Frison and Eggermont, 2016; Grieve et al., 2013; Nabi et al., 2013; Wang, 2013).

On this background, the question arises whether Facebook use might be a supportive self-help tool in the clinical context. For example, individuals with increased depression symptoms might be advised to become Facebook members and to engage in active use of this SNS to get positive supportive feedback. This could contribute to their life satisfaction and happiness level and make them more resistant to negative symptoms (Brailovskaia and Margraf, 2016; Moreno et al., 2011; Nadkarni and Hofmann, 2012). Furthermore, they could use different services provided by Facebook such as news feed and discussion groups to get information about events and activities. Additionally, in the Facebook groups that mostly cope with specific topics, they get the opportunity to find people with similar interests to discuss these topics, and probability to visit the outstanding events together. This could be of great benefit for persons with enhanced level of depression symptoms.

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However, other research findings raised doubts about the expectation of such a positive effect of Facebook use. Several longitudinal studies described daily Facebook use to contribute to a decrease in life satisfaction and positive mood (Kross et al., 2013; Sagioglou and Greitemeyer, 2014; Shakya and Christakis, 2017; Tromholt, 2016). Duration of daily Facebook use was positively linked to the level of major depression (Rosen et al., 2012) and anxiety symptoms (Frost and Rickwood, 2017). Additionally, Facebook use itself was assumed to be a source of psychological distress (Bevan et al., 2014). On the one hand, it overloads users with a high amount of available information (Campisi et al., 2012) and possibility for communication (Chen and Lee, 2013). On the other hand, extensive duration of Facebook use often leads to interpersonal conflicts at home and at work due to the neglect of obligations in the offline world (Brailovskaia and Margraf, 2017), which may contribute to an increase of negative mental health (e.g., enhancement of depression symptoms) (Ryan et al., 2014). Excessive Facebook use was described to be positively linked to late bedtimes and rising times. Therefore, it was assumed that it might negatively influence the circadian rhythm (Andreassen et al., 2012) and thus contribute to insomnia (Koc and Gulyagci, 2013). Note, insufficient sleep may directly negatively impact physical health and mental health (e.g., increase of anxiety symptoms). Moreover, it often affects individual response pattern by leading to inappropriate aggressive reactions that foster interpersonal conflicts (Lund et al., 2010; Taylor and Bramoweth, 2010).

These inconsistent results hinder a recommendation whether Facebook activity should be used or rather avoided in clinical context. A further issue that impedes such recommendations is that most available studies on Facebook use were conducted with young student samples, which limits the generalizability of previous results. To the best of our knowledge, evidence is lacking regarding Facebook use and its relationship with mental health in patients with mental disorder diagnoses, which might have an impact on the question whether online activity can support or detriment the mental recovery process. Considering the extensive amount of research that focuses on the improvement of therapeutic processes to enhance the chances of recovery for clinical patients, it would be advantageous to assess the role of Facebook use – which often belongs to everyday life – as a potential risk or as a protective factor of mental health in a clinical sample.

On this background, the present study aimed to fill the gap in research by comparing variables of mental health between clinical inpatients who use Facebook and those who do not use this platform. Similar to Brailovskaia and Margraf (2016), who compared Facebook users and Facebook non-users in a student sample, we followed the dual-factor model of mental health (Keyes, 2005). This model emphasizes the necessity to consider mental health on two interrelated but separate unipolar dimensions: positive (i.e., emotional, psychological and social well-being) and negative (i.e., psychopathology) (Antaramian et al., 2010; Suldo and Shaffer, 2008). Variables of both dimensions were included in the present investigation. Given the inconsistent results of prior research on healthy participants and the missing findings of Facebook use in clinical patients, the nature of the present study was exploratory. Therefore, research questions instead of hypotheses were formulated:

Do Facebook users and Facebook non-users in a clinical sample differ regarding positive mental health (PMH)? (*Research Question 1*)
Do Facebook users and Facebook non-users in a clinical sample differ regarding negative mental health (NMH)? (*Research Question 2*)
Furthermore, in the group of Facebook users, we investigated the association between duration of daily Facebook use and variables of mental health:
How is the duration of daily Facebook use related to PMH in a clinical sample?
(*Research Question 3*)

How is the duration of daily Facebook use related to NMH in a clinical sample?
(*Research Question 4*)

2. Methods

2.1. Procedure and participants

The investigation took place at a large psychosomatic rehabilitation clinic in Germany. Note that according to the German Social Law negative health states lasting over six months that are linked to "present or impending restrictions in social or occupational participation are called disability and are subject of rehabilitation" (Linden, 2014; p. 206). There are rehabilitation clinics specialized to specific forms of illness in Germany. Psychosomatic rehabilitation clinics focus mostly on affective disorders, anxiety disorders, adjustment disorders, and somatic symptom disorder.

As a part of diagnostic routine, all inpatients of the present clinic complete a computer survey in the German language within the first days after their admission in a group room including five computers. They are instructed that the survey consists of different questionnaires focusing on mental health. Before an inpatient starts the survey, an employee of the clinic (who previously uploaded and tested the technical part of the survey) enters the inpatient's code (a number that each patient gets at the clinic admission) in the computer. This enables a match of the data of the survey with demographic variables (i.e., age, gender, marital status) and diagnosis of the inpatient. During the completion of the survey (about 25 min), this employee is available for technical or content related questions.

For the current investigation that took place from June 2018 to November 2018, the computer survey included two additional questions (i.e., general use of SNSs, frequency of Facebook use). The total sample consists of 601 inpatients who admitted to the clinic in this period of time. While 336 inpatients of the current sample (M_{age} (SD) = 49.61 (9.65), range: 19–64) were identified as Facebook users, 265 inpatients (M_{age} (SD) = 53.14 (7.71), range: 19–64) were not members of this social platform. Table 1 presents participants' demographic data and diagnoses. In both groups, the most common diagnosis were affective disorders, followed by anxiety disorders, adjustment disorder, somatic symptom disorder and posttraumatic stress disorder. Results of a multivariate analysis of variance (MANOVA) revealed no significant group differences considering the diagnoses (Box's test: n.s.,

Table 1
Demographic statistics, distribution of diagnoses and duration of Facebook use.

	Facebook users (N = 336)	Facebook non-users (N = 265)
	n (%)	n (%)
Gender (women)	244 (72.6)	184 (69.4)
Married	237 (70.5)	175 (66)
Employees	336 (100)	265 (100)
Diagnoses		
Affective disorders	209 (62.2)	152 (57.4)
Anxiety disorders	55 (16.4)	45 (17)
Adjustment disorder	50 (14.9)	39 (14.7)
Somatic symptom disorder	12 (3.6)	17 (6.4)
Posttraumatic stress disorder	10 (3)	12 (4.5)
Duration of daily Facebook use		
(1) "less than 5 min"	108 (32.1)	
(2) "5–15 min"	60 (17.9)	
(3) "15–30 min"	55 (16.4)	
(4) "30–60 min"	55 (16.4)	
(5) "60–120 min"	45 (13.4)	
(6) "120–180 min"	11 (3.3)	
(7) "more than 180 min"	2 (0.6)	

Note. Due to rounding, the sum of listed figures is partly higher than 100%.

Hotelling's trace: $T = .008$, $F (5,595) = .979$, $p = .430$, $\eta_p^2 = .008$) between Facebook users and Facebook non-users. All participants were properly instructed and gave written informed consent to participate. No data were excluded.

2.2. Measures

2.2.1. Use of SNSs

Participants were asked to name all SNSs they are members of. Then, those who were members of Facebook rated the duration of their daily Facebook use (1 = *less than five minutes*, 7 = *more than 180 min*).

2.2.2. Positive mental health (PMH)

PMH was assessed with the unidimensional Positive Mental Health Scale (PMH-Scale; Lukat et al., 2016) that demonstrated good convergent and discriminant validity in various populations. It measures emotional, psychological and social aspects of well-being with nine items (e.g., "I feel that I am actually well equipped to deal with life and its difficulties") rated on 4-point Likert-scale (0 = *do not agree*, 3 = *agree*).

2.2.3. Negative mental health (NMH)

NMH was operationalized by two instruments typically used in psychosomatic rehabilitation in Germany (e.g., Köllner, 2014, 2016): (1) The scales "somatoform complaints", "depressiveness", and "social stress" of the Hamburger Modules for the Assessment of Psychosocial Health (HEALTH-49; Rabung et al., 2009): On the scales "somatoform complaints" (seven items, e.g., "feeling of weakness in individual parts of the body") and "depressiveness" (six items, e.g., "despondency or sadness") participants are asked to rate on a 5-point Likert-scale (0 = *not at all*, 4 = *very much*) how much they suffered from the specific symptoms during the last two weeks. On the scale "social stress", they rate the frequency of negative experiences with their close social network (four items, e.g., "How often does someone from your close social network play down your difficulties and problems?") on a 5-point Likert-scale (0 = *never*, 4 = *always*). (2) The Insomnia Severity Index (ISI; Bastien et al., 2001): This instrument measures the participants' perception of their insomnia level over the last two weeks with seven items (e.g., "difficulty falling asleep") rated on a 5-point Likert-scale (range: 0–4).

For all used scales, higher scores indicate higher level of the measured variable. The internal reliability for each subsample is presented in Table 2. In total, the survey included 35 items (for Facebook users) or 34 items (for Facebook non-users).

2.3. Statistical analyses

Statistical analyses were conducted with the Statistical Package for the Social Sciences (SPSS) 24. First, means of the investigated variables of mental health were compared between Facebook users and Facebook non-users by calculating a MANOVA. Since the Box's test was non-significant, Pillai's trace served as multivariate test. To assess the association between duration of daily Facebook use and mental health in the group of Facebook users, zero-order bivariate correlations and hierarchical regression analyses (CI 95%) were calculated. Each of the five regression models consisted of two steps. Age, gender and marital status were included in Step 1 as control variables, duration of daily Facebook use was added in Step 2. PMH and the four variables of NMH were successively considered as the dependent variable. In all regression analyses, there was no violation of multicollinearity (i.e., all values of tolerance > .25, all variance inflation factor values < 5; Urban and Mayerl, 2006).

3. Results

In the Facebook user group, 17 (5.1%) participants were members of the social platform Xing and twelve (3.6%) individuals used Instagram additionally to Facebook. In the Facebook non-user group, Xing was used by eleven (4.2%) participants, ten (3.8%) participants were members on Instagram and two (0.8%) participants were members on Twitter. The duration of daily Facebook use in the Facebook user group is presented in Table 1. Note that 58 (17.3%) participants spent more than one hour on Facebook daily.

Table 2 shows descriptive statistics of variables of PMH and NMH separately for Facebook users and Facebook non-users as well as the results of the MANOVA. Pillai's trace was significant, $V = .022$, $F (5595) = 2.654$, $p = .022$, $\eta_p^2 = .022$, demonstrating significant differences between both groups. Results revealed that Facebook users had significantly higher means of depressiveness, social stress and insomnia than Facebook non-users. In contrast, Facebook non-users showed a significantly higher mean of PMH. No significant differences were found for somatoform complaints.

In the Facebook user group, duration of daily Facebook use was significantly negatively correlated with PMH ($r = -.148$, $p = .007$). Its correlation with somatoform complaints ($r = .195$, $p < .001$), depressiveness ($r = .168$, $p = .002$), social stress ($r = .152$, $p = .005$), and insomnia ($r = .298$, $p < .001$) was significantly positive. As presented in Table 3, all regression models become significant. Duration of daily Facebook use added significant predictive variance of 2.2% for PMH, of 3.8% for somatoform complaints, of 2.8% for depressiveness, of 2.3% for social stress, and of 9% for insomnia.

4. Discussion

In the current study, for the first time, variables of positive mental health and negative mental health were compared between Facebook users and Facebook non-users in an inpatient sample. Results indicated significant differences which emphasizes the necessity to make Facebook use a subject of discussion within the therapeutic process.

The first research question referred to potential group differences of PMH (see *Research Question 1*). In 2016, young students from Germany, who were members of Facebook, were found to have a higher level of

Table 2

Descriptive statistics, internal reliability, and multivariate analysis of variance (MANOVA) for positive and negative mental health variables (Facebook users vs. Facebook non-users).

	Facebook users (N = 336)		Facebook non-users (N = 265)			
	M (*SD*; min–max)	α	*M* (*SD*; min–max)	α	*F*	*p*
Positive mental health	9.890 (6.078; 0–26)	.881	11.113 (5.647; 0–27)	.859	6.386	.012
Negative mental health						
Somatoform complaints	13.485 (6.357; 0–28)	.813	12.653 (6.129; 0–27)	.820	2.621	.106
Depressiveness	10.684 (5.862; 0–24)	.897	9.220 (5.442; 0–21)	.876	9.861	.002
Social stress	6.884 (3.001; 0–14)	.720	6.181 (2.945; 0–14)	.699	8.261	.004
Insomnia	15.740 (6.505; 0–28)	.917	14.660 (6.159; 0–28)	.910	4.231	.040

Note. *M* = mean, *SD* = standard deviation, *Min* = minimum, *Max* = maximum; degrees of freedom of all *F*-values = 1599, *p* = significance.

Table 3
Hierarchical regression analyses predicting PMH and NMH (Facebook users).

	ß	95% CI	T	Adjusted R^2	Changes in R^2
Model 1: positive mental health					
Step 1, $F(3,332) = .843$, $p = .471$		−.001	.008		
Age	.017	[−.057, .079]	.318		
Gender	−.060	[−2.280, .652]	−1.092		
Marital status	.057	[−.678, 2.191]	1.037		
Step 2, $F(4,331) = 2.500$, $p = .042$		.018	.022		
Duration of daily FB use	−.148**	[−.979, −.158]	−2.724		
Model 2: somatoform complaints					
Step 1, $F(3,332) = 1.499$, $p = 215$		.004	.013		
Age	.025	[−.008, .013]	.467		
Gender	.109*	[.004, .441]	2.004		
Marital status	−.026	[−.266, .161]	−.481		
Step 2, $F(4,331) = 4.489$, $p = .002$			.040	.038	
Duration of daily FB use	.195**	[.052, .173]	3.646		
Model 3: depressiveness					
Step 1, $F(3,332) = 1.889$, $p = .131$			.008	.017	
Age	−.046	[−.016, .006]	−.845		
Gender	.107*	[.000, .469]	1.965		
Marital status	−.048	[−.332, .127]	−.875		
Step 2, $F(4,331) = 3.880$, $p = .004$			.033	.028	
Duration of daily FB use	.167**	[.038, .169]	3.115		
Model 4: social stress					
Step 1, $F(3,332) = .936$, $p = .423$			−.001	.008	
Age	−.015	[−.010, .007]	−.278		
Gender	.046	[−.103, .259]	.846		
Marital status	.080	[−.045, .309]	1.464		
Step 2, $F(4,331) = 2.648$, $p = .033$			.019	.023	
Duration of daily FB use	.150**	[.021, .122]	2.780		
Model 5: insomnia					
Step 1, $F(3,332) = 3.538$, $p = .015$			.022	.031	
Age	.165**	[.040, .183]	3.051		
Gender	.046	[−.881, 2.220]	.850		
Marital status	−.051	[−2.239, .796]	−.935		
Step 2, $F(4,331) = 11.420$, $p < .001$			.111	.090	
Duration of daily FB use	.301**	[.821, 1.657]	5.832		

Note. $N = 336$; ß = standardized coefficient beta; CI = confidence interval; in Step 2, only the new included variable is presented.
** $p < .01$;.
* $p < .05$.

life satisfaction and subjective happiness that belong to variables of PMH than students who did not use Facebook (Brailovskaia and Margraf, 2016). In 2019, those results could not be replicated in an inpatient sample in Germany. In contrast, current findings indicated that Facebook users have a lower level of PMH than Facebook non-users.

Also, the investigation of the second research question that focused on NMH (see *Research Question 2*) revealed results which contradicted the findings of Brailovskaia and Margraf (2016). While in the student sample Facebook users had lower level of depression symptoms which belong to NMH than Facebook non-users, in the current inpatients sample, Facebook users had higher level of depressiveness, social stress and insomnia than non-users.

To answer the third and the fourth research question that referred to the link between duration of Facebook use and mental health, the group of Facebook users was investigated separately. While the duration of daily Facebook use was negatively associated with PMH (see *Research Question 3*), its relationship with NMH represented by somatoform complaints, depressiveness, social stress, and insomnia was positive (see *Research Question 4*). Note that particularly the correlations between the investigated variables are low. However, they are statistically significant on a $p < .01$ level. Furthermore, the results of the regression analyses revealed that the duration of daily Facebook use moreover contributes to the predictive variance of the investigated mental health variables, whereby the highest percentage was found for insomnia. Notably, mental health is a complex construct that may be influenced by various interrelated factors. The single effect of each factor is mostly small (Keyes, 2005), which is also reflected by the current findings

which are hypothesized to have also clinical significance.

Considering the present results, it can be summed up that in the investigated sample inpatients who use Facebook had higher level of NMH and lower level of PMH than those who do not use this social platform. Furthermore, the more time Facebook users who participated in the current study spent daily on the SNS, the lower was their level of PMH and the higher was their level of NMH. Those results reflect some previous findings from mentally healthy samples that emphasized potential negative consequences of Facebook use (Brailovskaia et al., 2018c; Kross et al., 2013; Tromholt, 2016).

Experience of stressful events and challenges at home and at work, which belong to daily life of many people, lead to different coping strategies (Almeida, 2005; Schönfeld et al., 2016). Especially individuals with increased level of depression and anxiety symptoms who often feel overwhelmed by the demand of daily life and lack adequate self-regulation strategies were found to consider Facebook use as escape from daily problems and therefore to engage in excessive online activity (Frost and Rickwood, 2017; Marino et al., 2018; Ryan et al., 2014). In the short run, the social platform enables its users the expected relief by immersion in an attractive online world where they can temporarily forget their responsibilities and tasks and receive a lot of supportive feedback, often missed offline (Brailovskaia et al., 2018b; Mauri et al., 2011). However, long term, excessive Facebook use may cause significant social stress (Brailovskaia et al., 2018a, 2018c). Because of the extensive time spent online, persons concerned often tend to neglect their offline requirements, which fosters interpersonal conflicts with family, friends, and colleagues. In accordance with these considerations, in our inpatient sample, we found Facebook users to have a

higher level of social stress than Facebook non-users. Furthermore, duration of daily Facebook use was positively associated with social stress.

Social stress in the offline world enhances sadness, feelings of failure and overload which may increase negative physical and mental symptoms and decrease PMH (Schönfeld et al., 2016). This, however, contributes to a further escape into the Facebook world and therefore closes the vicious circle (Brailovskaia et al., 2019a, 2018a, 2018b). Accordingly, in our inpatient sample Facebook users had not only higher level of depressiveness and somatoform complaints as well as lower level of PMH than non-users, but also duration of daily Facebook use was significantly associated with the mental health variables. Moreover, excessive Facebook use was previously found to be positively linked to late bedtimes and rising times, which lead to the assumption that it might contribute to insomnia (Koc and Gulyagci, 2013). Accordingly, we found higher insomnia level in the group of Facebook users and a positive link between the duration of daily Facebook use and insomnia.

Thus, to conclude, our results support the assumption that the recovery process of inpatients might be negatively affected by Facebook use. This can be explained by multiple reasons. Concerned individuals might try to escape into the online world form their offline problems, which, however, could enhance effectively these problems and aggravate their symptoms. Moreover, the inpatients' clinical symptoms might negatively impact their social interactions on Facebook and lead to additional interpersonal problems online. The clinical stay aims to support the inpatients in gaining distance to their problems and negative experiences at home and at work. They shell recover from the daily stress. However, due to the continuing Facebook use the online and offline conflicts that are often experienced as burdensome remain present during the clinical stay and therefore impede the recovery process. Furthermore, during the Facebook use inpatients might tend to negative self-evaluation of themselves compared to other users who often engage in positive self-presentation on the SNS (Brailovskaia and Bierhoff, 2018) which might negatively influence their mental health status.

Therefore, additionally to different activities, online and offline, Facebook use should be taken into account in the clinical context when planning the psychotherapeutic treatment process. Considering that many inpatients lack knowledge about potential consequences of Facebook use for mental health, this topic as well as alternative strategies for stress management, such as physical activity (Brailovskaia et al., 2018c), should be explicitly addressed within psychoeducation (Kuss and Pontes, 2019). Furthermore, inpatients should be advised to reduce their daily Facebook use. Instead of searching social support online, their attention should be drawn to potential offline resources that they often do not perceive, such as support from family and friends (Brailovskaia et al., 2019b). Especially inpatients with affective disorders who tend to social withdrawal and isolation offline because of their negative symptoms often lack the ability to perceive those resources and therefore can profit from appropriate therapeutic training.

4.1. Limitations and further research

Despite the statistically significant results, it should be considered that the current study investigated cross-sectional data. Thus, given the cross-sectional design (i.e., a survey conducted at only one timepoint), present data do not imply causality about the impact of Facebook use on positive and negative mental health. Moreover, note that inpatients' symptoms may change from day to day, and thus the validity of the results might be limited to that one measurement timepoint. To enable causal statements about the impact of Facebook use on mental health and conclusions about clinical significance of our results, future studies are advised to extend the present findings by results of longitudinal prospective investigations with an experimental design. For example, it

could be considered whether inpatients who are asked to completely waive Facebook use for the duration of their clinical stay (i.e., experimental group) show a higher therapeutic success than inpatients who continue to use Facebook as usual for this period of time (i.e., control group). Considering that the therapeutic process of the psychosomatic rehabilitation clinic implies a lot of social interactions among the inpatients (e.g., group activities, common meals) (Linden, 2014), it might by investigated whether inpatients who use those opportunities and reduce their daily Facebook activity have better recovery chances than those who do not give up the escape into the online world.

Moreover, note that similar to previous research (e.g., Koc and Gulyagci, 2013) we found higher insomnia level in the group of Facebook users and a positive link between the duration of daily Facebook use and insomnia. Therefore, future longitudinal research could investigate, whether lack of sleep might interact with Facebook use and thus influence the other variables of mental health.

Furthermore, both investigated groups comprised more females than males that restricts the generalizability of the present results. Therefore, the replicability of the current findings should be investigated in a sample with an equal gender ratio.

Future studies are advised to investigate whether the present findings may be generalized to inpatients with other diagnoses than those included in the current study and for outpatients. Moreover, it should be clarified whether the current results may also be replicated for users and non-users of SNSs other than Facebook, or whether they are unique with respect to this particular social platform. Additionally, future research that compares users and non-users is suggested to assess inpatients' engagement in other possible online activities (e.g., time spent reading online news, online shopping, watching videos), as well as offline activities (e.g., time spent reading books and newspapers) that might contribute to the explanation of differences between groups. Also, frequency of specific Facebook activities such as posting status updates, writing messages, and viewing status updates posted by other users should be considered.

To sum up, the present results underscore that Facebook use might be a risk factor that may negatively influence the recovery process of inpatients with mental disorders. Therefore, Facebook use should be explicitly taken into account in the planning of therapeutic interventions as well as in the research on the methods to improve the therapeutic process to enhance the chances for recovery in the clinical context.

CRediT authorship contribution statement

Julia Brailovskaia: Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Writing - original draft. **Jürgen Margraf:** Writing - review & editing. **Holger Schillack:** Writing - review & editing. **Volker Köllner:** Conceptualization, Data curation, Writing - review & editing.

Declaration of Competing Interest

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Supplementary materials

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References

Almeida, D.M., 2005. Resilience and vulnerability to daily stressors assessed via diary methods. Curr. Dir. Psychol. Sci. 14, 64–68.

Andreassen, C.S., Torsheim, T., Brunborg, G.S., Pallesen, S., 2012. Development of a Facebook addiction scale. Psychol. Rep. 110, 501–517.

Antaramian, S.P., Huebner, E.S., Hills, K.J., Valois, R.F., 2010. A dual-factor model of mental health: toward a more comprehensive understanding of youth functioning. Am. J. Orthopsychiatr. 80, 462–472.

Bastien, C.H., Vallières, A., Morin, C.M., 2001. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med. 2, 297–307.

Bevan, J.L., Gomez, R., Sparks, L., 2014. Disclosures about important life events on Facebook: relationships with stress and quality of life. Comput. Human Behav. 39, 246–253.

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.

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, e0166999.

Brailovskaia, J., Margraf, J., 2017. Facebook Addiction Disorder (FAD) among German students – a longitudinal approach. PLoS ONE 12, e0189719.

Brailovskaia, J., Margraf, J., Köllner, V., 2019a. Addicted to Facebook? Relationship between Facebook addiction disorder, duration of Facebook use and narcissism in an inpatient sample. Psychiatry Res. 273, 52–57.

Brailovskaia, J., Rohmann, E., Bierhoff, H.-W., Margraf, J., 2018a. The brave blue world: facebook flow and Facebook Addiction Disorder (FAD). PLoS ONE 13, e0201484.

Brailovskaia, J., Rohmann, E., Bierhoff, H.-W., Schillack, H., Margraf, J., 2019b. The relationship between daily stress, social support and Facebook Addiction Disorder. Psychiatry Res. 276, 167–174.

Brailovskaia, J., Schillack, H., Margraf, J., 2018b. Facebook Addiction Disorder (FAD) in Germany. Cyberpsychology, Behav. Soc. Netw 21, 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.

Campisi, J., Bynog, P., McGehee, H., Oakland, J.C., Quirk, S., Taga, C., Taylor, M., 2012. Facebook, stress, and incidence of upper respiratory infection in undergraduate college students. Cyberpsychology Behav. Soc. Netw. 15, 675–681.

Chen, W., Lee, K.-H., 2013. Sharing, liking, commenting, and distressed? The pathway between Facebook interaction and psychological distress. cyberpsychology Behavi. Soc. Netw. 16, 728–734.

Ellison, N.B., Steinfield, C., Lampe, C., 2011. Connection strategies: social capital implications of Facebook-enabled communication practices. New Media Soc. 13, 873–892.

Frison, E., Eggermont, S., 2016. Exploring the relationships between different types of Facebook use, perceived online social support, and adolescents' depressed mood. Soc. Sci. Comput. Rev. 34, 153–171.

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.

Grieve, R., Indian, M., Witteveen, K., Tolan, G.A., Marrington, J., 2013. Face-to-face or Facebook: can social connectedness be derived online? Comput. Human Behav. 29, 604–609.

Keyes, C.L., 2005. Mental illness and/or mental health? Investigating axioms of the complete state model of health. J. Consult. Clin. Psychol. 73, 539–548.

Koc, M., Gulyagci, S., 2013. Facebook addiction among Turkish college students: the role of psychological health, demographic, and usage characteristics. Cyberpsychology

Behav. Soc. Netw. 16, 279–284.

Köllner, V., 2014. Psychosomatische rehabilitation. Psychotherapeut 59, 485–502.

Köllner, V., 2016. Rehabilitation bei depressiven Störungen. Rehabili. (Stuttg) 55, 395–410.

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, e69841.

Kuss, D.J., Pontes, H.M., 2019. Internet addiction. Adv. Psychother. Evid.-Based Pract. 41, 1–79.

Linden, M., 2014. Psychosomatic inpatient rehabilitation: the German model. Psychother. Psychosom. 83, 205–212.

Lukat, J., Margraf, J., Lutz, R., van der Veld, W.M., Becker, E.S., 2016. Psychometric properties of the positive mental health scale (PMH-scale). BMC Psychol. 4, 8.

Lund, H.G., Reider, B.D., Whiting, A.B., Prichard, J.R., 2010. Sleep patterns and predictors of disturbed sleep in a large population of college students. J. Adolesc. Health 46, 124–132.

Marino, C., Gini, G., Vieno, A., Spada, M.M., 2018. A comprehensive meta-analysis on problematic Facebook use. Comput. Human Behav. 83, 262–277.

Mauri, M., Cipresso, P., Balgera, A., Villamira, M., Riva, G., 2011. Why is Facebook so successful? Psychophysiological measures describe a core flow state while using Facebook. Cyberpsychology Behav. Soc. Netw. 14, 723–731.

Moreno, M.A., Jelenchick, L.A., Egan, K.G., Cox, E., Young, H., Gannon, K.E., Becker, T., 2011. Feeling bad on Facebook: depression disclosures by college students on a social networking site. Depress. Anxiety 28, 447–455.

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. Cyberpsychology Behav. Soc. Netw. 16, 721–727.

Nadkarni, A., Hofmann, S.G., 2012. Why do people use Facebook? Pers. Individ. Dif. 52, 243–249.

Rabung, S., Harfst, T., Kawski, S., Koch, U., Wittchen, H.-.U., Schulz, H., 2009. Psychometrische Überprüfung einer verkürzten version der» Hamburger module zur erfassung allgemeiner aspekte psychosozialer gesundheit für die therapeutische praxis «(HEALTH-49). Z. Für Psychosom. Med. Psychother. 55, 162–179.

Rosen, L.D., Cheever, N.A., Carrier, L.M., 2012. iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us. Palgrave Macmillan, New York, NY.

Roth, P., 2019. Nutzerzahlen: Facebook, Instagram, Messenger und Whatsapp, Highlights, Umsätze, UVM. (Stand April 2019), allfacebook.de. Accessed 28 April 2019 from https://allfacebook.de/toll/state-of-facebook.

Ryan, T., Chester, A., Reece, J., Xenos, S., 2014. The uses and abuses of Facebook: a review of Facebook addiction. J. Behav. Addict. 3, 133–148.

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.

Schönfeld, P., Brailovskaia, J., Bieda, A., Zhang, X.C., Margraf, J., 2016. The effects of daily stress on positive and negative mental health: mediation through self-efficacy. Int. J. Clin. Health Psychol. 16, 1–10.

Shakya, H.B., Christakis, N.A., 2017. Association of Facebook use with compromised wellbeing: a longitudinal study. Am. J. Epidemiol. 185, 203–211.

Steinfield, C., Ellison, N.B., Lampe, C., 2008. Social capital, self-esteem, and use of online social network sites: a longitudinal analysis. J. Appl. Dev. Psychol. 29, 434–445.

Suldo, S.M., Shaffer, E.J., 2008. Looking beyond psychopathology: the dual-factor model of mental health in youth. School Psych. Rev. 37, 52–68.

Taylor, D.J., Bramoweth, A.D., 2010. Patterns and consequences of inadequate sleep in college students: substance use and motor vehicle accidents. J. Adolesc. Health 46, 610–612.

Tromholt, M., 2016. The Facebook experiment: quitting Facebook leads to higher levels of well-being. cyberpsychology Behav. Soc. Netw. 19, 661–666.

Urban, D., Mayerl, J., 2006. Regressionsanalyse: Theorie, Technik und Anwendung (2. Aufl.). VS Verlag für Sozialwissenschaften, Wiesbaden.

Wang, S.S., 2013. "I share, therefore I am": personality traits, life satisfaction, and Facebook check-ins. cyberpsychology Behav. Soc. Netw. 16, 870–877.