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# Addictive use of social networking sites can be explained by the interaction of Internet use expectancies, Internet literacy, and psychopathological symptoms

ELISA WEGMANN<sup>1</sup>, BENJAMIN STODT<sup>1</sup> and MATTHIAS BRAND<sup>1,2\*</sup>

<sup>1</sup>Department of General Psychology, Cognition, University of Duisburg-Essen, Duisburg, Germany

<sup>2</sup>Erwin L. Hahn Institute for Magnetic Resonance Imaging, Essen, Germany

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*Background and Aims:* Most people use the Internet in a functional way to achieve certain goals and needs. However, there is an increasing number of people who experience negative consequences like loss of control and distress based on an excessive use of the Internet and its specific online applications. Some approaches postulate similarities with behavioral addictions as well as substance dependencies. They differentiate between a generalized and a specific Internet addiction, such as the pathological use of social networking sites (SIA–SNS). Prior studies particularly identified the use of applications, personal characteristics, and psychopathological symptoms as significant predictors for the development and maintenance of this phenomenon. So far, it remains unclear how psychopathological symptoms like depression and social anxiety interact with individual expectancies of Internet use and capabilities of handling the Internet, summarized as Internet literacy. *Methods:* The current study ( $N = 334$ ) investigated the interaction of these components in a structural equation model. *Results:* The results indicate that the effects of depression and social anxiety on SIA–SNS were mediated by Internet use expectancies and self-regulation. *Discussion:* Thus, Internet use expectancies seem to be crucial for SIA–SNS, which is in line with prior models. *Conclusions:* SNS use may be reinforced by experienced gratification and relief from negative feelings. Individual competences in handling the Internet may be preventive for the development of SIA–SNS.

**Keywords:** Internet addiction, pathological Internet use, computer literacy, SNS, Internet use expectancies, Internet literacy

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## INTRODUCTION

The Internet is an everyday tool used for information search or staying connected to persons all over the world. The growing accessibility based upon the advancement of technology and the distribution of smartphones increase the popularity of social networking sites (SNS; Wu, Cheung, Ku & Hung, 2013). However, besides functional Internet use there is a rising amount of persons experiencing negative consequences due to an excessive use of SNS. Consequently, there is growing interest of this phenomenon frequently referred to as Internet addiction (IA; Pawlikowski et al., 2014; Widyanto & McMurrin, 2004). Thereby, some studies indicated parallels between substance dependencies and behavioral addictions such as pathological gambling in order to transfer this common ground to IA (Brand, Young & Laier, 2014). Based on the symptoms of behavioral addictions, persons suffering from IA show comparable symptoms like loss of control, withdrawal, development of tolerance, preoccupation, loss and negligence of interests or social relationships, as well as negative consequences in real life (Griffiths, Kuss & Demetrovics, 2014). These symptoms could result in social isolation or psychopathological problems. An excessive use of the Internet could also be enhanced by its compensative function in decreasing a person's negative emotions (Brand, Young et al., 2014; Korkeila, Kaarlas, Jääskeläinen, Vahlberg & Taiminen, 2010; Widyanto & McMurrin, 2004; Young, 2004; Young, Pistner, O'Mara & Buchanan, 1999). The concept could be transferred to a specific Internet addiction (SIA) as well. An SIA describes the addictive use of a certain function of the

Internet, e.g. Internet pornography or online gambling (for an overview see Davis, 2001; Griffiths, 2000; Meerkerk, van den Eijnden, Vermulst & Garretsen, 2009; Young, 1998; Young et al., 1999). Brand, Young et al. (2014) suggested a model to specify empirically addressable mechanisms of an IA. It is based on the assumption that Internet users have certain needs and goals, which can be achieved by different Internet applications. Regarding an SIA, users with psychopathological symptoms like depression or social anxiety and predispositions for example towards SNS, use the Internet to receive gratification. Such person's characteristics interact with specific cognitions like user's expectancies towards the Internet and coping style. Users may expect online applications to be helpful to distract from conflicts or to relief from negative feelings. Based on the experienced gratification, coping mechanisms and Internet use expectancies should be reinforced positively. It could increase the excessive use of specific applications resulting in loss of control, whereas the person's core characteristics are reinforced negatively (for a more detailed description, see Brand, Young, et al., 2014).

One potentially addictive behavior of the Internet could be the use of SNS. SNS are defined as web-based, virtual communities allowing the construction of an individual, (partially) public profile (Amichai-Hamburger & Vinitzky,

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\* Corresponding author: Matthias Brand; Department of General Psychology, Cognition, University of Duisburg-Essen, Forsthausweg 2, 47057 Duisburg, Germany; Phone: +49-203-3792541; Fax: +49-203-3791846; E-mail: Matthias.brand@uni-due.de

2010; Kuss & Griffiths, 2011). The aim of the current study is to identify the mechanisms and interactions which facilitate an excessive SNS use.

#### *Personal predispositions of SIA–SNS*

Hong, Huang, Lin and Chiu (2014) reported that SNS use measured by the time spent on SNS is associated with the development of an addiction. It is consistent with findings of Ryan and Xenos (2011), who illustrated that shy or anxious people spend more time on SNS due to escape from reality and to gratify their social needs. Based on the model by Brand, Young et al. (2014) there are further predictors stated as risk factors like psychopathological aspects: Inferiority feelings can be explained by the user's fear to get negative feedback and be less involved in direct communication situations. Furthermore, depressive symptoms could enhance the risk of SIA–SNS as well. It is based on the assumption that depressive people have less self-control and are socially isolated (Hong et al., 2014). Based on the proposed model by Brand, Laier and Young (2014) psychopathological aspects like depression and social anxiety belong to core characteristics. These are attributes/symptoms that survive over longer spans of time and can – besides further personality aspects and social cognitions – predispose an individual towards developing an IA (Brand, Laier et al., 2014). Altogether, this might result in negative psychosocial consequences such as low interest for real life or problems with the maintenance of offline relationships (Wu et al., 2013) resulting in an overuse of SNS.

#### *The role of Internet expectancies as mediator of SIA–SNS*

The uses and gratifications approach (UAG) describes what kind of media and media content are chosen by the users to achieve individual goals (Katz, Blumler & Gurevich, 1974). It is helpful to understand user's behavior, perception, and expectancies with regard to the experience of gratification (Katz, Gurevich & Haas, 1973; Smock, Ellison, Lampe & Wohn, 2011). Researchers attempted to adopt this approach of mass communication for Internet and SNS (Lampe, Wash, Velasquez & Ozkaya, 2010; Papacharissi & Mendelson, 2011; Raacke & Bonds-Raacke, 2008; Smock et al., 2011). Thereby, it is assumed that the gratification of individual and social needs by SNS can be summarized as expected outcome. It is regarded during decision making and the consideration of potential consequences of SNS use. While LaRose and Eastin (2004) showed that expected outcomes are a significant predictor of Internet use, Khang, Han and Ki (2014) did not report this effect in general. They rather found that the expectancies affect the motivations of the Internet use. Overstated expectancies and motivations are instead associated with dysfunctional self-regulation capacities (Griffiths et al., 2014). These deficits are linked to substance abuse and could be core mechanisms of IA respectively SIA–SNS (Khang et al., 2014; LaRose, Mastro & Eastin, 2001).

A further explanation of the relationship between IA and UAG is based on the assumption that users experience online gratification of needs. The user is conditioned to cope with negative emotions online. This conditioned consumption results in a repeated behavior influencing an exces-

sive use (Griffiths et al., 2014; Song, Larose, Eastin & Lin, 2004). Even the model by Brand, Young et al. (2014) suggested that self-regulation and expectancies towards the Internet interact with a person's predispositions. Consequently, we argue that Internet expectancies are the link between the person's characteristics (Billieux & Linden, 2012) and SIA–SNS. Moreover, we assume that people with depressive symptoms and social anxiety expect SNS as a possibility to handle negative emotions. Therefore, pathological tendencies should be reinforced positively. We hypothesize that the association between SIA–SNS and psychopathological symptoms is mediated by the user's specific Internet use expectancies.

#### *The role of Internet literacy as mediator of SIA–SNS*

The Commission of European Communities (2007) defines media literacy as the 'ability to access the media, to understand, and to critically evaluate different aspects of the media and media content and to create communications in a variety of contexts' (as cited in Koltay, 2011, p. 213). However, there are lots of different definitions besides media literacy and Internet literacy. All these definitions have in common that several sub-dimensions are described. They comprise the processing of information as well as production, discussion, analysis, or interpretation of media and the regulation of the own behavior (Baacke, 1999; Koltay, 2011).

A first link between Internet literacy and IA was shown by Leung and Lee (2012). They found that the ability to deal with information overload and a great knowledge about Internet functions are associated with loss of control and the preference of being online. It seems that those users feel more comfortable with computers than to interact with people directly in real life (Leung & Lee, 2012). Nevertheless, the role of handling the Internet and to reflect SNS use is still discussed. Indeed, the mentioned reflective capabilities in handling SNS use lead to the assumption that some parts of Internet literacy are suitable for preventive mechanisms against dysfunctional SNS use while others are not. We expect that the ability to regulate one's SNS use is counterbalanced. A strong involvement in SNS could enhance the probability of SIA–SNS. If people use SNS to comment or create content and get a positive response to their activities users are reinforced to do this again and again resulting in wasting time online and experiencing negative consequences (Davis, 2001). Therefore, the reinforcement of the production and interaction of new content could lead to an excessive use of SNS.

We assume that the Internet literacy sub-dimension self-regulation can decrease the probability of developing an SIA–SNS. In comparison, high competence/willingness to produce new content on the Internet represents a risk factor of SIA–SNS. Based on the assumption of Brand, Young et al. (2014) we further hypothesize that the relation between psychopathological symptoms and SIA–SNS is mediated by the Internet literacy sub-dimensions self-regulation and production of new content.

#### *Aims of the current study*

The aim of the current study was to investigate the interaction between psychopathological aspects, in terms of de-

pression and social anxiety, and the mediators Internet use expectancies and Internet literacy in predicting SIA–SNS in adolescents and younger adults, who are reported to be more vulnerable to negative consequences due to their Internet use (Andreassen et al., 2013; Korkeila et al., 2010; Kuss & Griffiths, 2011; Tonioni et al., 2012). We assumed a relationship between social anxiety, depression, and SIA–SNS. Further, we hypothesized that the correlation between these psychopathological aspects and SIA–SNS is mediated by Internet use expectancies. In addition, Internet literacy mediates the relationship between psychopathological symptoms and SIA–SNS. While the expectancies to experience pleasure or to avoid negative feelings enhance the probability of SIA–SNS, the different subcomponents of Internet literacy could be preventive (self-regulation) as well as risky (production competence). The theoretical model is illustrated in Figure 1.

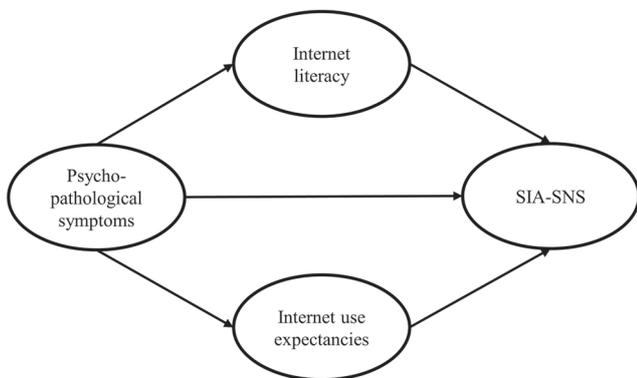


Figure 1. The operationalized model to analyze the main assumptions including the latent dimension of the SIA–SNS

## METHODS

### Participants

We investigated 334 adolescents and young adults of 14–29 years,  $M = 19.27$ ,  $SD = 4.26$  years. 239 participants were females, 95 were males, and 81.44% were pupils, students, or apprentices. This nonclinical convenient sample was recruited by mailing and contact lists of the University of Duisburg-Essen composed of persons who are interested in participating in a study about the Internet use of adolescents and young adults.

### Measures and procedure

**Modified version of the short Internet Addiction Test (s-IAT–SNS).** The tendency of pathological use of SNS as a specific form of IA was assessed with the short Internet Addiction Test (s-IAT; Pawlikowski, Altstötter-Gleich & Brand, 2013), modified for Internet communication sites respectively SNS. The s-IAT–SNS consists of twelve items and has to be answered on a five-point Likert scale from 1 (= never) to 5 (= very often). The s-IAT–SNS comprises two six-item factors: *loss of control/time management* and *craving/social problems*. Internal consistency (Cronbach's  $\alpha$ ) of the s-IAT–SNS was good:  $\alpha = .880$  (loss of control/time management  $\alpha = .841$ , craving/social problems  $\alpha = .801$ ).

**Brief Symptom Inventory – subscales depression and interpersonal sensitivity.** Psychological-psychiatric symptoms of depression and interpersonal sensitivity were assessed by the German version (Franke, 2000) of the Brief Symptom Inventory (BSI; Boulet & Boss, 1991; Derogatis, 1993). We used the subscale interpersonal sensitivity to measure social anxiety. This subscale represents difficulties and problems in social situations like feeling uncomfortable with other persons. We did not use the subscale anxiety because this “only” measures feelings of anxiety in general, but not focused on social situations. The participants rated the ten items of the subscales on a five-point Likert scale from 0 (= not at all) to 4 (= extremely). The subscale *interpersonal sensitivity* had four items and the internal consistency was acceptable (Cronbach's  $\alpha = .773$ ). The subscale *depression* consists of six items and had a good internal consistency (Cronbach's  $\alpha = .808$ ).

**Internet Use Expectancies Scale (IUES).** To assess Internet use expectancies we used a newly developed eight-item questionnaire comprising two subscales. The first scale reflects *positive reinforcement*, the second scale describes *avoidance expectancies*. All items were answered on a six-point Likert scale ranging from 1 (= completely disagree) to 6 (= totally agree). Both scales had a good reliability (Cronbach's  $\alpha$ ; positive reinforcement:  $\alpha = .829$ , avoidance expectancies:  $\alpha = .785$ , overall:  $\alpha = .843$ ) (Brand, Laier et al., 2014).

**Internet Literacy Questionnaire (ILQ).** To assess Internet literacy we used a newly developed questionnaire (Stodt, Wegmann & Brand, unpublished). The scale asks for participants' different competencies in dealing with the Internet. The literacies are divided into four subscales (technical expertise, production and interaction, reflection and critical analysis, and self-regulation). *Production and interaction* describes the use of the Internet as a communication platform and the consideration of online attributes conventions. The subscale *self-regulation* measures the self-assessment of the participants to manage online behavior.

The scale consists of 24 items (technical expertise: 6 items, production and interaction: 5 items, reflection and critical analysis: 7 items, self-regulation: 6 items). The answers were given on a six-point Likert scale ranging from 0 (= strongly disagree) to 5 (= totally agree). The internal consistency (Cronbach's  $\alpha$ ) was acceptable: *production and interaction*:  $\alpha = .741$ , *self-regulation*:  $\alpha = .728$ .

### Statistical analyses

The statistical analyses were carried out by SPSS 21.0 for Windows (IBM SPSS Statistics, released 2012). Pearson correlations were calculated to test the bivariate relationships between the variables. To control the data for outliers, all variables were regressed on a random variable. All correlations were low ( $r$ 's  $< .063$ ), the regression model with the random variable as dependent variable was not significant ( $R^2 = .015$ ,  $p = .886$ ) indicating no substantial influence of outliers (Brand, Laier et al., 2014; Brand, Schiebener, Pertl & Delazer, 2014; Schiebener et al., 2014).

The confirmatory factor analysis (CFA) and structural equation model (SEM) analyses were computed with Mplus 6 (Muthén & Muthén, 1998–2011). To evaluate the model fit, we used the standardized root mean square residual

(SRMR), comparative fit index respectively Tucker Lewis Index (CFI/TLI), and root mean square error of approximation (RMSEA). While RMSEA or SRMR values <.08 indicate a good and .08–.10 an acceptable model fit, some authors advise that a model should be neglected by SRMR >.10 (Hu & Bentler, 1999). For the CFI und TLI values >.97 represent an excellent, >.95 a good, and >.90 still an acceptable model fit (Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger & Müller, 2003; Schumacker & Lomax, 2004). The  $\chi^2$ -test was used to check if the data differ from the defined model (Brown, 2006; Weiber & Mülhhaus, 2010). For comparing different models, we used the Bayesian information criterion (BIC). Models which have a ten points lower BIC than other models are preferred (Kass & Raftery, 1995). For applying mediator analysis it was required that all variables correlated with each other (Baron & Kenny, 1986).

Ethics

All participants were written informed. The study was approved by the local ethics committee of the division of Computer Science and Applied Cognitive Science at the University of Duisburg-Essen in accordance with the Declaration of Helsinki.

RESULTS

Description and correlations

The mean scores of the questionnaires and their bivariate correlations can be found in Table 1.

Structural equation model

The proposed structural equation model showed a relatively weak fit with the data. The RMSEA was .113 ( $p = .089$ ), CFI = .927, TLI = .864, SRMR = .071. The  $\chi^2$ -test was significant ( $\chi^2 = 78.83, p < .001$ ). The latent dimensions of SIA–SNS, psychopathology, and Internet use expectancies were well represented by the manifest variables (factor loading from .600 to .854). For the latent dimension Internet literacy only self-regulation and production and interaction were included in the model, because only these two fulfilled the criteria for mediation analysis (Baron & Kenny, 1986). However, Internet literacy was not optimally represented by these two manifest variables (self-regulation:  $\beta = .466$ ; production and interaction:  $\beta = -.459$ ).

Thus, it seems that these two do not represent a common latent domain, but potentially represent conceptually relatively different aspects of handling the Internet competently. Therefore, we calculated two further models, still following the hypotheses that aspects of Internet literacy mediate the effects of psychopathological symptoms on SIA–SNS: one model with only the manifest variable self-regulation and one with only the manifest variable production and interaction as mediator.

The first structural equation model, using self-regulation, showed a good model fit. The RMSEA was .070, CFI = .979, TLI = .956, SRMR = .043,  $\chi^2 = 26.51, p < .003$ . As expected, psychopathological symptoms was a significant positive predictor of SIA–SNS as well as of Internet use expectancies

Table 1. Bivariate Correlations among the scores of the short Internet Addiction Test and the applied scales and their descriptive statistics

	M (SD)	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. s-IAT–SNS sum score	22.52 (7.57)	.932**	.874**	.455**	.484**	.330**	.456**	.122*	.364*	-.137*	-.356**
2. s-IAT–SNS 1 (loss of control/time management)	12.97 (4.78)		.638**	.412**	.420**	.290**	.402**	.107	.315**	-.117*	-.345**
3. s-IAT–SNS 2 (social problems/craving)	9.55 (3.57)			.413**	.464**	.313**	.430**	.116*	.350**	-.135*	-.293**
4. BSI – interpersonal sensitivity	0.77 (0.74)				.734**	.289**	.397**	-.049	.262**	-.136**	-.245**
5. BSI – depression	0.57 (0.65)					.267**	.388**	-.003	.205**	-.105	-.265**
6. IUE – positive reinforcement	3.53 (1.15)						.504**	.256**	.361**	.020	-.229**
7. IUE – avoidance expectancies	2.36 (1.12)							.102	.437**	-.111**	-.347**
8. ILQ – technical expertise	2.80 (0.97)								.150**	.461**	.089
9. ILQ – production and interaction	2.19 (1.08)									-.109	-.214**
10. ILQ – reflection and critical analysis	3.33 (0.81)										.368**
11. ILQ – self-regulation	3.19 (0.90)										

\*  $p \leq .050$   
 \*\*  $p \leq .01$

but a negative predictor of *self-regulation*. *Internet use expectancies* had a significant positive effect on *SIA-SNS*. The effect of *psychopathological symptoms* on *SIA-SNS* was partially mediated by *Internet use expectancies* ( $\beta = .191, SE = .051, p < .001$ ) and *self-regulation* ( $\beta = .051, SE = .019, p = .007$ ). Overall, the predictors significantly explained 51.2% of the variance of *SIA-SNS*. The structural equation model with the factor loadings,  $\beta$ -weights, and coefficients are shown in Figure 2.

The second model, using *production and interaction*, showed no acceptable model fit, RMSEA = .124, CFI = .937, TLI = .869, SRMR = .069,  $\chi^2 = 61.15, p < .001$ .

*Additional analyses*

In additional analyses, we controlled the results for potential effects of gender and age. Correlations between age and the other variables were mainly non-significant and had low effects ( $r < -.195$  and  $r > -.010$ ; Cohen, 1988). Only the correlation between *age* and *s-IAT-SNS craving/social problems* was significant ( $r = -.195, p < .001$ ). However, the preconditions for integrating age in the mediation model were not fulfilled (Baron & Kenny, 1986). To control for gender we calculated group comparisons with all used variables and found significant differences between male and female participants only for *s-IAT-SNS craving/social problems* ( $t(150.42) = -2.92, p = .004$ ).

We analyzed the main SEM described above (with *self-regulation* as manifest variable) with additional differentiation by gender with the help of mean structure analysis. The fit indices were all acceptable meaning that the models structures were not significantly different between gender.

The RMSEA was .097 (CFI = .950, TLI = .920, the SRMR = .058,  $\chi^2 = 66.51, p < .001$ ). We found the same relationships between *psychopathological symptoms* and *SIA-SNS* respectively *Internet use expectancies* and *self-regulation* as well as *Internet use expectancies* and *SIA-SNS*. The partial mediation of *psychopathological symptoms* to *SIA-SNS* mediated by *Internet use expectancies* was found for women ( $\beta = .195, SE = .060, p = .001$ ), but not for men ( $\beta = .137, SE = .079, p = .082$ ). The partial mediation of *psychopathological symptoms* to *SIA-SNS* mediated by *self-regulation* was also found only for women ( $\beta = .073, SE = .025, p = .003$ ).

To contrast the different models we consider the BIC. This underlined the best fit for the model using only self-regulation (Figure 2; BIC = 7503.00) when compared with the first proposed SEM (BIC = 8481.86) or the SEM controlling for gender (BIC = 7566.41).

DISCUSSION

In the current study, we tested a theoretical model to explain the underlying processes of an addictive use of SNS. Overall, the first structural equation model analysis showed no acceptable model fit with the data. Due to that, we tested a varied model only with self-regulation as mediator representing an aspect of Internet literacy. Altogether, 51.2% of the variance of *SIA-SNS* were explained by the used variables: interpersonal sensitivity, depression, positive reinforcement and avoidance expectancies, and self-regulation. The results illustrated that psychopathological symptoms like depression and social anxiety (operationalized by the BSI subscale interpersonal sensitivity) affected *SIA-SNS* directly. Moreover, Internet use expectancies as well as self-

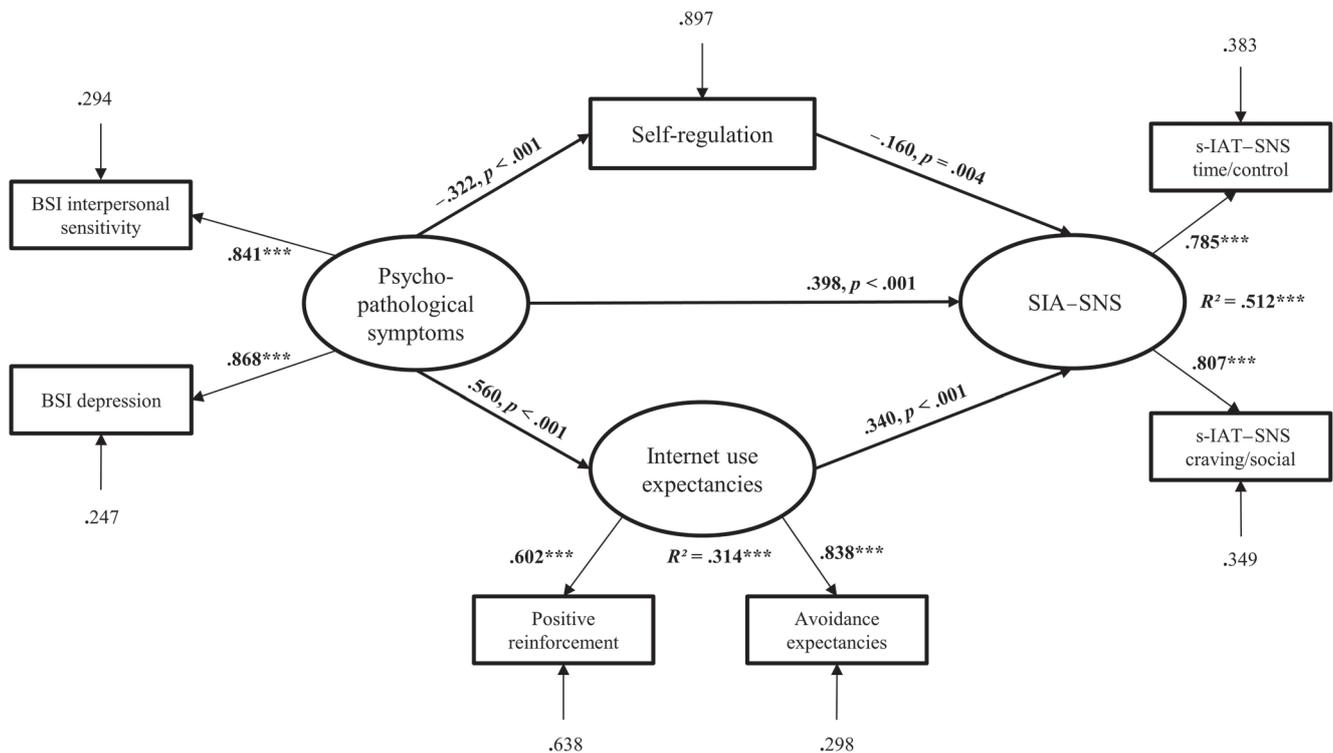


Figure 2. Results of the structural equation model with the factor loadings,  $\beta$ -weights,  $p$ -values, and residuals. \*\*\*  $p < .001$

regulation partially mediated the link between psychopathological symptoms and SIA–SNS. Internet use expectancies had a positive effect while self-regulation had a negative effect on the severity of SIA–SNS symptoms. The SEM using production and interaction as mediator revealed no acceptable model fit. Overall, the results are mostly consistent with our assumptions. We suggested that users with psychopathological symptoms have difficulties in handling the Internet functionally. Moreover, they have high expectancies with respect to experience gratification of individual needs online. User's expectancy of the Internet as a helpful tool for reducing negative feelings or for experiencing pleasure increases the probability of developing SIA–SNS. Especially the avoidance expectancies represented the latent dimension SNS use expectancies shown by the factor loads (Chou, 2000; Chou, Condrón & Belland, 2005; LaRose et al., 2001; Muñoz-Rivas, Fernández & Gámez-Guadix, 2010).

Furthermore, the results emphasize the role of Internet literacy in regulating SNS use. Users with higher self-regulation capabilities seem less vulnerable for SIA–SNS. Potentially, they are better able to control their online behavior. The effect of underlying psychopathological symptoms on self-regulation indicates that people who feel uncomfortable in social situations or have depressive symptoms have more problems in regulating their SNS use. This may then lead to negative consequences from excessive SNS use. Production and interaction as a component of Internet literacy does not seem to have such a mediating effect. However, the correlation analysis showed that the individual estimation of a person's competence and responsibility in producing new content may enhance the probability of SIA–SNS. Therefore a differentiation between functional and dysfunctional capabilities of Internet literacy may be regarded as an important research topic.

Consistent with the theoretical model by Brand, Young et al. (2014) the results illustrate that specific individual predispositions predict cognitive styles related to the Internet use. Hence, individual experiences with SNS lead to a positive reinforcement of certain needs and also cognitions. This mechanism is assumed to be based upon the expectancy to experience gratification and to satisfy certain desires and that these experiences increase the likelihood of SIA–SNS (Brand, Young et al., 2014; Robinson & Berridge, 2000, 2003). In line with the UAG it illustrates that users choose media to gratify individual needs or to experience entertainment or social support. This could be the initial point of conditioning the media consumption and coping behavior especially with dysfunctional self-regulation capabilities (LaRose et al., 2001; Smock et al., 2011; Song et al., 2004). However, the several models of this study explain the role of different components and underline a central mechanism: Individual characteristics interact with the expectancies to avoid negative feelings respectively to experience pleasure that could result in an SIA. It is also part of the treatment model proposed by Young (2011) that describes the impact of psychopathological symptoms and social cognition on IA mediated by individual cognitions like Internet use expectancies or coping strategies. The models include the individual ability to handle the Internet (i.e. Internet literacy).

We also controlled the results for age and gender. Age seemed to be relatively unrelated to the variables in the model. A gender difference in the structure of the SEM was

found with respect to self-regulation. Gender effects were also found for other SIA like cybersex addiction (Griffiths, 2012; Laier, Pekal & Brand, 2014) or online gaming (Brand, Laier et al., 2014; Ko, Yen, Chen, Chen & Yen, 2005). Studies postulated that women are in general more active on SNS than men (Chak & Leung, 2004; Moore & McElroy, 2012; Szczegieliński, Palka & Krysta, 2013). For that reason the role of gender and SIA–SNS should be addressed in future studies.

Finally, there are some limitations. We used an online survey to collect the data and had no laboratory or standardized conditions. Nonetheless, the data was controlled carefully. Additionally, the manifest variable positive reinforcement loaded on the latent dimension Internet use expectancies only with a medium effect, while avoidance expectancies loaded on the dimension with a large effect. Therefore, it seems that the dimension Internet use expectancies rather represents the aspect of avoiding offline problems than the aspect of gaining positive reinforcement from SNS use. Furthermore, we also used a newly developed questionnaire to evaluate Internet literacy. Considering the missing unitary definition of Internet literacy, the questionnaire needs further empirical investigations.

## CONCLUSIONS

The results have implications for media education of adolescents. SNS allows the escapism from unpleasant situations and negative feelings (Griffiths et al., 2014; Ryan & Xenos, 2011). Users should learn to deal with negative emotions. This could be the development of strategies in stressful situations or solving problems instead of avoiding their confrontation. In line with our conclusion, gratification of needs and goals in the context of SNS is attractive, but users need the competence to regulate their online behavior and/or avoid extreme expectancies towards the Internet. Consistent with this, persons need to learn strategies to get a positive feeling, to be in contact with other persons, and to build up self-esteem. Additionally, it is useful to teach students advantages and disadvantages of SNS use. They should be able to use SNS functionally which comprises a conscientious, reflective usage of SNS and the consideration of possible (negative) consequences.

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*Authors' contributions:* EW collected the data, conducted statistical analysis, interpreted the results, conceptualized and wrote the first draft of the manuscript, BS aided in data collection, writing the manuscript and interpretation of the data. MB designed the study and supervised interpreting the data and writing the manuscript. All authors contributed to and have approved the final manuscript.

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## REFERENCES

- Amichai-Hamburger, Y. & Vinitzky, G. (2010). Social network use and personality. *Computers in Human Behavior*, 26, 1289–1295.
- Andreassen, C. S., Griffiths, M. D., Gjertsen, S. R., Krossbakken, E., Kvam, S. & Pallesen, S. (2013). The relationship between behavioral addictions and the five-factor model of personality. *Journal of Behavioral Addictions*, 2, 90–99.
- Baacke, D. (1999). Medienkompetenz als zentrales Operationsfeld von Projekten. In D. Baacke, S. Kornblum & J. Lauffer (Eds.), *Handbuch Medien: Medienkompetenz, Modelle und Projekte* (pp. 31–35). Bonn: Bundeszentrale für politische Bildung.
- Baron, R. M. & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Billieux, J. & Linden, M. V. D. (2012). Problematic use of the Internet and self-regulation: A review of the initial studies. *The Open Addiction Journal*, 5, 24–29.
- Boulet, J. & Boss, M. W. (1991). Reliability and validity of the Brief Symptom Inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 3, 433–437.
- Brand, M., Laier, C. & Young, K. S. (2014). Internet addiction: Coping styles, expectancies, and treatment implications. *Frontiers in Psychology*, 5, 1256.
- Brand, M., Schiebener, J., Pertl, M.-T. & Delazer, M. (2014). Know the risk, take the win: How executive functions and probability processing influence advantageous decision making under risk conditions. *Journal of Clinical and Experimental Neuropsychology*, 36, 914–929.
- Brand, M., Young, K. S. & Laier, C. (2014). Prefrontal control and Internet addiction: A theoretical model and review of neuropsychological and neuroimaging findings. *Frontiers in Human Neuroscience*, 8, 1–36.
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research* (Vol. 62). New York, NY: Guilford Press.
- Chak, K. & Leung, L. (2004). Shyness and locus of control as predictors of Internet addiction and Internet use. *CyberPsychology & Behavior*, 7, 559–570.
- Chou, C. (2000). Internet addiction, usage, gratification, and pleasure experience: The Taiwan college students' case. *Computers & Education*, 35, 65–80.
- Chou, C., Condrón, L. & Belland, J. C. (2005). A review of the research on Internet addiction. *Educational Psychology Review*, 17, 363–387.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2 ed.). Hillsdale, NJ: Erlbaum.
- Commission of European Communities. (2007). A European approach to media literacy in the digital environment. Retrieved 2014/03/31 from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0833:FIN:EN:PDF>
- Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*, 17, 187–195.
- Derogatis, L. R. (1993). *BSI Brief Symptom Inventory: Administration, scoring, and procedures manual* (3rd ed.). Minneapolis: National Computer Services.
- Franke, G. H. (2000). *Brief Symptom Inventory von L. R. Derogatis (Kurzform der SCL-90-R) – Deutsche Version*. Göttingen: Beltz Test GmbH.
- Griffiths, M. D. (2000). Internet addiction – Time to be taken seriously? *Addiction Research*, 8, 413–418.
- Griffiths, M. D. (2012). Internet sex addiction: A review of empirical research. *Addiction Research & Theory*, 20, 111–124.
- Griffiths, M. D., Kuss, D. J. & Demetrovics, Z. (2014). Chapter 6 – Social networking addiction: An overview of preliminary findings. In K. P. R. C. Feder (Ed.), *Behavioral addictions* (pp. 119–141). San Diego: Academic Press.
- Hong, F.-Y., Huang, D.-H., Lin, H.-Y. & Chiu, S.-L. (2014). Analysis of the psychological traits, Facebook usage, and Facebook addiction model of Taiwanese university students. *Telematics and Informatics*, 31, 597–606.
- Hu, L. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55.
- Kass, R. E. & Raftery, A. E. (1995). Bayes factors. *Journal of American Statistical Association*, 90, 773–795.
- Katz, E., Blumler, J. G. & Gurevich, M. (1974). Utilization of mass communication by the individual. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communication: Current perspectives on gratifications research* (pp. 19–32). Beverly Hills, CA: Sage.
- Katz, E., Gurevich, M. & Haas, H. (1973). On the use of the mass media for important things. *American Sociological Review*, 38, 164–181.
- Khang, H., Han, E.-K. & Ki, E.-Y. (2014). Exploring influential social cognitive determinants of social media use. *Computers in Human Behavior*, 36, 48–55.
- Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H. & Yen, C. F. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *The Journal of Nervous and Mental Disease*, 193, 273–277.
- Koltay, T. (2011). The media and the literacies: Media literacy, information literacy, digital literacy. *Media, Culture & Society*, 33, 211–221.
- Korkeila, J., Kaarlas, S., Jääskeläinen, M., Vahlberg, T. & Taiminen, T. (2010). Attached to the web – harmful use of the Internet and its correlates. *European Psychiatry*, 25, 236–241.
- Kuss, D. J. & Griffiths, M. D. (2011). Online social networking and addiction: A review of the psychological literature. *International Journal of Environmental Research and Public Health*, 8, 3528–3552.
- Laier, C., Pekal, J. & Brand, M. (2014). Cybersex addiction in heterosexual female users of Internet pornography can be explained by gratification hypothesis. *Cyberpsychology, Behavior, and Social Networking*, 17, 505–511.
- Lampe, C., Wash, R., Velasquez, A. & Ozkaya, E. (2010). *Motivations to participate in online communities*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Atlanta, Georgia, USA.
- LaRose, R. & Eastin, M. S. (2004). A social cognitive theory of Internet uses and gratifications: Toward a new model of media attendance. *Journal of Broadcasting and Electronic Media*, 48, 358–377.
- LaRose, R., Mastro, D. & Eastin, M. S. (2001). Understanding Internet usage: A social-cognitive approach to uses and gratifications. *Social Science Computer Review*, 19, 395–413.

- Leung, L. & Lee, P. S. N. (2012). Impact of Internet literacy, Internet addiction symptoms, and Internet activities on academic performance. *Social Science Computer Review*, 30, 403–418.
- Meerkerk, G., van den Eijnden, R. J. J. M., Vermulst, A. A. & Garretsen, H. F. L. (2009). The Compulsive Internet Use Scale (CIUS): Some psychometric properties. *CyberPsychology & Behavior*, 12, 1–6.
- Moore, K. & McElroy, J. C. (2012). The influence of personality on Facebook usage, wall postings, and regret. *Computers in Human Behavior*, 28, 267–274.
- Muñoz-Rivas, M. J., Fernández, L. & Gámez-Guadix, M. (2010). Analysis of the indicators of pathological Internet use in Spanish university students. *The Spanish Journal of Psychology*, 13, 697–707.
- Muthén, L. K. & Muthén, B. O. (1998–2011). *Mplus user's guide* (Vol. 6). Los Angeles: Muthén & Muthén.
- Papacharissi, Z. & Mendelson, A. (2011). Toward a new(er) sociability: Uses, gratifications, and social capital on Facebook. In S. Papathanassopoulos (Ed.), *Media perspectives for the 21st century* (pp. 212–230). New York: Routledge.
- Pawlikowski, M., Altstötter-Gleich, C. & Brand, M. (2013). Validation and psychometric properties of a short version of Young's Internet Addiction Test. *Computers in Human Behavior*, 29, 1212–1223.
- Pawlikowski, M., Nader, I. W., Burger, C., Biermann, I., Stieger, S. & Brand, M. (2014). Pathological Internet use – It is a multidimensional and not a unidimensional construct. *Addiction Research & Theory*, 22, 166–175.
- Raacke, J. & Bonds-Raacke, J. (2008). MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *CyberPsychology & Behavior*, 11, 169–174.
- Robinson, T. E. & Berridge, K. C. (2000). The psychology and neurobiology of addiction: An incentive-sensitization view. *Addiction*, 95, 91–117.
- Robinson, T. E. & Berridge, K. C. (2003). Addiction. *Annual Review of Psychology*, 54, 25–53.
- Ryan, T. & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior*, 27, 1658–1664.
- Schermelleh-Engel, K., Moosbrugger, H. & Müller, H. (2003). Evaluating the fit of Structural Equation Models: Tests of significance and descriptive goodness-of-fit measures. *Psychological Research*, 8, 23–74.
- Schiebener, J., Wegmann, E., Gathmann, B., Laier, C., Pawlikowski, M. & Brand, M. (2014). Among three different executive functions, general executive control ability is a key predictor of decision making under objective risk. *Frontiers in Psychology*, 5, 1386.
- Schumacker, R. E. & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Smock, A. D., Ellison, N. B., Lampe, C. & Wohn, D. Y. (2011). Facebook as a toolkit: A uses and gratification approach to unbundling feature use. *Computers in Human Behavior*, 27, 2322–2329.
- Song, I., Larose, R., Eastin, M. S. & Lin, C. A. (2004). Internet gratifications and Internet addiction: On the uses and abuses of new media. *CyberPsychology & Behavior*, 7, 384–394.
- Stodt, B., Wegmann, E. & Brand, M. (unpublished). Predicting dysfunctional Internet use: The role of personal factors and Internet literacy on Internet addiction and cyberbullying.
- Szcegielniak, A., Palka, J. & Krysta, K. (2013). Problems associated with the use of social networks: A pilot study. *Psychiatria Danubina*, 25, 212–215.
- Tonioni, F., D'Alessandris, L., Lai, C., Martinelli, D., Corvino, S., Vasale, M., Fanella, F., Aceto P. & Bria, P. (2012). Internet addiction: Hours spent online, behaviors, and psychological symptoms. *General Hospital Psychiatry*, 34, 80–87.
- Weiber, R. & Mühlhaus, D. (2010). *Strukturgleichungsmodellierung. Eine anwendungsorientierte Einführung in die Kausalanalyse mit Hilfe von AMOS, SmartPLS und SPSS*. Heidelberg: Springer.
- Widyanto, L. & McMurrin, M. (2004). The psychometric properties of the Internet Addiction Test. *CyberPsychology & Behavior*, 7, 443–450.
- Wu, A. M. S., Cheung, V. I., Ku, L. & Hung, E. P. W. (2013). Psychological risk factors of addiction to social networking sites among Chinese smartphone users. *Journal of Behavioral Addictions*, 2, 160–166.
- Young, K. S. (1998). *Caught in the net: How to recognize the signs of Internet addiction – and a winning strategy for recovery*. New York: John Wiley & Sons, Inc.
- Young, K. S. (2004). Internet addiction: A new clinical phenomenon and its consequences. *American Behavioral Scientist*, 48, 402–415.
- Young, K. S. (2011). CBT-IA: The first treatment model to address Internet addiction. *Journal of Cognitive Therapy*, 25, 304–312.
- Young, K. S., Pistner, M., O'Mara, J. & Buchanan, J. (1999). Cyber disorders: The mental health concern for the new millennium. *CyberPsychology & Behavior*, 2, 475–479.