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Gender differences in Facebook addiction

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Abstract. A large number of people of all ages participate in social networks with different aims. The number of users attending the on-line social networks is increasing daily. University students also spend a lot of time on Online Social Networks (OSN), and this can cause them to become potential addicts. The aim of this paper is twofold: (1) to analyze the relationship between the Facebook dependence and the negative consequences on the students' university work and (2) to analyze the measurement invariance across gender. The results of the empirical study that used a sample from the Technical University of Civil Engineering in Bucharest show a significant difference between male and female students regarding the Facebook dependence and its negative effects on the work of students.

Keywords: Facebook, social networking websites, gender differences, comparative study.

1. Introduction

Online Social Networks are virtual communities where users can create individual public profiles, interact with real-life friends, and meet other people based on shared interests.

The usage of online social networks has been extensively studied (Valenzuela, et al, 2009, Brandtzaeg, 2012, Lamanauskas et al., 2013). Many studies show that Facebook can support the offline university education of students (Brown & Adler, 2008, Madge et al., 2009, Selwyn, 2009, Lampe et al., 2011). At the same time, there are many studies revealing not only positive but also negative effects of social networking websites (Andreassen et al., 2012, Balog et al., 2013, Griffiths, 2005).

The gender differences regarding Facebook addiction is another research topic that needs to be analyzed. Empirical research has suggested gender differences in OSN usage patterns. Some studies claim that men tend to have more friends on OSNs than women (Raacke & Bonds-Raacke, 2008) whereas others have found the opposite (Pfeil et al., 2009). In addition, men

were found to take more risks with regards to disclosure of personal information (Fogel & Nehmad, 2009).

Egocentrism has been linked to Internet addiction (Li, 2010). The egocentric construction of OSNs may facilitate the engagement in addictive behaviors and may thus serve as a factor that attracts people to using it in a potentially excessive way.

Some studies suggested that a combination of biological, psychological and social factors contributes to the etiology of addictions (Griffiths, 2005), that may also hold true for OSN addiction. From this, it follows that OSN addiction shares a common underlying etiological framework with other substance-related and behavioral addictions.

The aim of this paper is twofold: (1) to analyze the relationship between the Facebook dependence and the negative consequences on the students' university work and (2) to analyze the measurement invariance on two groups according to the gender of students. Facebook dependence was measured with the withdrawal syndrome scale. For the negative consequences, the scale developed by Masur et al. (2014) has been used.

The rest of this paper is organized as follows. The following section presents related work in the area of online social networks with a focus on the Facebook dependence and associated negative effects on the educational activities. In section 3, the empirical study is presented. The paper ends with conclusions.

2. Related work

Researchers have suggested that the excessive use of new technologies and especially online social networking may be particularly addictive to young people (Echeburua, 2010).

Some studies have highlighted a number of potential negative correlates of extensive OSN usage. For instance, the results of an online survey indicated that people who use OSN more in terms of time spent on usage were perceived to be less involved with their real life communities (Nyland et al., 2007).

As earlier research shows (Lamanauskas et al., 2012), female students more than male tend to communicate in OSN, more than male students, they devote attention to learning and exchanging information in the virtual

environment. Therefore, one can think, that females communicating more in virtual space with their university people, more than male students get acquainted with new people, are interested in what other people are thinking and what goes on at their university. Females are willing to spend time on Facebook, to support general activities at their university, while the male students devote less attention to the mentioned social capital aspects.

The study conducted by Kimpton et al (2016) investigated the relationship between the level of Facebook addiction, Facebook behaviors, gender, and intimacy development in emerging adults. The study showed that the females are more likely to use Facebook for maintenance of existing and long distance relationships and impression management through the use of photos. Additionally, passive behaviors were found to be associated with higher addiction scores in females but not in males. Males had elevated levels of Facebook addiction when they used Facebook for gaming, which is consistent with Zhou and Leung (2012) who found males more likely to use social networking sites for gaming. It is also consistent with the literature on gaming addictions, which suggests that males are at higher risk of gaming addictions than females (Kuss & Griffiths, 2012).

Çam & Isbulan, (2012) found that there is significant difference between genders and classes. Male teacher candidates are significantly more addicted to Facebook than female teacher candidates. However, seniors are more significantly addicted to the Facebook than juniors, sophomores, and freshmen.

A study by Barker (2009) suggested there may be differences in motivations for OSN use between men and women. Females used OSNs for communication with peer group members, entertainment and passing time, whereas men used it in an instrumental way for social compensation, learning, and social identity gratifications (i.e., the possibility to identify with group members who share similar characteristics).

Furthermore, men tend to disclose more personal information on OSN sites relative to women. Also, more women were found to use MySpace specifically relative to men (Wilkinson & Thelwall, 2010). Moreover, usage patterns were found to differ between genders as a function of personality. Unlike women with neurotic traits, men with neurotic traits were found to be more frequent OSN users. In addition to this, it was found that males were more likely to be addicted to OSN games specifically relative to females.

Gender differences also occur when comparing uses and gratifications

for users (Racke et al., 2008). However, sex differences were not found for the most popular uses and gratifications, indicating that in general men and women meet the same needs by using the online social networks. A sex difference did occur with the number of friends linked to the account, with men having significantly more friends linked to their accounts than women.

These studies highlight that in some circumstances, OSN usage can lead to a variety of negative consequences that imply a potential decrease in involvement in real-life communities and worse academic performance, as well as relationship problems. Reducing and jeopardizing academic, social and recreational activities are considered as criteria for substance dependence and may thus be considered as valid criteria for behavioral addictions, such as OSN addiction.

3. Empirical validation

3.1 Method and samples

The evaluation instrument

The conceptualization has been presented in a previous work (Gorghiu et al., 2016). The operationalization of constructs is based on the related work in the literature. The items for the two constructs are presented in Table 1.

Table 1. Constructs and items

Item	Description
AWS1	If I am off Facebook for a longer period of time I feel nervous
AWS2	When I am not online I ask myself what happens on Facebook
AWS3	I feel out of touch when I haven't logged onto Facebook for a while
ANC1	I am regularly on Facebook while being at university
ANC2	My concentration at university suffers because I am on Facebook
ANC3	I often neglect my university work because of Facebook

It is hypothesized that a significant positive correlation exists between the Facebook dependence and the negative consequences of the excessive use of Facebook on the university work of students.

Participants

The sample includes 227 students (129 men and 98 women) from Technical University of Civil Engineering in Bucharest. The participants were asked to answer some general questions then to rate the items on a 7-point Likert scale. All participants except for two are undergraduates.

After checking the multivariate outliers two observations were eliminated so the final working sample has 225 observations. The age of participants is varying between 18 and 39 years with a mean of 20.95 (SD=2.36). Almost all students are undergraduate (except for two).

The mean network size (number of Facebook friends) is 856.93 (SD=866.18. The mean number of the logs/day is 3.05 (SD=0. 82) and the time spent in minutes/day is on average 79.73 (SD=106.09).

Method

The normality of variables was checked by using SPSS for Windows. In order to assess the two scales, a confirmatory factor analysis (CFA) using structural equation modeling (SEM) approach was taken. The model has been tested with AMOS 7.0 for Windows, using the maximum likelihood estimation method.

Convergent validity has been assessed by examining the loadings and their statistical significance through t-values, the construct reliability (composite reliability), and the average variance extracted. The scale reliability has been analyzed checking the magnitude of Cronbach's alpha.

Factor loadings of all standardized items should be greater than 0.50, ideally, exceed 0.7. Item reliability indicating the amount of variance should be greater than 0.50. Composite reliability (CR) measuring the internal consistency of a construct should be at least 0.60 (preferably greater than 0.7). The average variance extracted (AVE) measuring the amount of variance captured by the construct should be greater than 0.50.

The model testing results are analyzed based on the GOF (goodness-of-fit) indices recommended by Hair et al. (2006).

Comparisons between groups require evaluation instruments that exhibit adequate equivalence across groups (Steenkamp and Baumgartner, 1998; Milfont and Fischer, 2010). In other words, the constructs should be invariant across groups. Otherwise the conclusion based on the measurement scale are ambiguous if not erroneous since it is not possible to assess if the differences are due to different perceptions or a different interpretation of the evaluation instrument (Steenkamp and Baumgartner, 1998; Byrne, 2010).

3.2 Invariance analysis

In order to test the factorial invariance, the model has been tested on each sample.

Males

The estimation results of the model for male students sample are presented in Figure 2. There is a significant ($p<0.001$) positive correlation between the Facebook dependence and the negative consequences on the work of male students.

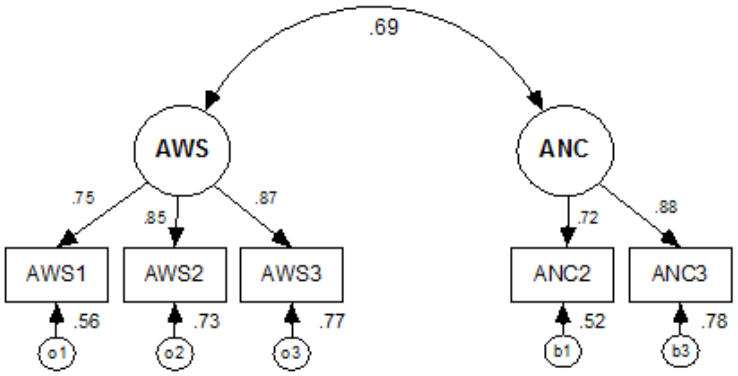

Figure 1. Model testing results (N=127)

All item loadings are over 0.7, which demonstate unidimensionality and good convergent validity.

The results indicated a good level of fit of the proposed model with the data: χ^2=15.471, DF=4, p=0.004, χ^2/DF=3.868, TLI=0.907, CFI=0.963, SRMR =0.0303, RMSEA=0.151.

Females

The estimation results of the model for female students are presented in Figure 3. There is a significant ($p<0.001$) positive correlation between the Facebook dependence and the negative consequences on the work of female students.

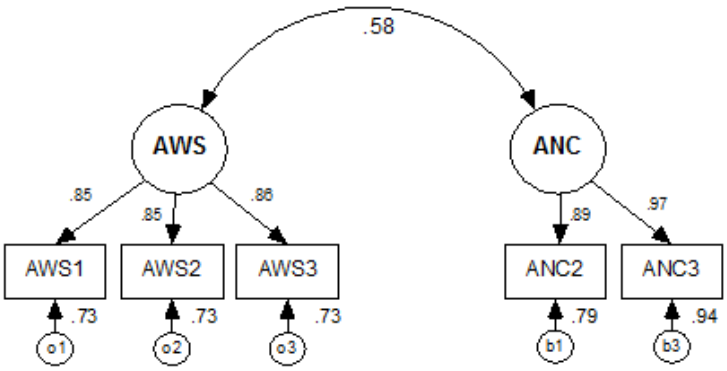

Figure 2. Model testing results (N=98)

All item loadings for this sample are also over 0.7, which demonstate unidimensionality and good convergent validity.

The results indicated a good level of fit of the proposed model with the data: χ^2=5.718, DF=4, *p*=0.221, χ^2/DF=1.430, TLI=0.987, CFI=0.995, SRMR =0.0239, RMSEA=0.067.

The results of testing the unconstraint model revealed a very good fit of the model with the data: χ^2=59.561, DF=24, *p*=0.000, χ^2/DF=2.482, TLI=0.953, CFI=0.944, SRMR = 0.0303, RMSEA=0.082.

The next step is to test the metric invariance between samples by constraining the factor loadings of like items to be invariant. The results show that the evaluation instrument demonstrate metric invariance (ΔDF=3, $\Delta\chi^2$=0.91, p = 0.823). In this case, the observed mean differences could be further compared across groups.

Then the scalar invariance between groups has been tested. The test for scalar invariance requires constraining the item intercepts of like items (Vandenberg & Lance, 2000). The results show that the evaluation instrument demonstrate metric invariance (ΔDF=5, $\Delta\chi^2$= 6.741, p=0.241). The implication is that the latent means could be compared across groups.

The test for the structural covariance invariance between groups requires constraining the structural covariance of latent variables (Vandenberg & Lance, 2000). The results show that the evaluation instrument exhibits structural invariance (ΔDF=3, $\Delta\chi^2$=6.353, p=0.096). The implication is that the covariance between the two latent variables could be compared across

groups.

3.3 Gender differences

Comparison of observed scores

The metric invariance shows the equality of scaling units and enables the comparison between the observed means. The comparison of the two groups (male and female students) is presented in Table 2.

Table 2. Comparison of observed scores

Sex	N	ANC2		ANC3		AWS1		AWS2		AWS3	
		M	SD	M	SD	M	SD	M	SD	M	SD
Male	127	2.80	1.94	2.33	1.73	2.30	1.70	2.40	1.71	2.40	1.81
Female	98	2.67	1.90	2.40	1.78	2.49	1.86	2.79	1.96	2.91	2.01
Total	225	2.74	1.92	2.36	1.75	2.38	1.77	2.57	1.83	2.62	1.91

A one-way ANOVA shows that the differences are statistically significant for AWS3 (F=3.924, p=0.049) and marginally significant for AWS2 and AWS1. Regarding negative consequences of the excessive use of Facebook on the students' university work the mean values are close both in the case of ANC2 and in the case of ANC3 .

Comparison of the latent means

The scalar invariance enables the comparison between the two latent means. The results are presented in Table 3 and the mean values of items suggest a small to moderate Facebook dependence and small to moderate negative effects.

Table 3. Comparison of the latent means

Sex	N	mAWS		mANC	
		M	SD	M	SD
Male	127	2.37	1.55	2.56	1.66
Female	98	2.73	1.76	2.54	1.78
Total	225	2.52	1.65	2.55	1.71

Overall, the mean value for Facebook dependence is not high (2.52 on a 7-point Likert scale). The mean value for female (M=2.73) is higher than the mean value for male (2.37) indicating that female students are more dependent on Facebook than male students.

In the same time, the mean values for negative consequences of the excessive use of Facebook are very close between male (M=2.56) and female (M=2.54) students.

Comparison of structural covariance

As could be noticed in Figures 1 and 2, the covariance between the Facebook dependence and the negative effects on the university work of students is 0.11, which represents 18.9% more for the males group.

Gender differences as regards the network size

The analysis of differences between male and female students as regards the network size is presented in Table 4.

In order to assess the Facebook network size, three variables have been used: the total number of Facebook friends (FBf), Facebook friends that are students (FBfS) and Facebook friends that are students in the university (FBfSu).

Table 4. Gender difference as regards the network size

Sex	N	FBf		FBfS		FBfSu	
		M	SD	M	SD	M	SD
Male	127	807.69	843.69	361.61	432.24	84.24	89.92
Female	98	920.06	894.85	487.33	589.93	117.68	120.81
Total	225	856.63	866.18	416.36	509.61	98.81	105.57

As we can see, the female students have larger networks than male students both in terms of total number of Facebook friends, as well as regards Facebook friends that are students.

Gender differences as regards the usage

In Table 5 are presented the main differences between male and female students as regards the usage.

Table 5. Gender difference as regards the usage

Sex	N	DaysW		LogDay		MinDay	
		M	SD	M	SD	M	SD
Male	127	6.31	1.44	2.97	0.86	60.84	56.68
Female	98	6.80	0.76	3.16	0.74	104.21	144.24
Total	225	6.52	1.21	3.05	0.82	79.73	106.09

The frequency of use is measured with two variables: Days/Week (DaysW) and Logs/Day (LogDay). The duration is measured in Minutes/Day (MinDay).

Results indicated that the number of logging per day does not significantly differ by sex, with woman logging into their accounts more frequently than men. A one-way ANOVA shows that the differences are statistically significant for two variables: DaysW ($F=9.300$, $p=0.003$) and MinDay ($F=9.601$, $p=0.002$). This fact indicates that female students spend significantly more time on Facebook comparing to male students.

4 Conclusions

This study contributes with an empirically validated model measuring the Facebook dependence and the negative consequences onto the university work of students.

Overall, the results show a small to moderate dependence on Facebook and small to moderate negative effects on the university work of students. The measurement invariance analysis shows that the model exhibits factorial, metric, scalar, and structural invariance across gender groups.

Regarding the Facebook dependence, the mean values for the female students are higher than the mean values for the male students. These results indicate that female students are more dependent than male students. But regarding negative effects, the differences between male and female students are very small. An explanation is the different structural covariance which is larger for the men than for the women.

The female students have larger networks than male students both in terms of the total number of Facebook friends, as well as regards the Facebook friends that are students.

In the same time, female students reported spending a greater percentage

of their daily time on Facebook than males. This may allow the inference that men are more prone to become addicted to solitary behaviors, whereas women tend to score higher on measures of behavioral addiction involving social interaction (Andreassen, 2012).

There are some limitations of this work because the sample is relatively small and all students have a technical profile. To achieve a deeper understanding of Facebook dependence and its negative consequences on the students' university work, larger samples are needed.

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