

Investigation of Social Media on Depression

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Abstract

With rapid technological advancement, many have questioned the benefits and side effects of social media on a user's psychological health. Research from the western communities found a strong correlation between social media and depression rate. This research further affirms this finding in the Asian counterpart. A study was carried out in Singapore to determine the relationship of social media usage and depression in Asian individuals of different genders and age groups. Our findings show that the higher the usage of social media, the higher the risk of depression, with teenage girls being subjected to the highest risk. An early depression detector is proposed to track and control this risk factor of social media usage.

Index Terms: HCI, social media, depression

1. Introduction

Social media has become an indispensable part of almost everyone's life. According to [1], social media being any website that allows for social interaction, including sites with networking, gaming and virtual world elements, it has increased quality of life substantially, bringing about great efficiency. Nevertheless there exist dangerous sides to it. This research therefore attempts to investigate the negative effect of social media, particularly on depression, a social challenge of psychological health concerns, and look into how technology can help minimize, if not neutralize, the negative effect caused by social media so as to provide a better human computer interactive user experience.

Literature reviews show that effects of social media on depression have been largely based on the western communities, and the findings offered insight to probably similar problem in the Asian context [2]. The dialectical relationship between social media and depression poses a threat to the Asian society because the increasing usage of social media in Singapore is reported as almost 7-13% yearly, and as of the year 2012, 74.0% of Singaporeans are social media users [3]. If there is a direct correlation of social media and depression, then as this trend of increased social media usage continues, the growing number of citizens at risk of depression will burden the social and economic development of our society. It is therefore essential to ascertain the relationship between social media and depression, as well as to identify the group of people in Singapore who are most at risk of social media induced depression. This research is significant and attempt to pave way to more relevant research in the field of human machine interface as the effect of social media on depression is pressing.

2. Asian Context Social Media Study

A study on social media and depression was carried out in Singapore with approval obtained from the institutional review board.

2.1. Data collection

Data was collected through a survey adapted from the Centre of Epidemiologic Studies Depression Scale (CES-D) to assess the risk at which participants were to depression [4]. The CES-D scale was used because it was recently revised to reflect modern depression symptoms. In addition to this depression survey, there were 12 questions included in the offline questionnaire to survey on the strongest emotions experienced on social media, the user's social media usage rate and platform, as well as to collect demographics data from the participants, such as age group, and gender.

2.2. Distribution of participants

Fifty-nine people of different age groups and genders participated in this study. The demographics of these participants is shown in Table 1 below.

Table 1. Number of participants in different age groups

Age group	Male	Female
Below 13 (children)	5	8
13-19 (teenagers)	3	4
20-35 (young adults)	9	8
36-55 (middle aged)	9	9

The participants were chosen randomly and independently. The data collected were collated carefully to ensure private and confidential information were maintained and not be leaked.

2.3. Data analysis

An individual's overall CESD-style symptom score was calculated as the sum of the response values based on frequency of occurrence of the stated emotions within the past week. Their possible depressive symptom category was then determined based upon the following rules [5][6]:

- Not at all or less than one day = 0
- 1-2 days = 1
- 3-4 days = 2
- 5-7 days = 3

Table 2. Determining categories (extracted from [6])

Category	Criteria
Major depressive episode	Anhedonia or dysphoria nearly every day for the past week, plus symptoms in an additional 4 DSM symptom groups noted as occurring nearly every day in the past week.

Probable major depressive episode	Anhedonia or dysphoria either 3-4 days or 5-7 days for the past week, plus symptoms in an additional 3 DSM symptom groups reported as occurring nearly every day in the past week.
Possible major depressive episode	Anhedonia or dysphoria 3-4 days for the past week, plus symptoms in an additional 2 other DSM symptom groups reported as occurring either nearly every day in the past week
Sub threshold depression symptoms	Overall CESD-style score of at least 16 but do not meet above criteria
No clinical significance	Overall CESD-style score less than 16

2.4. Assumptions and limitations

This study assumed that the participants' responses were truthful and reliable, and that the results of the survey were a general representation of the majority of their respective age group. Another assumption is that the participants' depression results are completely due to their use of social media and not because of other factors.

Limitations of this study include the small sample and the small number of elderly responses. There was an observation that a large majority of the elderly above 55 years old in Singapore were not using social media. Since the survey aimed to elicit the relationship between social media and signs leading to depression, this group of elderly was eliminated from the study.

3. Discussion

The observation that senior citizens above 55 years old were not active on using social media does not imply that they cannot be associated with depression, but rather that if they are affected by depression, it may not be social media-induced depression.

From the analysis of data collected from the participants of Table 1, there exists a high frequency and widespread usage of social media across all age groups and genders. With the exception of two participants, the rest of them were found to be users of social media. 48.9% of the total participants used social media 5-7 days a week. Furthermore 82.3% of them used the social networking sites (such as Facebook and Twitter) and 69.2% of them used video sites (such as blogs and Youtube). Only about 9.8% of the participants used the gaming and virtual world platforms. These statistics were illustrated in Figures 1, 2 and 3 below.

Age Groups	Percentage of each age group and gender using social media at various frequencies/%				
	Male				
	5-7 days	3-4 days	1-2 days	Less than 1 day	Never
Children	20.0	0	60.0	20.0	0

Teens	66.7	33.3	0	0	0
Young Adults	66.7	0	33.3	0	0
Middle Aged	77.8	0	11.1	0	11.1

Figure 1: Statistics of Participants using Social Media

Age Groups	Percentage of each age group and gender using social media at various frequencies/%				
	Female				
	5-7 days	3-4 days	1-2 days	Less than 1 day	Never
Children	37.5	25.0	12.5	25.0	0
Teens	50.0	50.0	0	0	0
Young Adults	50.0	0	25.0	25.0	0
Middle Aged	22.2	22.2	22.2	22.2	11.1

Figure 2: Statistics of Participants using Social Media

Age groups	Percentage of types of social media platforms used/%					
	Male			Female		
	Social Networking Sites	Gaming Sites	Vid eo Site s	Social Network ing Sites	Gami ng Sites	Vid eo Site s
Childre n	60.0	20.0	80.0	62.5	0.0	62.5
Teens	100.0	33.3	100.0	100.0	25.0	100.0
Young adults	100.0	55.6	0.0	87.5	0.0	62.5
Middle aged	77.8	55.6	0.0	66.7	33.3	0.0

Examples of social networking platforms: Facebook, Twitter, Instagram

Examples video sites: Youtube, blogs

Examples of gaming sites and virtual worlds: Club Penguin, The Sims

Figure 3. Social media platforms used by participants

Frequency of Social Media Usage	Average Depression Scores across all Age Groups	Standard deviation
Never	20.000	7.070
Less than 1 day	10.667	5.315
1-2 days	12.600	8.442
3-4 days	17.000	12.144
5-7 days	13.444	11.988

Figure 4. Correlation between frequency of social media usage and average depression scores

Figure 4 above shows that the higher the frequency of social media usage, the higher the average depression scores. However, the scores of those who never use social media and those who use social media for 5-7 days are an exception because the number of participants for these categories is very

few and hence the results are not as reliable. However, comparatively, the general trend shows that the average depression scores increases as can be seen from the high score of 17.000 for participants using social media for 3-4 days as compared to the lower score for participants using for 1-2 days.

All in all, there was an observed trend that females have higher average CESD-style depression scores as compared to male, across all age groups. This is shown in Figure 5 below.

CES-D Scale Depression Levels based on age and gender								
Age	Male				Female			
	Average score*	Standard deviation	Median	Conclusion	Average score*	Standard deviation	Median	Conclusion
< 13	0.20	0.45	0	No clinical significance	0.38	0.52	0	No clinical significance
13 - 19	0.33	0.58	0	No clinical significance	1.50	1.00	1	Subthreshold depression symptoms
20 - 35	0.44	0.73	0	No clinical significance	0.50	0.54	0	No clinical significance
36 - 55	0.11	0.33	0	No clinical significance	0.44	0.73	0	No clinical significance

*Average score of participants in each category ÷ number of participants in each category based on the following:
No clinical significance – 0
Subthreshold depression symptoms – 1
Possible major depressive episode – 2
Probable major depressive episode – 3
Major depressive episode – 4

Figure 5. Depression scores for participants

Additionally, teenagers aged between 13 and 19 displayed the highest depression scores among all the age groups. This indicated the varying influence social media has on the individuals' risk of depression, based on their age and gender.

From our results, we can also deduce that the usage of social media in the Singaporean community is comparable to that of the Western communities. Nearly all Singaporeans are Internet users, while only 81% of North Americans were online users [7]. The study concluded that there is a correlation between higher usage of social media and the depression level of individuals. Finally the study also observed that social media had generally a heavier impact on teenagers, specifically females.

Relationship: Social media causes depression

According to the social comparison theory proposed by social psychologist Leon Festinger, individuals tend to evaluate their opinions and abilities by comparing themselves to others, as a means to define the self [8]. Hence the unrealistic projection of peers' seemingly ideal lives on social media results in decreased self-worth. Furthermore individuals feel the need to be accepted on social media. Exclusion in any form, such as cyber-bullying or online harassment will result in depression,

anxiety, isolation and even suicide. Hence increased usage of social media results in higher risk of depression.

Age: Heavier impact on teenagers

Based on the data collected, teenagers are found to be at higher risk of social media-induced depression than other age groups. This might be due to their limited capacity for self-regulation and susceptibility to peer pressure, especially as they struggle with finding a sense of self-identity during the transition from childhood to adulthood. Exposure to social networking sites that project unrealistic views of peers' seemingly ideal lives and where social exclusion is commonplace, causes them to compare and inaccurately evaluate themselves as being inferior or unaccepted.

Gender: Heavier impact on females

The higher rates of depression found in females can be attributed to their less effective coping-responses to lowering of mood caused by self-comparison and demoralization from social media. Research has found that the males tend to distract themselves from their mood by engaging in physical or instrumental activities whereas the female counterparts were less active and ruminate over the possible causes and implications of their depression, thus prolonging the depressed mood [9].

Females also tend to be more sensitive than males. Being constantly alert for new social media messages in the hope of being accepted by their friends also tend to cause a constant release of the stress hormone cortisol [10], which over time, causes damage to the gastrointestinal tract and opens the door to an immuno-inflammatory response in the body and brain, leading to depression anxiety.

Heaviest impact on female teenagers

According to the survey results, a higher percentage of female teenagers at 60% as compared to a lower percentage of male teenagers at 50% used social media platforms, including social networking sites, gaming sites and video sites, five to seven days per week. This figure also corresponded to the higher average scores of 1.5 as compared to 0.3 of males from the 13-19 age group.

Additionally, in the case of teenagers, the higher risks of depression can also be attributed to another factor-- the manifestation of hormonal changes as a result of puberty and menstruation. Before puberty, the rates of mood and anxiety disorders were found to be similar in boys and girls. It is only after females begin menstruation that a gender differential in mood disorders manifests itself. Females are then more prone to having hormonal fluctuations such as irritability and fatigue. Since teenage girls are also more sensitive than teenage boys, girls are thus about thrice likely as boys to suffer from depression [11].

Overall, the survey results showed that teenagers, females in particular, were most susceptible to risks of depression caused by social media. Thus for further in-depth studies, female teenagers, aged 13-16, would be the target audience in this research project.

Social media-induced depression due to social comparison and exclusion can lead to feelings of inadequacy, jealousy and resentment, which can result in many negative implications. To date, depression is already classified as a common mental disorder. A report by Microsoft Research [11] found that globally, more than 350 million people of all ages suffered from depression. It is one of the leading causes of disability

worldwide and a major contributor to the global burden of diseases. At its worst, depression can lead to increased suicides if there is no proper treatment and intervention.

4. Conclusions

In conclusion, this research confirms the relationship between social media and depression, and identifies that teenage girls are at the highest risk of social media-caused depression.

Nevertheless, the risk of depression at which people are subjected to has not been properly addressed. If teenagers, especially those displaying symptoms of sub threshold depression, do not receive proper attention or guidance in time, it can result in them turning to risky internet sites and blogs for help, further exacerbating the situation.

Prevention programmes can be effective to reduce depression. Effective community approaches to prevent depression include school-based programmes for the prevention of child abuse, or programmes to enhance cognitive, problem-solving and social skills of children and adolescents. Interventions for parents of children with behavioural problems may reduce parental depressive symptoms and improve outcomes for their children.

Findings of this Asian context social media study showed that this research is significant and useful for new application development. To further this study, a smart phone application can be designed and developed such that it can aim at early detection of depression symptoms so as to providing reliable guidance and advice to seek professional treatment can be created and produced. The most applicable target user of such application would be the teenage girls because they were, from the above study, found to be the participants who are most frequent users of smartphone games and most at risk of depression. More future directions could also include in depth emotion analysis through speech data analysis. This would allow higher chances of early depression detection so that treatment, reliable and professional ones can be given earlier, and thus decreases the chances of teenage girls getting depression.

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