What Can Mental Health Teach Us About Social Media Screen Time Misestimation?

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ABSTRACT

Mobile platform providers have provided the ability to measure the time consumers spend on each app. This provides the opportunity to measure a consumer's misestimation of their screentime which is a concept relevant to several mental health attributes such as depression, anxiety, and addiction. We provide additional evidence about the effect of objective screentime on mental health, but add a unique perspective on how screentime misestimation is determined by various mental health attributes. We collected data from a student sample (n=1005) who are from the demographic who most commonly use social media apps (18-29 yr olds). We measured our model across several of the most common platforms including Facebook, Instagram, Twitter, and YouTube to maximize the practical implications. The results indicate that mental health attributes can indeed be reflected by misestimations of screentime. However, this effect varies by social media platform.

Keywords

Screentime, misestimation, social media, mental health

INTRODUCTION

Mobile device platform providers (e.g. Android and iOS) have provided the ability to objectively measure the time consumers spend on each app. Known as *Screentime* in iOS and *Digital Wellbeing* on Android devices, these features are becoming popular among researchers [1].

Having an objective measure of screentime creates an opportunity to use another potentially useful and interesting measure—the difference between a consumers' *perceived* usage and *actual* usage. Misestimation based on mobile device screentime data has received relatively little research (with some notable exceptions [2]). Most notably, the tendency to misestimate usage patterns has been demonstrated to reflect certain mental health issues. One obvious example is that underestimation with social media (SM) can be a significant indicator of SM addiction [2] while an overestimation may indicate depression [3].

The purpose of this study is to: 1) demonstrate the effects of SM usage measured by screen time on various identified mental health attributes, 2) understand how those mental health attributes impact a person's estimation accuracy of their screen time, and 3) differentiate among these relationships by SM platforms.

SOCIAL MEDIA AND MENTAL HEALTH

Recent data indicates that 3.78 billion people use social media (SM) [4]. Many positive outcomes of SM usage have been identified like increased social well-being and positive mental health, stress management, and happiness [5] among others. Yet, many negative factors have also been identified such as increased depression and loneliness [6], anxiety [7], fear of missing out [8], and social comparison [9].

While it is clear that SM does have significant relationships with mental health, there are still many mixed and inconsistent findings concerning the exact form of that relationship which can benefit from continued research [6]. For example, one study found no relationship between time spent on SM sites and depression using a particular scale [10], while another study using a different depression scale found the opposite with increased levels of psychological distress [11]. Thus, the method of measurement is one relevant issue in explaining these findings.

Generally, SM usage characteristics are modeled as exogenous to mental health attributes [6]. However, a growing body of research also demonstrates that the *content* of SM interactions reflects mental health [ex., 12]. Thus, the relationship is cyclical as indicated in Figure 1.
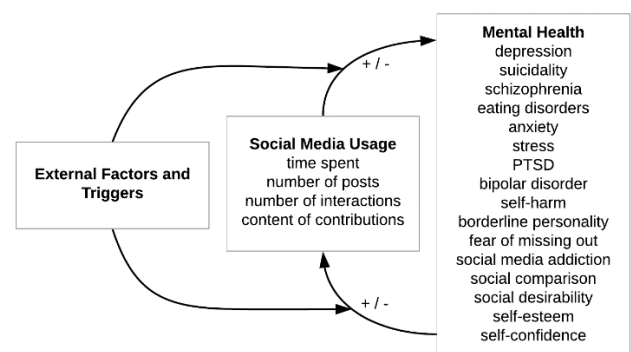
THEORECTICAL BACKGROUND

Social Media to Mental Health

The displacement hypothesis is the most common theory

framing the causal relationship from SM usage to mental health [13]. It implies that time spent on SM replaces time spent on other activities that may be more beneficial for mental health. The main assumption of this theory is that time is a zero-sum commodity. This theory has been used in the past to explain the negative effects of excessive radio or television [14]. Recent longitudinal research shows this theory may explain the negative effects of SM on depression when measuring between-subjects [15]. However, the authors note that, "…time is not the whole story" [15, p. 7] as the relationship between SM time spent and depression was not correlated when evaluating over an eight-year period. Their findings suggested while that the relationship existed between-person, it was absent within-person—meaning that people who used SM more than their average amount did not see significant changes in mental health; thus, supporting concerns that between-person findings should not be used to make conclusions about with-person changes.

Cyclical Relationship

There is reason to theorize that the relationship between SM and mental health is cyclical. The network perspective on psychopathology frames mental health as a complex, dynamic network of systems [16]. The network perspective refers to the fact that the many dimensions of mental health can activate each other in positive and negative ways. For example, SM usage may be activated as a way to reduce stress or relieve boredom [17]. But the resulting passive SM usage (PSMU) may unintentionally lead to a disconnect from others and depression [18].

Hypotheses

In summary, there is theory and evidence to posit the model in Figure 2. Actual SM screen time may either negatively or positively affect mental health depending on the purpose it is used for (H1) and mental health will positively or negatively affect the estimation of screen time. However, although we have given theoretical support for the effects of depression and anxiety on screen time estimations, we still *explore* the same relationship among the other mental health attributes with estimated screen time. Thus, we do not offer a directional hypothesis for anxiety, FOMO, social comparison, or social desirability.
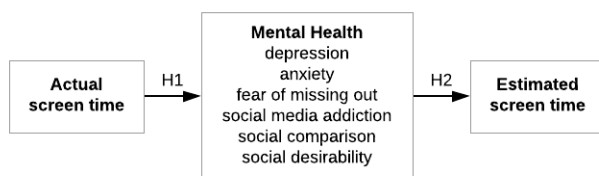

Figure 2. Theoretical Model and Hypotheses

H1: Actual screen time is related to mental health

H2: Mental health is related to consumers' over- and underestimation of their SM time spent.

METHODOLOGY

To test our model, we created a survey (n=1005) to include generally accepted and validated measures of mental health, SM time estimates, and actual screen time values. Because 18-to-29-year old's use SM at the highest rate of any age range [19], university students were deemed an acceptable population to study.

Each of our measures was drawn from validated instruments found in prior research [20-25]. Finally, age, sex, and ethnicity were measured as control variables.

RESULTS

Hypothesis testing was performed by generating a path model using SmartPLS 3.3 [26]. Table 1 summarizes the overall variance explained (R^2) in every construct across platforms. Facebook exhibited the largest R^2 values across all mental health attributes with values ranging from 4.4% to 14.6%. Underestimation was explained between 4.0% to 9.2% depending on the platform.

	Instagram	Facebook	Twitter	YouTube	Average
SM addiction	0.039	0.146	0.026	0.037	**0.062**
Anxiety	0.014	0.059	0.008	0.011	**0.023**
Depression	0.000	0.072	0.010	0.029	**0.028**
FOMO	0.024	0.129	0.033	0.030	**0.054**
Social comparison	0.003	0.044	0.005	0.024	**0.019**
Social desirability	0.006	0.085	0.016	0.026	**0.033**
Mental health average	**0.011**	**0.081**	**0.014**	**0.023**	**0.035**
Under-estimation	0.071	0.092	0.040	0.043	**0.062**

Table 1. R Squared Values

DISCUSSION

In general, our two hypotheses were confirmed at least on some platforms and with some mental health attributes. Concerning the body of research on the relationship between SM consumption and mental health, we find that there is a relationship given the many significant coefficients from actual minutes spent on mental health attributes (confirming H1).

The effect of mental health on the misestimation of screen time had both surprising and expected results. SM addiction had the expected impact of causing significant underestimation of screen time across every platform except for Twitter (confirming H2) but was most pronounced on Instagram.

IMPLICATIONS FOR FUTURE RESEARCH

Our study adds evidence to the body of literature and

theory on the relationship between mental health and SM. We find that a relationship does exist, but that SM explains only a small (although significant) portion of our mental health attributes. To the research literature, our primary contribution is that this relationship depends greatly on the SM platform and the demographics of the consumer. We are each affected differently by SM and not all screen time is either positive or negative.

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