



Time distortion when users at-risk for social media addiction engage in non-social media tasks



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ABSTRACT

Background: There is a growing concern over the addictiveness of Social Media use. Additional representative indicators of impaired control are needed in order to distinguish presumed social media addiction from normal use.

Aims: (1) To examine the existence of time distortion during non-social media use tasks that involve social media cues among those who may be considered at-risk for social media addiction. (2) To examine the usefulness of this distortion for at-risk vs. low/no-risk classification.

Method: We used a task that prevented Facebook use and invoked Facebook reflections (survey on self-control strategies) and subsequently measured estimated vs. actual task completion time. We captured the level of addiction using the Bergen Facebook Addiction Scale in the survey, and we used a common cutoff criterion to classify people as at-risk vs. low/no-risk of Facebook addiction.

Results: The at-risk group presented significant upward time estimate bias and the low/no-risk group presented significant downward time estimate bias. The bias was positively correlated with Facebook addiction scores. It was efficacious, especially when combined with self-reported estimates of extent of Facebook use, in classifying people to the two categories.

Conclusions: Our study points to a novel, easy to obtain, and useful marker of at-risk for social media addiction, which may be considered for inclusion in diagnosis tools and procedures.

1. Introduction

The addictive use of social media (e.g., Facebook, Snapchat, Twitter) can be seen as a specific form of technology addictions, which shares common phenomenology with “Internet gaming disorder,” recently included in Section 3 of the DSM-5 (American Psychiatric Association, 2013). It manifests in addiction-like symptoms, including salience (preoccupation with the behavior), mood modification (performing the behavior to relieve or reduce aversive emotional states), tolerance (increasing engagement in the behavior over time to attain the initial mood modifying effects), withdrawal (experiencing psychological and physical discomfort when the behavior is reduced or prohibited), conflict (putting off or neglecting social, recreational, work, educational, household, and/or other activities as well as one's own and others' needs because of the behavior), and relapse (unsuccessfully attempting to cut down or control the behavior) (He et al., 2017a). Hence, it can be conceived as a state in which the individual is overly

concerned about social media activities, driven by an uncontrollable motivation to perform the behavior, and devotes so much time and effort to it, so that it interferes with other important life areas (Dong and Potenza, 2014).

There is mounting behavioral and neuro-physiological evidence showing that such possible addiction-like symptoms are prevalent, can adversely impact the lives of many individuals, and can be similar in many respects to symptoms manifested in more established addictions (Banyai et al., 2017; Dong et al., 2012). While the boundaries of what exactly constitutes such addictions are still controversial (Turel et al., 2011), the appropriate terminology (e.g., disorder, addiction, problematic use) is not agreed upon (Lortie and Guitton, 2013), and there are no established clinical classification criteria for social media addiction (He et al., 2017b), studies largely agree that many social media users present addiction-like symptoms that cause some impairment in other life domains (Turel and Serenko, 2012). Moreover, studies of adolescents point to about 4.5% prevalence rate of at-risk for addiction, and

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show that most adolescent social media users present some degree of addiction symptoms (Banyai et al., 2017). It is important to study such presumed addictions because they can adversely impact the wellbeing, social functioning, sleep, academic and work performance and health of large cross-sections of social media users (Turel, 2015; He et al., 2017a), and can serve as a gateway for risky and problematic behaviors, such as social media use while driving (Turel and Bechara, 2016a).

Social media addiction is often captured by means of self-reports (as a continuous concept that encapsulates the level of symptoms) and clinical interviews (Turel et al., 2014). Recent research indicates that there is a growing need to find objective markers for such addictions, to supplement rather than replace surveys and clinical interviews. This need stems from the idea that self-reports, especially as related to core symptoms that involve time estimates: compulsion, overuse and tolerance, can be biased (Lin et al., 2015; Rau et al., 2006). Such studies show that in line with time perception theories (Takahashi et al., 2008; Wilson et al., 2015; Wittmann and Paulus, 2008), time distortion is a marker that can help classifying people to addiction and no-addiction groups. They specifically show that the stronger the addiction is, the greater the temporal misperception of users is; users underestimate the time intervals in which they engage in the addictive behavior, and this contributes to addictive behaviors (Lin et al., 2015). One explanation for this is that Internet (and presumably also social media) addictions can be conceived as a special type of an impulse control disorder; a condition under which people lose track of time (i.e., their psychological clock runs slow) and their self-consciousness is impaired (Rau et al., 2006). Viewed this way, it is possible that social media addiction shares similar time distortion features, with more common impulse control disorders, such as compulsive sexual behavior, in which time distortion is a common feature of dissociation (Birchard, 2015).

Two psychological processes underlie such time perception biases: an attention mechanism that can be impaired when people engage in highly rewarding behaviors, and an arousal mechanism that distorts how people accumulate temporal units (Wittmann et al., 2006; Wittmann and Paulus, 2008). Consequently, there tends to be downward-biased time estimates of use epochs in presumed technology addicts, and these can be used for screening and research purposes, as supplements for self-reports (Lin et al., 2015; Rau et al., 2006).

In this study we contend that distortion of time regarding tasks that prevent the use of the addictive technology but involve reflections on it, can too be indicative of social media addiction and serve as another marker for signaling risk for such disorders. Specifically, a period of non-social media use in which there is exposure to social media cues might trigger a deprivation state in people at-risk for addiction. Hence, one may expect that these individuals will overestimate the completion time of a task where they do not have access to social media, especially when the task requires social media reflections. For instance, when people with obesity are deprived of food (e.g., while dieting), they perceive the time intervals between meals to be longer than they are, and hence allow themselves to eat sooner and more often; this bias has been shown to prevent recovery and to contribute to obesity etiology (Faulkner and Duecker, 1989). Similarly, it has been shown that deprivation of smoking and drug use when people try to quit, result in impaired (upward) time perception (Merson and Perriot, 2011; Sayette et al., 2005). Indeed, cognitive time passes more slowly in stressful (e.g., under deprivation when an addict is exposed to cues related to the addictive substance/behavior and homeostasis is disrupted) than in less stressful situations (Fraisse, 1984). In contrast, people with no/low risk of addiction will likely have no or negative time distortion, because they are likely to find reflections on social media to be enjoyable, without being stressed by the deprivation the task induces (Turel and Bechara, 2016b).

We follow the same logic here and suggest that (1) one's level of social media addiction as manifested via the degree of addiction-like symptoms will be positively associated with upward time distortion during this task, and (2) this time distortion can be used as one marker

(out of many) that can separates people at-risk for social media addiction from those who are not. In essence, we expect that tasks that prevent social media use but involve social media cues will produce upward time distortion for people who meet common at-risk for addiction criteria, and possibly downward time distortion for people who do not meet these criteria. This proposed time distortion can be easy to measure and may extend the battery of manifestations in technology addiction research and practice.

2. Methods

2.1. Participants

A total of 274 university students who use Facebook were recruited from statistics classes at a university in the United States (response rate of 88%), in July 2017. The recruitment strategy was based on the idea that university students can be heavy users of social media and present varying degrees of addiction-like symptoms in relation to Facebook use (Turel and Qahri-Saremi, 2016). The split at-risk of social media addiction vs. no- or low-risk was done based on a suggested cutoff point (Banyai et al., 2017) applied to the addiction scores. Sample attributes are given in Table 1:

The range and means of the addiction scores imply that many respondents experienced addiction-like symptoms in relation to social media use, but on average these were experienced somewhat rarely, as expected in the case of problematic behaviors (Turel et al., 2011).

2.2. Procedures

The study was approved by the institutional review board of the university; participation was voluntary and was encouraged with class bonus points. Inclusion criteria included Facebook use and age > 18. Twelve records were excluded because they met the exclusion criteria; the sample was consequently reduced from 286 to 274. The study was conducted in a computer lab from which time elements (e.g., clock) were removed.

The study followed the method of retrospect verbal estimation of duration. The fact that time is a key aspect in the study was not disclosed, and a concurrent task (survey completion) prevented time counting (Wittmann and Paulus, 2008). To operationalize this, the study was presented to students as a study that solicits information on self-control strategies related to Facebook use. Participants were asked to complete an online survey in one attempt; the survey collected data relevant for this study as well as a range of open ended questions that asked participants to write the strategies they use for controlling their level of Facebook use and rate the frequency, difficulty and efficacy of these strategies. The nature of this task served two purposes. First, it

Table 1
Sample characteristics.

	No/low Risk	At Risk	All
n	232 (84.7%)	42 (15.23%)	274
Sex [Male/Female]	151/81	28/14	179/95
Age [Mean, Range, SD]	25.55, 18–54, 5.69	23.52, 18–32, 3.15	25.24, 18–54, 5.42
GPA [Modal range]	3.0–3.2	3.0–3.2	3.0–3.2
Extent of Facebook Use [Mean, SD]	3.89, 1.19	4.92, 0.95	4.04, 1.22
Social Media Addiction Score [Mean, SD]	2.77, 0.87	5.07, 0.66	3.13, 1.18
Big-5 personality profile [Mean, SD]			
Openness	4.31, 1.11	4.65, 1.45	4.36, 1.18
Conscientiousness	5.16, 1.14	4.92, 1.03	5.12, 1.13
Extraversion	4.38, 1.28	4.70, 0.99	4.43, 1.25
Agreeableness	5.03, 1.03	5.23, 0.97	5.06, 1.02
Neuroticism	3.51, 1.29	3.93, 1.50	3.58, 1.33

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