



Full length article

Unfolding the notes from the walls: Adolescents' depression manifestations on Facebook



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ARTICLE INFO

Article history:

Received 8 June 2016

Received in revised form

27 September 2016

Accepted 4 February 2017

Available online 4 February 2017

Keywords:

Adolescents

Depression

Social media

Detection

Social networks

ABSTRACT

Little is known about the manifestation of teenage depression on Social Network Sites (SNS) in general, and in adolescents' Facebook status updates in particular.

Objective: In this study, we compare the traditional 'offline' clinical picture of depression with its online manifestations and explore unique features of online depression that are less dominant 'offline'.

Method: We collected 190 Facebook status updates of adolescents-at-risk (14–18 yrs), who receive psychosocial treatment. Ten licensed psychologists rated the extent to which a status update contained references to depression ($\alpha = 0.96$).

Results: Based on both theory-driven as well as bottom-up approaches, a coding scheme was developed, resulting in a total of 13 features that significantly differentiated between 'depressive status updates' and 'non-depressive status updates'. Detailed descriptions and examples of these features are offered. Furthermore, a multiple regression analysis revealed four status update features that predicted status update depression scores: (1) DSM-5 depressive symptoms (including emotional and behavioral, *but not* somatic symptoms); (2) cognitive distortions; (3) poetic-dramatic form of verbal content; and (4) attitudes toward others.

Conclusions: We discuss the findings and highlight unique features of online depression manifestation, which will ultimately contribute to early (and perhaps even automatic) detection of adolescents' depression from their online SNS activities.

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"Fortune is a traitor. I have cried and shouted to the stars, I have no love, I have no life ... I hate life and I hate living, so I don't care anymore if it hurts others - apparently killing my self is the best way to solve my problems. So I would like to thank everyone who encouraged me to do so. Byyyyye..... BTW, those of you who see this and are thinking (again) that they are saving me by calling my mother, it's time that you understand: I don't want your help and believe me, you are just not helping, so go mind your own business and get out of mine!!! Bye and G-d willing, if he exists, I will see you in the afterlife" (documented Facebook status update of an adolescent girl).

1. Introduction

Adolescence is characterized by psychological changes, including a dramatic increase in rates of depression (Merrell, 2013). Depression is estimated to affect 10.7% of adolescents aged 12 to 17 (NIMH, 2013) and the highest rates of suicide attempts are documented among youth and young adults (Varnik, 2012). Many depressed adolescents endorse biased and maladaptive beliefs about themselves (Beck, 1974; Brent, Kolko, Allan, & Brown, 1990; Spirito, Esposito-Smythers, Wolff, & Uhl, 2011) and tend to ruminate about their negative experiences (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Rood, Roelofs, Bögels, Nolen-Hoeksema, & Schouten, 2009). Unfortunately, adult caregivers often underestimate, or are not aware of, their children's negative experiences (Rey & Bird, 1991; Velting et al., 1998). Since online Social Network Sites (SNS) have become extremely popular among adolescents (Brenner, 2012; Lenhart, Purcell, Smith, & Zickur, 2010), and because SNS are used by adolescents as a platform for emotional self-disclosure (Manago, Taylor, & Greenfield, 2012), we propose that SNS may be used as a novel tool for early detection of

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depression.

The number of active users of SNS is ever increasing and Facebook is by far the most popular SNS, with an estimated 1490 million registered accounts as of August 2015, (Statista, 2015). In 2014, 96% of Israeli Hebrew-speaking teens¹ reported being active on at least one SNS (Ophir, Rosenberg, Asterhan, & Schwarz, 2016), with 89% having active Facebook accounts, on which they spend 2.3 h a day on average (Asterhan & Bouton, submitted). Teenagers and young adults use SNS technology for various activities, but most notably for self-presentation (Back et al., 2010), emotional self-disclosure and frustration “venting” (Manago et al., 2012), maintaining and creating social relations and affiliations (Hew, 2011) and even sharing learning materials (Asterhan & Bouton, submitted; Bouton & Asterhan, in press; Rosenberg & Asterhan, in press).

For better or for worse, online social networks have then become a central domain of adolescents’ social life (e.g., Lenhart et al., 2010; Valkenburg & Peter, 2007). In popular media outlets as well as some academic literature, this often draws negative attention, highlighting concerns such as online bullying (e.g., Subrahmanyam, Reich, Waechter, & Espinoza, 2008), ‘sexting’ (e.g., Temple & Choi, 2014; Temple et al., 2014), and procrastination (Kirschner & Karpinski, 2010). In the present research, we argue for a more pragmatic approach and consider how the centrality of online social networks in adolescent life may be leveraged for detection and prevention of psycho-social distress.

Recent findings reveal that educational and other practitioners already use SNS data for such purposes in an intuitive way: Teachers and school counselors leverage their SNS connections with teenage students to monitor their emotional states and to detect signs of distress (Asterhan & Rosenberg, 2015). Ophir, Asterhan, and Schwarz (in press) report that social workers in urban youth-at-risk centers systematically scan the Facebook activities of adolescents under their care for risky behaviors and signs of depression. In times of war and political violence, Israeli high school teachers were found to provide their students with emotional support through Facebook and WhatsApp communication (Ophir, Rosenberg, Asterhan, & Schwarz, 2016). To date however, educational practitioners and counselors who use SNS for monitoring and detection purposes do so intuitively, without formal knowledge about the phenomenology of adolescents’ depression on social media. Moreover, little is known about adolescents’ online manifestations of depression or other types of psychological distress.

The present study is a first study in a line of research that aims to gain a better understanding of how adolescents’ depression may be detected from SNS activity log data. The goal of this study is to describe the manifestations of depression in teenagers’ Facebook status updates, and how this compares to officially recognized, offline manifestations and symptoms of depression. Specifically, we compare teenage Facebook status updates that clinical professionals judged to be “depressive” with “non-depressive” ones, in order to extract and describe the content features that distinguish between the two.

Whereas some headway has been made regarding online signs of depression among college students (Moreno, Jelenchick, & Kota, 2013; Moreno et al., 2011), there is no research to date that focuses on adolescents in high schools. Moreover, previous attempts to detect depression have mainly focused on explicit manifestations of depressive symptoms, based on the Diagnostic and Statistical Manual (DSM) of mental disorders (APA, 2013). In the present work, we extend this scope in two ways: First, we include additional

theoretical frameworks of depression such as cognitive distortions (Beck, 1974) and depressive rumination (Nolen-Hoeksema et al., 2008). Second, we use a bottom-up approach to reveal unique features of online depression that are not a-priori related to the clinical picture of ‘offline’ depression. By combining the two approaches, we address two research questions: (1) Which of the documented ‘offline’ depressive manifestations are also likely to be found in online social network activity, and which are not? (2) What (if any) depressive manifestations are unique to online social network activities?

In the next sections, we shortly outline the foundation for the assumption that adolescents’ SNS activity will include (either overt or covert) references to depression. We then review cognitive, emotional, and behavioral characteristics of depression, which may be manifested on SNS from a top-down approach. We complement this approach with the presentation of a bottom-up, a-theoretical approach and review previous attempts to link language usage and depression.

1.1. References to emotional states in social network activity

One of the reasons behind the proposition that depression could be detected from Facebook activity is because SNS are used for emotion sharing (Ophir, 2017). Adolescents report that they often disclose more about themselves on SNS than they do in person (Christofides, Muise, & Demarais, 2009) and that emotion sharing is one of their main motives for using SNS (Hew & Cheung, 2012). In other research, Facebook status updates were indeed found to be used primarily for emotional self-disclosure (Manago et al., 2012). In comparison with off line experiences, the advantage of emotion sharing on SNS allows the individual to reach broad and diverse audiences (Bazarova, Taft, Choi & Cosley, 2013; Kivran-Swaine, Govindan & Naaman, 2011) and therefore increases the number of replies (Bazarova, Choi, Schwanda Sosik, Cosley & Whitlock, 2015). When users receive ‘likes’ or ‘comments’ such as “hang in there” or “it will get better” in response to their status updates, they essentially receive acknowledgement (Moreno et al., 2011) and may experience a sense of belonging to a group of friends and acquaintance who acknowledge them (Holleran, 2010; Pickett, Gardner, & Knowles, 2004).

In some cases, status updates may include direct references to negative emotions, experiences, and distress (e.g., “When will all this stop? Just leave me be, I can’t take it anymore!”). Research by Moreno and colleagues (Moreno, Brockman, Wasserheit, & Christakis, 2009; Moreno, Egan, & Fleming, 2011; Moreno, Jelenchick, Grant, Pumper, & Richardson, 2011) screened college students’ Facebook status updates for direct references to a range of health risk behaviors and for depression. They found that status updates included direct references to substance use and sexual behavior, as well as to negative emotional states and depression symptoms, as defined in the DSM-IV.

Mere reliance on top-down keyword searches for depression however, may prove to be problematic for detection. What may seem as an overt sign of adolescent depression at face value may not necessarily be a genuine cry for help, but an act of teasing, sarcasm or theatrical playfulness (e.g., “OMG, I just want to die!;-) ha ha ha”). Moreover, people usually express fewer negative emotions in visible communication channels (i.e., status updates) than in one-on-one private communication (e.g., Choi & Toma, 2014). Therefore, public, overt reference to depression may be infrequent (Moreno et al., 2011). Positive emotions in contrast, may occur in higher frequencies because they serve the user’s self-presentation management efforts (Bazarova et al., 2013). The question of whether online self-presentation is some form of embellished, idealized self (Paulhus & Trapnell, 2008; Siibak, 2009; Walther,

¹ This study did not include teens from the Ultra-Orthodox Jewish and the Arab-speaking populations.

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