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Original article

Peer Influences: The Impact of Online and Offline Friendship Networks on Adolescent Smoking and Alcohol Use

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A B S T R A C T

Purpose: Online social networking sites (SNSs) have become a popular mode of communication among adolescents. However, little is known about the effects of social online activity on health behaviors. The authors examined the use of SNSs among friends and the degree to which SNS activities relate to face-to-face peer influences and adolescent risk behaviors.

Methods: Longitudinal egocentric friendship network data along with adolescent social media use and risk behaviors were collected from 1,563 10th-grade students across five Southern California high schools. Measures of online and offline peer influences were computed and assessed using fixed-effects models.

Results: The frequency of adolescent SNS use and the number of their closest friends on the same SNSs were not significantly associated with risk behaviors. However, exposure to friends' online pictures of partying or drinking was significantly associated with both smoking ($\beta = .11, p < .001$) and alcohol use ($\beta = .06, p < .05$). Whereas adolescents with drinking friends had higher risk levels for drinking, adolescents without drinking friends were more likely to be affected by higher exposure to risky online pictures ($\beta = -.10, p < .05$). Myspace and Facebook had demographically distinct user characteristics and differential effects on risk behaviors.

Conclusions: Exposure to risky online content had a direct impact on adolescents' risk behaviors and significantly interacted with risk behaviors of their friends. These results provide evidence that friends' online behaviors should be considered a viable source of peer influence and that increased efforts should focus on educating adolescents on the negative effects of risky online displays.

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IMPLICATIONS AND CONTRIBUTION

This study provides further evidence that adolescents who are exposed to friends' risky online displays are more likely to smoke and use alcohol. The effects are magnified for adolescents without face-to-face drinking friends. Continued research to examine online peer influence mechanisms are needed to effectively educate adolescents about these risks.

Smoking and alcohol use among adolescents are still prominent risk behaviors in the United States [1]. Despite falling rates in adolescent smoking over the past decade, 15.8% report

smoking cigarettes in the past month and almost half (46.3%) have ever tried smoking [2]. Over 80% of adult smokers begin smoking during adolescence [1]. Alcohol use has declined steadily over the past 2 decades, but it still remains the drug most widely used by today's adolescents [3]. The national Monitoring the Future study indicates that 70% of students have consumed alcohol and half (51%) have been drunk at least once in their life by the end of high school [3].

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Adolescent friendships and risk behaviors

Peer influences have a significant role during adolescence, a time when new identities, friendships, and peer group affiliations are solidified and parental influences gradually diminish [4,5]. Peers have a profound effect on each other and may encourage experimentation of risky behaviors when there is normative pressure to do so [6]. There is also substantial evidence that adolescents' use of tobacco and alcohol is highly associated with their friends' use [7–10].

Adolescents and social media use

Recent increases in social media outlets have transformed traditional communication and information exchange mechanisms, as well as the dimensions of social influence. Online social networking sites (SNSs) such as Facebook, Twitter, and Myspace have gained immense popularity among adolescents within the past few years and have redefined their network boundaries and spheres of influence. In the United States, 95% of youth between 12 and 17 years of age access the Internet on a daily basis, and of these, 80% use SNSs [11]. Almost five times as many adolescents use SNSs (29%) instead of e-mail (6%) for daily communication [12].

With increased accessibility through mobile devices, SNSs provide a mechanism for adolescents to connect with friends instantaneously [13]. Studies indicate that adolescents benefit from the socialization opportunities such as staying in touch, sharing pictures, and exchanging ideas [13,14]. Social networking sites have also been used to foster community engagement, creative expression, and diversity [15].

Recent attention, however, has been directed toward uncovering the risks associated with SNS use, including adolescents' creation and display of inappropriate content such as sexual references and substance use [16–19]. Exposure to risky content posted by friends can cultivate unfavorable norms that are then rapidly spread through the online networks and contribute to the adoption of risky beliefs and behaviors [20]. Other risks include higher exposures to sexual solicitations, bullying [21], tobacco advertisements [22], and psychosocial consequences such as depression, anxiety, and loneliness [23,24], which may pave the way toward higher likelihoods of substance abuse, unsafe sex, or other self-destructive behaviors [15].

Social media contexts

The prevalence of adolescent engagement in SNSs suggests that their online networks reflect their offline ones, in that most online connections extend from existing face-to-face relationships [25]. Evidence also suggests that these sites are distinct in demographic distribution. In an ethnographic survey of both Myspace and Facebook users, boyd [26] described how race and class influenced adolescents' choice of SNS. Myspace was described as a place for creative expression, a portal for discovering new musical artists and tastes. Users were also more likely to be younger and Hispanic, and to have lower socioeconomic status [27,28]. In contrast, the clean, predictable, and functional format of Facebook appealed to older adolescents who viewed Facebook as a marker of status and aspired to connect with friends in college. Migrating from Myspace to Facebook was a "growing up" process as "adult" relationships through Facebook superseded the need for more introspective features on Myspace [29].

Social media use and health among adolescents

Little is known about the effects of social media use on adolescent health behaviors. One study of 400 adolescent Myspace profiles found that 56% contained alcohol references and among these 49% talked explicitly about alcohol use [30]. Studies of homeless youth indicate that online friendships were associated with both risky behaviors such as increased exchanges of sex for drugs or money and protective behaviors such as human immunodeficiency virus/sexually transmitted infection testing—depending on the type of relationships that were fostered and topics discussed through these networks [31,32]. Further understanding about the nature of online friendships is necessary to mitigate these harmful effects on adolescents.

Online communication portals such as Facebook and Myspace have the ability to simultaneously transmit new attitudes and behaviors to countless people beyond geographic boundaries [33]. Content displayed by peers can be a powerful source of influence through peer modeling that is likely to promote biased normative perceptions, especially for adolescents who have many friends on SNSs, and for those who frequently visit these sites. The goal of this study was to investigate peer offline and online friendships to determine how online activities with friends might broker the peer influence processes by either encouraging or hindering the influence of peer risk behaviors on adolescent smoking and alcohol use. The questions examined were whether there are positive associations between adolescent SNS activity and risk behaviors, and whether higher levels of online activity might amplify the effects of friends' risk behaviors on adolescent risk behaviors.

Methods

Data were drawn from the Social Network Study, a longitudinal study of high school adolescents designed to answer methodological and theoretical questions about data collection practices and effects of different peer relationships on risk outcomes [34]. The sample consisted of 10th-grade students at five comprehensive high schools in the El Monte Union High School District. (These five high schools comprised the entire school district. None of these schools are considered charter or magnet schools.) At the time of this study, El Monte was the ninth largest city of Los Angeles County, with a population of approximately 113,500 and an ethnic distribution of 69.0% Hispanic, 24.9% Asian, 4.9% White, and .4% Black/African-American [35].

Study design and data collection

The first two waves of the Social Network Study were collected in October 2010 and April 2011. Paper-and-pencil surveys were administered during class on a regular school day. Of the total 2,290 enrolled 10th graders, 2,016 returned valid parental consent forms (88.0%), with 1,823 agreeing to participate in the study. Some 28 of these students did not provide student assent, which reduced the eligible pool to 1,795. A total of 1,719 students completed surveys at the first wave (T1) of data collection, 1,620 students completed the survey at the second wave (T2), and 1,563 students completed the surveys at both time points. The Institutional Review Board of the University of Southern California approved all study protocols.

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