Highlights

► Sexting, alcohol use, and sex-related alcohol expectancies were involved in hookups. ► Sexting mediated the relationship between problematic alcohol use and hookups. ► Negative urgency and sensation seeking were related to alcohol use and sexting. ► Sensation seeking and negative urgency acted as distal risk factors for hookups.
From the bar to the bed via mobile phone: A first test of the role of problematic alcohol use, sexting, and impulsivity-related traits in sexual hookups

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**Abstract**

Computer-mediated sexting behaviors, problematic alcohol use, and sexual hookups are prevalent among college populations. While relationships between sexting and alcohol, and sexting and sex have been established, the potential role of sexting as a mediator between alcohol use and hookups is unknown. The current study highlights sexting as one example of how technology is becoming seamlessly integrated with all domains of human behavior.

Sexual hookups are broadly defined as unplanned, casual sexual encounters (coital and non-coital) between individuals who are not romantically committed, and who have no intentions of developing a committed relationship (see Stinson, 2010 for review). Evidence suggests that alcohol use precedes sexual behaviors (e.g., Brown & Vanable, 2007; Patrick & Maggs, 2009), and when alcohol is involved, casual hookups can become unwanted sexual encounters (Owen & Fincham, 2011; Paul, McManus, & Hayes, 2000), and sexual health risks are more likely (Cook & Clark, 2005; Thompson, Kao, & Thomas, 2005). Considering the potential negative outcomes associated with alcohol-related sexual hookups, especially among college students (Owen, Rhoades, Stanley, & Fincham, 2010; Paul et al., 2000), it is important to understand how the increased use of smart phones could enhance risk for engaging in sexual hookups while intoxicated. Sexting is a unique blend of technology and sexual interaction that is growing in popularity and may be an important mechanism in explaining risk for sexual hookups.

Sexing is a prevalent and expanding computer-mediated behavior across adolescents (Ferguson, 2011; Mitchell, Finkelhor, 2013). The current study highlights sexting as one example of how technology is becoming seamlessly integrated with all domains of human behavior.

**Introduction**

Over the past decade, digital media, including mobile phones and Internet social networking sites, have become essential in social communication, especially among college students. Moreover, with the advancement of smart phones (Weiss & Samenow, 2010), college students have the ability to text message, take pictures, and access online social networks from almost anywhere, such as in bars and clubs. In turn, this burgeoning technology fosters the assimilation of digital media in all domains of human behavior, including some hallmarks of college culture, such as alcohol use and sexual hookup behaviors. Empirical research addressing the psychological, health, and social impacts of such increased and widespread digital media and computer use is warranted. The current study examines how sexting, the exchange of sexually charged material via mobile phone or Internet social-networking site (Chalfen, 2009), affects social interactions during alcohol consumption, leading to more risky sexual hookup behaviors. Moreover, the current study highlights sexting as one example of how technology is becoming seamlessly integrated with all domains of human behavior.

**Methods**

In a college sample, (N = 611; M(SD) age = 21.4 (4.18); 77.3% female), a causal path model using structural equation modeling indicated that: (1) Problematic alcohol use (b = .05, p < .001) and sexting (b = .14, p < .05) were related to sexual hookups; (2) sensation seeking and negative urgency were related to problematic alcohol use (b = .96, p < .001, b = .60, p < .05) and sexting (b = .11, p < .05, b = .12, p < .001); and (3) problematic alcohol use was indirectly related to hookups through sexting (b = .01, p < .01).

**Conclusion**

Findings provide initial support for sexting as a partial mediator between problematic alcohol use and sexual hookups, and for the role of impulsivity-related traits and alcohol expectancies as distal predictors in this process. Findings highlight sexting as one example of the intersection between computer-mediated and human interaction.
Given evidence, we conducted the first concurrent test of a causal path model integrating impulsive personality-based dispositions, sex-related alcohol expectancies, problematic alcohol use, sexting, and sexual hookups in a college sample. Understanding psychological dimensions associated with sexting and how sexting might be related to alcohol use and sexual hookups is an important step in the advancement of theory concerning how such digital path directions proposed by this model, we view this study as an appropriate initial test of these effects that can speak to the validity of examining such a model in future prospective research.

### 1.1. The Acquired Preparedness Model of Risk

The AP Model of Risk (Smith & Anderson, 2001) is based in personality-environment transaction theory and suggests that personality traits, such as impulsivity, both directly and indirectly influence risk-taking through the development of socially-learned expectations about the outcomes of specific behaviors (Smith & Anderson, 2001). In other words, impulsivity predisposes one to engage in certain behaviors, and impulsivity also predisposes one to focus on the positive, rewarding outcomes associated with risk-taking, thus making it more likely to participate in that behavior in the future (e.g., Settles, Cyders, & Smith, 2010). These socially-learned expectancies, which are developed through biased learning mechanisms, often conceptualize one's past experiences with a certain behavior, and summarize one's beliefs about potential outcomes “in an ‘if…then’ format” (Fischer, Smith, Anderson, & Flory, 2003, p. 108). The AP Model was originally designed to address the risk for alcoholism (Smith & Anderson, 2001), but has been extended to other risk-taking behaviors (e.g., Combs, Pearson, & Smith, 2010; Vangsness, Bry, & LaBouvie, 2005). Notably, the AP Model has been validated to demonstrate how the impulsive personality trait of sensation seeking directly predicts sexual behavior, and indirectly predicts sex through sex-related alcohol expectancies (e.g., Hendershot, Stoner, George, & Norris, 2007; White, Fleming, Catalano, & Bailey, 2009), thus supporting the model's viability in the current study.

In the current study, we propose an application of the AP Model to comorbid problematic alcohol use, sexting, and sexual hookups.

A review of the literature suggests two main personality traits that are of interest to the current study — negative urgency and sensation seeking. Sensation seeking, which is defined as the tendency to seek out new and exciting experiences (Whiteside & Lynam, 2001), is associated with sexting (Dir, Koo, & Cyders, 2013), sexual risk-taking (e.g., Denohew et al., 2000; Hoyle, Fejfar, & Miller, 2000; Justus, Finn, & Steinmetz, 2000; Paul et al., 2000; Veléz-Blasini, 2008), and alcohol use (Cyders, Flory, Rainer, & Smith, 2009; Hittner & Swickert, 2006). Negative urgency, defined as the tendency to act rashly in response to extreme negative emotions (Whiteside & Lynam, 2001), has also been implicated in problematic alcohol use (Cyders et al., 2009; Verdejo-Garcia, Bechara, Recknor, & Pérez-García, 2007). Sexual behavior (Deckman & DeWall, 2011; Settles et al., 2012), and sexting (Dir et al., in press).

There is also evidence suggesting that these traits might affect sexual-related behaviors through socially-learned expectancies about the outcomes of alcohol (Smith & Anderson, 2001). The literature concerning sex-related alcohol expectancies represents one domain of alcohol expectancies that provide a potential explanation for the comorbidity of alcohol use and sexual hookups. Research suggests that individuals share common beliefs about the effects of alcohol on sex (Leigh, 1989), and these sex-related alcohol expectancies can be conceptualized into three main domains (Dermen & Cooper, 1994a, 1994b): sexual enhancement ("I am a better lover"), sexual disinhibition ("I am more likely to do sexual things that I wouldn’t do when sober"), and sexual risk ("I am less likely to use a condom") expectancies (p. 153). Those who believe that they are more likely to experience sexual activity during alcohol or marijuana use tend to drink or use more frequently, and in turn report more sexual partners (Hendershot, Otto, Collins, Liang, & Wall, 2010; Hendershot et al., 2007; Patrick & Maggs, 2009). The idea that using substances will enhance sexual activity encourages more frequent substance use and often results in more unprotected sex compared to non-substance sexual activity (Hendershot et al., 2007; Hendershot et al., 2010).

Given evidence, we conducted the first concurrent test of a causal path model integrating impulsive personality-based dispositions, sex-related alcohol expectancies, problematic alcohol use, sexting, and sexual hookups in a college sample. Understanding psychological dimensions associated with sexting and how sexting might be related to alcohol use and sexual hookups is an important step in the advancement of theory concerning how such digital communication might impart risk for maladaptive behaviors and negative health outcomes. Although this cross-sectional data is limited in causal determination, it is a necessary first step to test such a model in future longitudinal designs. Our model hypothesizes that (1) sexting behaviors partially mediate the relationship between problematic alcohol use and sexual hookups (as suggested by Benotsch et al., 2012; Dake et al., 2012), and that (2) negative urgency and sensation seeking are indirectly and directly associated with increased problematic alcohol use through sex-related alcohol expectancies.
related alcohol expectancies (as supported by Leigh and Stall (1993) and Smith and Anderson (2001)), this study replicates recent research in which alcohol and sexting were found to predict sexual hookups among college students (e.g., Benotsch et al., 2012), but also extends these findings to examine sexting as a mediator in this relationship. Additionally, no research to date has examined personality-based risk factors for sexting, or the validity of the AP model as applied to sexting and sexual hookup risk, making this study a valid first step to enable future examination.

2. Method

2.1. Participants

A sample of undergraduate students (N = 611; 77.3% Female; 77.0% Caucasian) with a mean age of 21.4 years (SD = 4.2) completed the self-report questionnaires listed below via an online survey and received course credit for their participation. Fifty-three percent of the sample reported being in a committed relationship or married, 38.3% reported being single, and 7.0% reported casually dating (i.e., involved with individual(s) but not in an exclusive, committed, or monogamous relationship).

2.2. Measures

2.2.1. Sexting Behaviors Scale (SBS)

The SBS assesses the frequency of receiving and sending sexts (i.e., sexually provocative texts or pictures) via mobile phone or Internet social-networking site (e.g., Facebook, Twitter). The scale has 10 items rated on a 5-point Likert scale from 1 (never) to 5 (frequently or daily), and one item assessing for lifetime sexting partners. Higher mean scores indicate more frequent sexting (x = .93 in the current sample), and on average, participants reported sexting only “rarely,” or only a few times (M = 1.77, SD = 0.61), and with few different partners (M = 2.16, SD = 0.41).

2.2.2. The UPPS-P impulsive behavior questionnaire

The UPPS-P (Lynam, Smith, Cyders, Fischer, & Whiteside, 2007) was used to assess sensation seeking and negative urgency (12 items each). Responses are based on a 4-point Likert scale from 1 (agree strongly) to 4 (disagree strongly), and recoded so that higher mean values indicated higher levels of impulsive behavior (x = .82 and .88 for sensation seeking and negative urgency in the current sample).

2.2.3. The Alcohol Use Disorders Test (AUDIT)

The AUDIT (Babor et al., 2001) assesses problematic patterns of alcohol use (10 items; x = .83), including both hazardous drinking patterns (e.g., binge drinking) as well as frequency of alcohol-related problems (e.g., missing work or class due to drinking). Items are rated on a 5-point Likert scale and higher summed scores indicate a greater degree of alcohol involvement (M = 13.77, SD = 4.04 across the sample).

2.2.4. Sexual hookup behaviors

Sexual hookups were measured based on operationalizations of hookups used in previous studies (e.g., Fielder & Carey, 2009). The measure consists of four items regarding the number of partners with whom one has engaged in: (1) Sex with only once; (2) oral sex with only once; (3) sex with an uncommitted partner; and (4) oral sex with an uncommitted partner (x = .91 in the current sample). Responses range from 1 (no partners) to 7 (nine or more partners) (M = 2.02, SD = .88).

2.2.5. The Sex-related Alcohol Expectancy Questionnaire (SRAEQ)

The SRAEQ (Dermen & Cooper, 1994a) is a 13-item scale with responses ranging from 1 (strongly disagree), to 6 (strongly agree) and assesses three domains of sex-related expectations from drinking alcohol: sexual disinhibition (x = .92), sexual enhancement (x = .95), and sexual risk taking (x = .94). Total mean score across three subscales was used for study analyses (M = 2.58, SD = 1.24).

2.3. Data analysis

We examined a path model using structural equation modeling via MPlus with the weighted least squares mean variance (WLSMV) method (Muthén & Muthén, 2010). Sensation seeking and negative urgency were each represented as latent variables in the model predicted by three parcelled item indicators, because of the unidimensional nature of the UPPS-P impulsivity facets (Cyders et al., 2009), and due to reported advantages of parceling (Hagtvet & Nasser, 2004; Little, Cunningham, Shahar, & Widamon, 2002).

Sexting behaviors, hookups, problematic alcohol use, and relationship status served as continuous dependent measured variables. The following mediational paths were identified: Indirect paths from (1) sensation seeking and (2) negative urgency to problematic alcohol use through sex-related alcohol expectancies; indirect paths from (3) sensation seeking and (4) negative urgency to sexting behaviors through problematic alcohol use; (5) indirect path from sex-related alcohol expectations to hookups through problematic alcohol use; and (6) indirect path from problematic alcohol use to hookups through sexting behaviors.

The following fit indices were examined to determine the best fitting model: the Comparative Fix Index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the chi-square test of model fit ($\chi^2$). (Bentler, 1990). Generally, a CFI and TLI above either .90 or .95, RMSEA values of .06 or lower, and chi-square values closer to zero and not significant indicate a close fit (Hu & Bentler, 1999; Kline, 2011).

3. Results

Overall, the hypothesized model predicting sexual hookups from alcohol use and sexting showed good fit (as illustrated in Fig. 1): $\chi^2$ = 37.47 (df = 34, p = .31); RMSEA = .01 (90% CI [.00 – .03]); CFI = .99; and TLI = .99. Sensation seeking and negative urgency were significantly related to problematic alcohol use (b = .96, p < .001, and b = .60, p < .01, respectively), sexting behaviors (b = .11, p < .01, and b = .12, p < .001, respectively), and sex-related alcohol expectancies (b = .13, p < .05, and b = .54, p < .001, respectively). Sex-related alcohol expectancies significantly mediated the effects of sensation seeking and negative urgency on problematic alcohol use (both at b = .01, p < .01), and problematic alcohol use significantly mediated the effects of sensation seeking and negative urgency on sexting behaviors (b = .03, p < .001, and b = .02, p < .01, respectively). Sex-related alcohol expectancies were significantly associated with problematic alcohol use (b = 1.2, p < .001) and hookups (b = .25, p < .001), and problematic alcohol use significantly mediated sex-related alcohol expectancies and hookups (b = .06, p < .001). Problematic alcohol use was significantly associated with sexting (b = .04, p < .001) and hookups (b = .05, p < .001), and the indirect effect of problematic alcohol use on hookups through sexting was small, yet significant (b = .01, p = .02). Problematic alcohol use mediated the relationship between sex-related alcohol expectancies and sexting (b = .04, p < .001). Relationship status had a significant relationship with sexting (b = .07, p < .001). Lastly, sexting behaviors were significantly related to...
h hookups ($b = .17, p < .001$). See Table 1 for correlations among study variables and Fig. 1 for full illustration of the structural model.

### 4. Discussion

The current study highlights the role of sexting behaviors as an excellent example of the intersection between computer technology and human interaction, in particular, the role of sexting in explaining the temporal relationship between alcohol use and sexual hookups. The examined model was supported, suggesting viability of our temporal, causal model predicting hookups. This study extended recent findings that showed a relationship between alcohol use, sexual hookups, and sexting (Benotsch et al., 2012), providing some evidence for the role of sexting as a partial mediator in the relationship between problematic alcohol use and hookups among college students. Additionally, this was the first study to apply the AP Model to the comorbidity of problematic alcohol use and sexual hookups in college students, and to examine how computer-mediated communication can influence the engagement in sexual hookups during alcohol consumption. This study suggests how impulsive personality dispositions (sensation seeking and negative urgency) might exert their effects on these outcomes through biased learning, resulting in the stronger acquisition of sex-related alcohol expectancies. Better understanding about how the increasing use of smart phones and digital media can influence the health and well-being of individuals, particularly with regards to sexting and alcohol-related sexual hookups, is integral to prevent negative outcomes associated with such behaviors. Of course, the current data is cross-sectional in nature, and thus determination of causal pathways cannot be confirmed. However, given that this was the first test of such a model, we view this as an important initial test that provides rationale to examine this model in prospective or longitudinal designs.

Therefore, future prospective designs should examine how, developmentally, impulsivity-related traits might lead to greater acquisition of sex-related alcohol expectancies, and how the co-occurrence of both these factors increases problematic alcohol use in college samples. Secondly, event-level data might be useful to determine whether or not, while drinking, college students are using sexting as a mechanism to initiate sexual hookups. This study provides an initial test that shows promise, though, follow-

### Table 1

Correlational analyses of variables.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Relation</th>
<th>SBS total</th>
<th>AUDIT</th>
<th>SS</th>
<th>NUR</th>
<th>Hookups</th>
<th>SRAEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>1</td>
<td>.06</td>
<td>-.06</td>
<td>-.12**</td>
<td>-.20**</td>
<td>.00</td>
<td>-.16**</td>
</tr>
<tr>
<td>Relation</td>
<td>1</td>
<td>.12**</td>
<td>.01</td>
<td>-.06</td>
<td>-.06</td>
<td>.13**</td>
<td>-.02</td>
</tr>
<tr>
<td>SBS total</td>
<td>1</td>
<td>.33**</td>
<td>.21**</td>
<td>.22**</td>
<td>.24**</td>
<td>.20**</td>
<td>.29**</td>
</tr>
<tr>
<td>AUDIT</td>
<td>1</td>
<td>.23**</td>
<td>.29</td>
<td>.28</td>
<td>.47**</td>
<td>.47**</td>
<td></td>
</tr>
<tr>
<td>SS</td>
<td>1</td>
<td>.21**</td>
<td>.11**</td>
<td>.15**</td>
<td>.15**</td>
<td></td>
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<tr>
<td>NUR</td>
<td>1</td>
<td>.12**</td>
<td>.34**</td>
<td></td>
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<tr>
<td>Hookups</td>
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<td>.28**</td>
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<tr>
<td>SRAEQ</td>
<td>1</td>
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<td></td>
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<tr>
<td>Mean</td>
<td></td>
<td>2.16</td>
<td>13.77</td>
<td>1.78</td>
<td>2.28</td>
<td>2.02</td>
<td>2.58</td>
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<tr>
<td>SD</td>
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<td>4.1</td>
<td>4.40</td>
<td>0.47</td>
<td>0.62</td>
<td>0.98</td>
<td>1.24</td>
</tr>
</tbody>
</table>

Note: N = 611. Sex: Male = 1, Female = 2. *p < .05, **p < .01. Relation: 1 = single (38.3%), 2 = dating (7.0%), 3 = exclusive relationship (42.1%), 4 = cohabitating (5.1%), 5 = married (6.1%). SBS Total: sexting behaviors. Hookups: mean hookup score from sexual behaviors questionnaire. AUDIT: problematic alcohol use. SS: sensation seeking. NUR: negative urgency. SRAEQ: sex-related alcohol expectancies.

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up studies are necessary to clearly determine the existence of this relationship is actually occurring.

However, the causal directions and overall model tested were based in prior theory and empirical data, and thus, serve as viable preliminary findings to inform future work. These findings give new insight into the potential step-by-step pathway from alcohol to sexual hookups. In particular, distal personality traits of sensation seeking and negative urgency appear to be important in the development of sex-related alcohol expectancies, alcohol use, sexting behaviors, and subsequently, sexual hookups. While it is well understood that alcohol use predicts hookups (e.g., Fielder & Carey, 2009; see Stinson, 2010 for review), sexting might be a unique, intermediary computer-mediated step in the process.

One potential application of this causal model is related to the risk involved in the sexual hookup experience. We believe that the combination of alcohol use and sexting leads to increased sexual hookups because of (1) the disinhibiting effects of alcohol leading to both an increased likelihood of sexting and an increased likelihood of engaging in sexual behavior; and (2) the potential role of sexting as a means to initiate sexual activity (e.g., Lenhart, 2009), although further examination is warranted. We hypothesize that sexual hookups resulting from these situations are more likely to be nonconsensual, as women who are intoxicated are not able to give consent for sexual activity, and men who are intoxicated are more likely to misperceive their potential partner’s degree of sexual interest (Abbey, 2002). Additionally, we hypothesize that sexting could be viewed as implicit consent, or misperceived as consent, for subsequent sexual activity. Thus, although sexting might not always result in negative outcomes (e.g., Dir, 2012), we view sexting while consuming alcohol to be a potentially more risky behavior that could be associated with increased sexual hookups, particularly nonconsensual ones. This should be examined in future work.

This study mirrors recent literature examining the development of digital media and social interaction (e.g., Lenhart, Purcell, Smith, & Zickuhr, 2010), and builds on research addressing online media and sexual-related behaviors (Moreno, Brockman, Wassertheil, & Christakis, 2012; Moreno, Swanson, Royer, & Roberts, 2010; Weiss & Samenow, 2010). The potential links among alcohol use, sexting, and hookups suggest an important role for digital media in sexual initiation. This study proposes sexting as a potential intermediary behavior that could be targeted in intervention or prevention strategies to reduce negative consequences associated with problematic alcohol use and hookups (e.g., Thompson et al., 2005).

First, for example, a sexting-based intervention might allow individuals to think twice before sending a sext. One anecdotal example of such an approach is Google Lab’s Gmail Mail Goggles (Official Gmail Blog, 2008). Mail Goggles is a setting for personal email accounts that requires one to answer math problems before being able to send an email at night and on weekends in order to help prevent “drunk emailing.” One could imagine such an app being available on any smart phone to avoid “drunk sexting,” which may help prevent high-risk sexual behaviors.

Second, sex-related alcohol expectancies were associated with problematic alcohol use and hookups, consistent with previous research (Carey, 1995; Dermer and Cooper, 1994). Research suggests that challenging one’s expectancies can actually change behavior (Darke & Goldman, 1993; Darke & Goldman, 1998). Thus, targeting sex-related alcohol expectancies could potentially reduce problematic alcohol use, and indirectly, sexual hookups. Further research should address the viability of such interventions for college students.

Although not addressed in the current study, future research should examine how engagement in sexting might be related to other computer-mediated behaviors. It is unclear whether or not sexting has addiction potential like mobile phone (Bianchi & Phillips, 2005) and Internet addiction (Block, 2008); however, given that sexting, excessive Internet use, excessive computer/video game playing, and engagement in pornography have been linked to general disinhibition (Suler, 2004) and impulsive personality traits (e.g., Butt & Phillips, 2008; Cao, Su, Liu, & Gao, 2007; Gentile et al., 2011; Ross et al., 2009), it is likely that these behaviors would be related to one another, although this should be tested empirically.

Future work should continue to empirically investigate how the integration of computers and technology in our everyday lives is affecting our psychological well-being and social interactions, including not only the examination of sexting and sexual hookups, but also how use of smart phones and computers might affect other areas of well-being, such as depression (Ha et al., 2007), self-esteem (Niemz, Griffiths, & Banyard, 2005), substance use (Moreno, Briner, Williams, Walker, & Christakis, 2009), and bullying (Ybarra & Mitchell, 2004). This is a growing area of inquiry, and, indeed, technology is changing faster than research can be conducted. However, what is clear is that technology has widespread effects on our social lives and health, and it is important to take a critical and empirical approach to understanding its effects to be at the forefront of this new and emerging field.

The current study had a number of limitations. All the data were cross-sectional, hence, causation cannot be confirmed, although findings serve as a viable first step in theory formation. Longitudinal design and event-level data analysis would help to clarify the proposed casual pathway. The use of a college student, mostly Caucasian, and primarily female sample could limit generalizability of results; however there is a high prevalence of sexting, problematic alcohol use, and hookups among college students (Benotsch et al., 2012; Gordon-Messer et al., in press; Owen et al., 2010; Paul et al., 2000), and thus serve as a prime sample of interest.

5. Unified reference

McDonald and Marsh (1990).

References


