Published in final edited form as:

Psychol Violence. 2013 July 1; 3(3): 233–246. doi:10.1037/a0030904.

Prospective Predictors of Technology-Based Sexual Coercion by College Males

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Abstract

Objective—Technology-based coercive behavior (TBC) represents an emerging public health problem. This study contributes to the literature by identifying prospective individual-, social-, and community-level predictors of TBC.

Method—Data were collected from 800 males who participated in a prospective study on attitudes and behaviors regarding relationships with women. Variables across multiple ecological layers were used to predict TBC.

Results—Bivariate analyses indicated that 16 of the 17 risk variables significantly predicted TBC including anger, impulsivity, sexual compulsivity, hostility towards women, rape supportive beliefs, high-risk drinking, childhood sexual abuse, interparental conflict, peer pressure to engage in sex, peer approval of forced sex, number of sexual partners, perceived negative sanctions for sexual aggression, exposure to pornography, and participation in varsity sports, student government, and religious groups. Multivariate regression analyses indicated five variables uniquely accounted for TBC behaviors, including rape supportive beliefs, peer approval of forced sex, number of sexual partners, exposure to pornography, and participation in student government.

Conclusions—Our findings that TBC can be prospectively predicted by these risk factors suggest that computer-based technology interventions focusing on these factors through social network ads that promote reflection on healthy social and romantic relationship behaviors and attitudes could help prevent and reduce TBC.

Keywords

technology-based sexual coercion; sexual coercion; sexual aggression; cyber aggression; prospective design

Technology-based coercive behavior (TBC) represents an emerging public health problem. One national survey found that 35% of 1–15 year olds reported being the victim of either Internet harassment (34%) or unwanted sexual solicitation (15%), and 21% reported perpetrating either Internet harassment (21%) or unwanted sexual solicitation (3%) during the past year (Ybarra, Espelage, & Mitchell, 2007). In another national study, 6% of 10–17 year olds reported having been victimized online in the past year (Mitchell, Finkelhor, Wolak, Ybarra, & Turner, 2011). In a third national study on youth internet and safety that was conducted with 10–17 year olds, unwanted online sexual solicitations by someone five or more years older occurred most frequently among older than younger youth and was

reported by 14% of 16–17 year olds (Jones, Mitchell, & Finklehor, 2012). In a survey conducted by the National Campaign To Prevent Teen and Unplanned Pregnancy (2008), 38% of teen girls, 39% of teen boys, 37% of young adult women, and 47% of young adult men reported having had sexually suggestive text messages or emails originally meant for someone else shared with them. Further, 25% of teen girls, 33% of teen boys, 24% of young adult women, and 40% of young adult men had nude or semi-nude images originally meant for someone else shared with them. Also, 37% of teen girls, 40% of teen boys, 56% of young adult women, and 62% of young adult men have themselves sent or posted sexually suggestive messages. Given the prevalence of TBC, the purpose of the current study was to describe the type and extent of TBC behaviors among college males as well as to determine prospective predictors of TBC behaviors.

Young adults, like all segments of the population, are spending increasing amounts of time communicating in online spaces (Ybarra, Espelage, & Mitchell, 2007). Not only has Facebook experienced a high growth in membership, but the time spent on online social networking sites has increased more rapidly relative to the total time spent online (Nielsenwire, 2010a, 2010b). However, although the increased use of social networking has resulted in more research in this line of inquiry, there remains a dearth of knowledge regarding TBC behaviors.

Although physical assault does not occur through these technologies, victims of TBC are at increased risk of experiencing psychological and emotional stress as a result (Mitchell et al., 2011), and TBC has been found to be associated with higher levels of anger, alcohol and other drug use, and poorer relationships with their parents (Ybarra, Espelage, & Mitchell, 2007). Due to the prevalence and negative consequences of TBC, more research is needed to better understand the extent and nature of TBC, and to explore factors that convey increased risk for college males engaging in TBC behaviors.

Given that online victimization has been found to be strongly correlated with “offline” sexual victimization (Mitchell et al., 2011), a potential avenue for the exploration of risk factors for TBC is to look to the extant research on risk factors for sexual aggression perpetration among male college students. This research indicates that 7%–14% of college males report perpetrating some form of sexual aggression including unwanted sexual contact, coercion, and attempted or completed rape (Abbey & McAuslan, 2004; Koss, Gidycz, & Wisniewski, 1987; Monson & Langhinrichsen-Rohling, 2002; Thompson, Koss, Kingree, Goree, & Rice, 2011; White & Smith, 2004) and also has elucidated important risk factors for predicting sexual aggression perpetration (Abbey, 2002; Lyndon, White, & Kadlec, 2007; Malamuth, Sockloskie, Koss, & Tanka, 1991; Malamuth, Heavey, & Linz, 1993; Malamuth, Linz, Heavey, Barnes, & Acker, 1995; White & Smith, 2004). These risk factors occur across multiple ecological domains, including intrapersonal or individual domains, peer or social domains, and community or environmental domains. Several different theories incorporate these ecological domains into their frameworks for conceptualizing influences on behavior (DiClemente, Crosby, & Kegler, 2009). One of these is the Theory of Triadic Influence (TTI) (Flay, Petraitis, & Hu, 1999), which has been applied to investigating risk factors for other problem behaviors such as youth tobacco use (Flay, Allred, & Ordway, 2001; Flay, Graulich, Segawa, Burns, & Holliday, 2004), violence (Bell & Fink, 2000; Ngwe, Liu, Flay, Segawa, & Aban, 2004), sexual violence (Thompson et al., 2011), substance abuse (Komro & Toomey, 2002; Sieving, Maruyama, Williams, & Perry, 2000; Sussman, Dent, & Leu, 2000), and sexual behavior (Bearinger & Resnick, 2003; Sieving, McNeely, & Blum, 2000). Given the application of the TTI to other problem behaviors among youth and given its inclusion of risk factors across several ecological domains, we used the TTI to guide our investigation of risk factors for TBC.

The TTI describes three different types of influences on risky behaviors: intrapersonal, social/situational, and community/environmental. Intrapersonal influences that have been found to be associated with sexual aggression perpetration include anger (Lewis & Fremouw, 2001; Malamuth et al., 1995), impulsivity (Knight & Sims-Knight, 2003), sexual compulsivity (Knight & Sims-Knight, 2005), hostility towards women (Abbey & McAuslan, 2004; Knight & Sims-Knight, 2005), rape supportive beliefs (Lonsway & Fitzgerald, 1995; Thompson et al., 2011), and alcohol use (Abbey, 2002; Giancola, 2002; Koss & Dinero, 1989; Thompson et al., 2011). Social influences that have been found to be associated with sexual aggression perpetration include experiences with violence in childhood (Fagan & Wexler, 1988; Lewis & Fremouw, 2001; Malamuth et al., 1991; Malamuth et al., 1995; Rich, Combs-Lane, Resnick, & Kilpatrick, 2004; Schumacher, Feldbau-Kohn, Smith Slep, & Heyman; Thompson et al., 2011), exposure to inter-parental violence (Arriaga & Foshee, 2004; Lewis & Fremouw, 2001; O'Leary & Arias, 1988; White & Smith, 2004), peer pressure to engage in high levels of sexual activity (Malamuth et al., 1995), peer approval of sexual aggression (Burt, 1980; Check & Malamuth, 1983; Foshee, Linder, MacDougall, & Bangdiwala, 2001; Riggs & O'Leary, 1989; Thompson et al., 2011), and number of sexual partners (Abbey et al., 2001; Calhoun, Bernat, Clum, & Frame, 1997; Malamuth et al., 1991). Community/environmental influences that have been found to be associated with sexual aggression perpetration include such factors as not perceiving there to be negative sanctions against violence (Hall & Barongan, 1997), exposure to pornography (Davis, Norris, George, Martell, & Heiman, 2006; Malamuth, Addison, & Koss, 2000), and participation in various organizations such as fraternities (Cook, 1995; Koss & Gaines, 1993), athletic teams (Koss & Gaines, 1993), student government, and religious groups (Donnelly & Fraser, 1998).

The current study adds to the literature base by examining *prospective* risk factors of TBC, thereby moving beyond descriptive studies that elucidate characteristics of those who engage in TBC and providing information about whether these characteristics can be used to predict future TBC. The current study also adds to the literature by examining risk factors across multiple ecological domains. This ecological approach guides our inquiry towards risk factors at the individual, social, and community levels, thereby providing a comprehensive, empirical assessment of potential targets for interventions. In sum, the purpose of the study was (1) to describe the type and extent of TBC behaviors in a sample of college males and (2) to examine potential risk factors for these behaviors. We used a prospective design to determine bivariate and multivariate risk predictors of TBC. Risk factors were derived from extant research on sexual aggression perpetration and represented risk across three ecological domains -intrapersonal, social, and community/environmental. It was hypothesized that TBC behaviors would be associated with intrapersonal, social/peer, and community/environmental risk factors assessed three years earlier. In terms of intrapersonal risk factors, we hypothesized that college males who reported higher levels on anger, impulsivity, sexual compulsivity, hostility towards women, rape supportive beliefs, and high-risk drinking their freshmen year would report greater levels of TBC their senior year. In terms of social/peer risk factors, we hypothesized that college males who reported higher levels or the presence of childhood sexual abuse, interparental conflict, peer pressure to engage in sex, peer approval of forced sex, and number of sexual partners their freshmen year would report greater levels of TBC their senior year. In terms of community/environmental risk factors, we hypothesized that college males who reported more exposure to pornography, participation in fraternities, and varsity sports would report greater levels of TBC their senior year, and that those who participated in student government and religious groups, as well as those who reported higher levels on perceived negative sanctions for sexual aggression would report lower levels of TBC their senior year.

Method

Sample

The original sample included 800 males who were recruited from a population of 1,472 men enrolled as 1st-year, full-time students at a large southeastern university to participate in a 4-wave longitudinal study. Five individuals were excluded from the study because they were not 18 years of age at the time of Wave 1 data collection. The average age of males at Wave 1 was 18.56 years ($SD = 0.51$) and 89% were white. Almost two-thirds (64%) were from suburban hometowns, 24% were from rural hometowns, and 12% were from urban hometowns. The majority (71%) lived in all-male dorms, 25% lived in coed dorms, and 4% reported “other” living arrangements. The sample was representative of the population of 1st-year male students in terms of age and race based on data provided from the Office of Institutional Research. The sample for the current study included the 571 males who completed Wave 4 surveys (72% follow-up rate). Attrition at Wave 4 was unrelated to the study variables with the exception of number of sexual partners ($F(1,794) = 11.89, p < .001$), interparental conflict ($F(1,794) = 17.02, p < .001$), and participation in a religious group ($X^2(1, N = 795) = 3.35, p < .05$). Compared to males lost to follow-up, those who were retained in the study at Wave 4 had fewer sexual partners ($M = 1.80, SD = 3.48$) v. ($M = 2.90, SD = 4.76$), lower levels of inter-parental conflict ($M = 1.71, SD = 0.55$) v. ($M = 1.90, SD = .61$), and a greater likelihood of religious group participation (28% v. 21%) at Wave 1.

Procedures

Recruitment for the study was primarily via electronic mail. Each first-year male student at the university was sent a personal email at the end of the school year requesting his participation in the study. We also posted an announcement in the student newspaper and distributed flyers around campus. The request for participation invited students to come to the student health center anytime between 9:00 a.m. and 4:00 p.m. during the upcoming week to complete a confidential, 20 to 30 minute self-report survey on men’s attitudes and behaviors regarding relationships with women. Potential participants also were informed that they would be compensated for their time (\$20.00 at Wave 1 and \$25.00 at Wave 4). Wave 1 data were collected over a 1-week period in March-April 2008. Data collection ended once the target sample size of 800 was achieved.

At Wave 1, males who came to the health center to complete a survey had, their names verified on a master list of names of full-time, first-year male students. All males who participated at Wave 1 were invited to participate at all three subsequent waves. At Waves 2, 3, and 4, males were provided survey packets with confidential, unique codes that linked their surveys. Males who were no longer enrolled at the university were eligible for participation at all subsequent waves. The number of males at Wave 4 who were no longer students at the university was 15. These students did not differ on the outcome measure from those who were still students at the study site university at Wave 4 ($F(1,571) = 0.39, p = .53$). Participants provided written informed consent prior to completing the survey. Local IRB approval from the university and a Certificate of Confidentiality from the National Institutes of Health were obtained prior to data collection. No personal identifiers were included on the surveys. After completing the surveys, participants deposited them (without consent forms attached) into a locked box, received payment for their participation, and were provided a referral sheet of counseling resources.

Measures

Outcome variable

Technology-based sexual coercion (TBC): At Wave 4, participants answered five questions about their engagement in cyber-based sexual behaviors (see Table 1). The items assessed for sexual solicitation and harassment and were derived from two sources. Three items assessed unwanted internet sexual solicitation during the past year and were based on work by Finkelhor and colleagues (Finkelhor, Mitchell, & Wolak, 2000; Wolak, Mitchell & Finkelhor, 2006) and Ybarra and colleagues (Ybarra, Espelage, & Mitchell, 2007). These items used a 6-point response format (1 = “never,” 2 = “less than a few times a year,” 3 = “a few times a year,” 4 = “one or two times a month,” 5 = “one or two times a week,” and 6 = “every day or almost every day”). Two items assessed participants’ behaviors of sending sexually suggestive content via texts, emails, or social networking sites during the past year and were derived from a survey conducted by the National Campaign to Prevent Teen and Unplanned Pregnancy (National Campaign To Prevent Teen and Unplanned Pregnancy, 2008). These items used a “yes/no” response format. The five items were standardized and then summed. The measure showed good internal consistency reliability in the current sample ($\alpha = .77$). Further, the measure’s concurrent validity was supported based on significant associations with concurrently obtained scores on the revised Sexual Experiences Survey (Koss et al., 2007) the most widely used measure of sexually aggression among college students, $r(571) = .35, p < .001$.

Predictor variables—The measures for the TTI-based predictors are described below and descriptive statistics are provided in Table 2. TTI predictors were assessed at Wave 1, and unless noted, used a lifetime reporting time frame.

Intrapersonal/Individual variables

Anger: Eight items from the Pervasive Anger scale (Knight, Prentsky, & Cerce, 1994) were used to assess for tendencies towards anger. The items were answered using a 5-point response format (1–5), with higher scores indicative of higher levels of anger (sample item: “I lose my temper easily”). The measure showed good internal consistency reliability in the current sample ($\alpha = .86$).

Impulsivity: The 19-item Impulsivity Questionnaire (Eysenck, Pearson, Easting, & Allsopp, 1985) was used to assess for impulsive behaviors. Items were answered using a yes/no (0 = no; 1 = yes) response format, with higher scores on the summed items indicating greater impulsivity (sample item: “I do and say things without stopping to think”). The measure showed good internal consistency reliability in the current sample ($\alpha = .79$).

Sexual compulsivity: The 10-item Sexual Compulsivity Scale (Kalichman & Rompa, 2001) was used to assess for sexually compulsive behaviors, sexual preoccupations, and sexually intrusive thoughts. Items were answered using a 4-point response format (1–4), with higher scores indicating greater sexual compulsivity (sample item: “I feel that sexual thoughts and feelings that are stronger than I am”). The measure showed good internal consistency reliability in the current sample ($\alpha = .83$).

Hostility toward women: An 8-item scale adapted by Koss and Gaines (1993) from the Hostility Toward Women Scale (Check Malamuth, Elias, & Burton, 1985) assessed for hostility towards women. Items were answered using a 5-point response format (1–5), with higher scores reflecting higher levels of hostility (sample item: “Many times a woman appears to care, but really just wants to use me”). The measure showed good internal consistency reliability in the current sample ($\alpha = .90$).

Rape supportive beliefs: The 19-item Rape Supportive Beliefs Scale (Lonsway & Fitzgerald, 1995) was used to assess for rape supportive attitudes. Items were answered on a 5-point scale (1–5), with higher mean scores indicating higher levels of rape supportive attitudes (sample item: “When women talk and act sexy, they are inviting rape”). The measure showed good internal consistency reliability in the current sample ($\alpha = .90$).

High-risk drinking: We computed a high-risk drinking score by averaging five standardized items assessing different aspects of high-risk drinking including: the frequency of drinking alcohol in the past 30 days, the average quantity of alcohol consumed on days on which alcohol was consumed, how often they drank to get drunk in the past 30 days, the largest number of drinks consumed in a 24-hour period in the past 30 days, and if they had consumed five or more drinks in a row in a two hour period in the past two weeks. The items are recommended by NIAAA to assess drinking amount and patterns (Dawson & Room, 2000). The measure showed good internal consistency reliability in the current sample ($\alpha = .92$).

Social variables

Sexual abuse in childhood: Respondents were asked if before the age of 18 “anyone 5 or more years older than you ever kissed or touched you in a sexual way or had you touch them in a sexual way?” (Briere & Runtz, 1990).

Interparental conflict in family of origin: The 7-item conflict subscale of the Children’s Perception of Interparental Conflict Scale was used to assess for exposure to interparental conflict (Grych, Seid, & Finchman, 1992). A 4-point response format was used (1–4), with higher mean scores reflecting higher levels of inter-parental conflict in the family of origin (sample item: “When my parents had an argument they said mean things to each other”). The measure showed good internal consistency reliability in the current sample ($\alpha = .86$).

Peer pressure to have sex: Three items were used to assess perceptions of peer pressure from one’s current set of friends to have sex with women (Kanin, 1985). Items were answered on 4-point scale (1–4), with higher scores reflective of perceived pressure from friends to have sex with women (sample item: “Do your friends lack respect for guys who have never had sex?”). The measure showed good internal consistency reliability in the current sample ($\alpha = .76$).

Peer approval of forced sex: Six items were used to assess for perceptions of one’s current set of friends’ approval of forced sex (Abbey & McAuslan, 2004). Items were answered using a 4-point response format (1–4), with higher mean scores indicating greater perceptions that their peers would approve of various strategies to obtain sex with a woman (sample item: “Do your friends approve of getting a woman drunk or high to have sex?”). A log 10 transformation was done prior to using this variable in the regression models due to its non-normal distribution. The scale showed good internal consistency ($\alpha = .78$) in the current sample.

Number of sexual partners: Respondents were asked how many people they had had vaginal or anal sex with since the age of 14. Due to a non-normal distribution, a log 10 transformation was performed prior to using this variable in the regression models.

Community variables

Perceived negative sanctions against sexual violence: Three items adapted from a measure of perceived sanctions toward dating violence (Foshee et al., 2001) were used to assess for perceived sanctions against sexual violence. Items were answered using a 4-point response

format (1–4), with lower mean scores reflecting perceptions that sexual aggression would be punished (sample item: “Bad things will happen to people who are sexually aggressive to girls”). The measure showed adequate internal consistency reliability in the current sample ($\alpha = .68$).

Pornography exposure: Respondents were asked how many hours a week they looked at sexually explicit material in magazines or on the internet. Responses ranged from none (0), less than one hour (1), one to two hours (2), 3 to 4 hours (3), to more than 4 hours (4).

Participation in a fraternity: Respondents were asked if they belonged to a Greek fraternity during the last academic year.

Participation in intercollegiate sports: Varsity sports participation assessed if a respondent was on a varsity athletic team during the last academic year.

Participation in student government/political organization: Respondents were asked if they had participated in student government or a political organization in the last academic year.

Participation in a religious group: Respondents were asked if they had participated in a religious group during the last academic year.

Data analytic strategy

We used SPSS 19.0 to conduct our analyses. First, we examined bivariate associations among all of the study variables using correlational analyses. Next, we conducted a multiple linear regression analysis that simultaneously included all of the predictor variables in order to determine which variables were unique and significant predictors of the outcome. We predicted TBC assessed at Wave 4 from the predictor variables assessed at Wave 1 in order to determine prospective associations. Multicollinearity statistics (tolerance, VIF) were examined in the regression models. All VIFs were less than 2.00 and all tolerance statistics were greater than .10, indicating that there was not significant multicollinearity among the variables entered into the same models.

Results

Descriptive statistics

The extent to which the sample engaged in TBC behaviors is shown in Table 1. For descriptive purposes, items were dichotomized to represent not having engaged in that particular behavior at all over the last year or having engaged in the activity at some point in the last year. As can be seen, the percentages varied based on the type of cyber-based behavior and ranged from a low of 2.3% who reported having asked someone online for sexual information about themselves when that person did not want to tell, 2.8% who had asked someone to do something sexual online when they did not want to, 4.5% who had tried to get someone else to talk about sex online when they did not want to, 5.2% who had posted a sexually suggestive message or picture to someone’s online profile, to 16.4% who reported having shared a sexually suggestive message or picture with someone other than the person it was originally meant for. Approximately one-fifth (21.9%) of the sample engaged in at least one of these types of TBC behaviors.

Bivariate results

Correlational analyses were conducted in order to determine each predictor’s prospective association with TBC. Results are shown in Table 3 and indicate that 16 of the 17 variables significantly predicted levels of TBC behaviors 3 years later, including anger, impulsivity,

sexual compulsivity, hostility towards women, rape supportive beliefs, high-risk drinking, childhood sexual abuse, interparental conflict, peer pressure to engage in sex, peer approval of forced sex, number of sexual partners, perceived negative sanctions for sexual aggression, exposure to pornography, and participation in varsity sports, student government, and religious groups. All of these associations were in the expected direction with the exception of TBC's association with student government participation. Counter to hypothesized, males who participated in student government their freshmen year were more likely than their counterparts to report higher levels of TBC their senior year.

Multiple regression model—A multivariate linear regression model was tested that included all 17 predictor variables. Results revealed that five of these variables continued to predict TBC, and the full model accounted for 14% of the variance in TBC. Higher levels of TBC behaviors were predicted by rape supportive beliefs ($\beta = .12$, $t(559) = 2.27$, $p < .05$), peer approval of forced sex ($\beta = .12$, $t(559) = 2.12$, $p < .05$), number of sexual partners ($\beta = .11$, $t(559) = 2.16$, $p < .05$), exposure to pornography ($\beta = .10$, $t(559) = 2.14$, $p < .05$), and participation in student government ($\beta = .14$, $t(559) = 3.23$, $p < .001$). Participation in a religious group marginally predicted lower levels of TBC behaviors ($\beta = -.08$, $t(559) = -1.70$, $p < .09$). These associations were in the expected directions, yet counter to hypothesis, first-year participation in student government was associated with higher levels of TBC three years later.

Discussion

Findings from this study add to the literature by determining the type and extent of TBC behaviors and elucidating characteristics that predict future TBC. Study findings revealed that approximately one-fifth of males completing their final year of college self-reported having engaged in electronic behaviors consistent with sexual solicitation and harassment. The one-year incidence varied based on the type of cyber-based behavior, ranging from a low of 2.3% who reported having asked someone online for sexual information about themselves when that person did not want to tell, to a high of 16.4% who reported having shared a sexually suggestive message or picture with someone other than the person it was originally meant for. These numbers are fairly consistent with data gleaned from surveys that have used similar items to assess for sexual solicitation perpetration such as the study by Ybarra and colleagues that found that 21% reported perpetrating Internet harassment and 3% unwanted sexual solicitation during the past year (Ybarra, Espelage, & Mitchell, 2007).

Our study addresses a gap in the literature by using a prospective design to determine individual-, social-, and community-level predictors of TBC. Assessing risk factors based on extant research on sexual aggression perpetration and that represented risk across multiple ecological domains revealed key factors that uniquely and prospectively accounted for TBC behaviors. These included rape supportive beliefs, peer approval of forced sex, number of sexual partners, exposure to pornography, and participation in student government.

Study results also are in line with research on online stalking behaviors (Lyndon, Bonds-Raacke, & Cratty, 2011; Melander, 2010). In a study that focused on college students' "Facebook stalking" of ex-partners, two-thirds reported having engaged in covert provocation (e.g., updated status to make ex-partner jealous), 18% reported having engaged in public harassment (e.g., creating a false Facebook profile of ex-partner), and 18% reported having engaged in venting (e.g., posting a spiteful comment). These findings, along with other research indicating an increase tactics such as posting sexually suggestive photos or threatening and sharing intimate information with others in order to control and threaten partners and ex-partners (Alexy, Burgess, Baker, & Smoyak, 2005; Halder & Jaishankar, 2009; Melander, 2010) reveal that TBC behaviors are becoming more frequent. Further, of

particular relevance to our study findings' implications is that these "Facebook stalking" behaviors are associated with the perpetration of cyber obsessional pursuit, defined as using technology-based stalking to harass or demand intimacy from a victim, as well as obsessive relational intrusion, defined as repeated and unwanted pursuit of intimacy, indicating that TBC is likely associated with more severe in-person coercive behaviors (Lyndon et al., 2011).

When looking at bivariate correlations of TTI variables and TBC, six of the six intrapersonal variables, five of the five social/peer variables, and five of the six community/environmental variables were significantly associated with TBC. In the multivariate model however only five variables continued to significantly predict higher instances of TBC behaviors. Of the five significant prospective and unique predictors of TBC, one was from the intrapersonal domain, two were from the social/peer domain, and two were from the community/environmental domain. Specifically, TBC was linked to earlier reports of higher levels of rape supportive beliefs, peer approval of forced sex, number of sexual partners, exposure to pornography, and participation in student government. The majority of these significant multivariate predictors of TBC were measures of other sexually-oriented attitudes and behaviors (e.g., rape supportive beliefs, peer approval of forced sex, number of sexual partners, pornography exposure). Thus, prior levels of sexual activity and exposure increase the likelihood of future TBC behaviors. Counter to hypothesis, participation in student government was associated with increased levels of TBC. One possible explanation for this is that those who participate in student government have a larger social network and consequently have more contacts and interactions in social media spaces. It was not possible for us to control for this potential confound since we did not assess for quantity of social media contacts or frequency of time spent in social media spaces. It might also be that those who participate in student government have personality characteristics, (e.g., motivation for authority and power) that also convey risk for TBC and in-person sexual aggression. Recent studies have shown measures of narcissistic vulnerability predict cyber and in-person stalking and harassment behaviors in men (Menard & Pincus, 2012), and some research suggests that narcissistic traits are higher among college students who participate in student government compared to their respective counterparts (Munshaw-Rodriguez, Nava, & Wiegner, 2011).

Our findings also indicate that the significant predictors of TBC are similar to predictors of in-person sexual aggression. Specifically, rape supportive beliefs (Lonsway & Fitzgerald, 1995; Thompson et al., 2011), peer approval of forced sex (Burt, 1980; Check & Malamuth, 1983; Foshee, Linder, MacDougall, & Bangdiwala, 2001; Riggs & O'Leary, 1989; Thompson et al., 2011), more sexual partners (Calhoun, Bernat, Clum, & Frame, 1997; Malamuth et al., 1991), and exposure to pornography (Davis, Norris, George, Martell, & Heiman, 2006; Malamuth, Addison, & Koss, 2000) have all been found to be associated with in-person sexual aggression.

Limitations

There are limitations to the study that should be addressed. First, our results may not be generalizable due to the fact that the data are from only one university and this university has significantly increased the integration of technology into the campus atmosphere. Availability of access to online communities and advance technology are factors that should be assessed in future studies to determine how they might affect TBC behaviors. Second, the study relied only on self-reported data. Third, we unfortunately assessed for TBC only at Wave 4, limiting our ability to track changes in TBC and to determine what factors predict changes in TBC or how TBC is prospectively related to other constructs such as sexual aggression and mental health. Fourth, we are not able to determine that the intended recipients of the TBC behaviors had failed to give consent or felt coerced. Fifth, we did not

assess for sexual orientation in the survey, nor do we know if some of the TBC behaviors might have occurred in same-sex relationships.

Research implications

Despite these limitations, this work is an important step in a relatively new area of research. This study indicates the incidence of TBC among young adult males and also identifies specific risk factors that prospectively predict TBC. Further, findings also suggest support for an ecological approach in that intrapersonal, social/peer, and community/environmental variables were all predictive of TBC. Many of the intrapersonal, social, and community/environmental risk factors for TBC found in this study are similar to risk factors for offline sexual aggression found in other studies. Among the significant prospective and unique predictors of TBC that emerged in multivariate analyses, a slightly greater proportion were from the social (two of five) and community-level (two of six) domains than from the intrapersonal-level domain (one in six). Also, four of the five significant multivariate predictors of TBC were measures of sexually-oriented attitudes and behaviors. Future research should determine if predictors of offline sexual aggression and in-person stalking followed these same patterns. Future research also is needed to determine if TBC is a precursor to offline sexual aggression. Although our study focused only on perpetrators of TBC, future research is needed to determine to what extent TBC predicts psychological consequences among intended victims of TBC.

Clinical and policy implications

TBC is a relatively new area of investigation, and thus more research is needed to help inform clinical and policy interventions. If future research demonstrates prospective linkages between TBC and actual sexual aggression and/or adverse psychological consequences of its intended victims, then intervention strategies can move forward more readily. Our findings also indicate that interventions to address TBC would need to take a comprehensive approach in focusing preventive strategies at more than one ecological domain. Given that TBC behaviors often occur in the context of social networking, one potential avenue for interventions is to use ad portals on social networking sites. Technology services and online sites currently utilize advertising and make efforts to personalize delivery of these ads. A similar approach could be implemented for preventing TBC. Given the amount of personal data that are collected on social networking sites, risk profiles or algorithms could be developed. Then, personalized ads and messages targeting to users at risk of engaging in TBC could be delivered (e.g., ads that promoted reflection on social and romantic relationship behaviors and directed users to information resources or program sites that would help them better understand how they can adjust their behaviors or become more knowledgeable about the risks of sexual aggression and harassment). This method could also be used to encourage bystander interventions by targeting ad messages to certain demographic groups about ways to help if they believe friends or relatives are at risk of perpetration or victimization.

Acknowledgments

This research was supported by three grants to the first author from the Eunice Kennedy Shriver National Institute of Child Health and Human Development at the National Institutes of Health (Award numbers R03HD053444, R15HD065568, R15HD065568-S1). The content is solely the responsibility of the authors and does not necessarily represent the official views of the Eunice Kennedy Shriver National Institute of Child Health and Human Development or the National Institutes of Health.

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Table 1

Descriptive Statistics for Technology-based Coercive Behaviors (n = 571)

	% Yes	n
Tried to get someone else to talk about sex online when they did not want to.	4.6%	26
Asked anyone online for sexual information about themselves when that person did not want to tell	2.3%	13
Asked anyone to do something sexual online when they did not want to.	2.8%	16
Posted a sexually suggestive message or picture to someone's online profile (e.g., MySpace, Facebook, etc.).	5.3%	30
Shared a sexually suggestive message or picture with someone other than the person it was originally meant for.	16.3%	93
Any of these technology-based coercive behaviors	21.9%	125

Table 2

Descriptive Statistics for Study Variables (n = 571)

<i>Variable</i>	<i>M (SD)</i>	<i>%</i>	<i>skewness</i>	<i>kurtosis</i>
Anger	2.38 (0.67)		.61	.39
Impulsivity	6.35 (3.94)		.55	-.45
Sexual compulsivity	1.42 (0.38)		1.59	2.80
Hostility towards women	2.57 (0.81)		.08	-.40
Rape-supportive beliefs	2.26 (0.62)		.04	-.06
High-risk drinking	0 (0.92)		.41	-1.06
Sexual abuse		8.4	3.01	7.07
Interparental conflict	1.71 (0.55)		.91	.80
Pressure for sex	1.66 (0.68)		1.03	.40
Peer approval of forced sex *	1.27 (0.39)		2.31	7.54
Number sexual partners *	1.85 (3.48)		5.34	47.30
Perceived negative sanctions	3.19 (0.64)		-.67	.12
Pornography	1.12 (0.98)		.93	.71
Fraternity		24.0		
Varsity sports		5.0		
Student government		3.4		
Religious group		25.8		

Notes.

* variable transformed prior to analyses due to skewness

Table 3

Inter-correlations between Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. TBC (Wave 4)	1.00																
2. Anger	.19***	1.00															
3. Impulsivity	.18***	.41***	1.00														
4. Sexual compulsivity	.18***	.24***	.18***	1.00													
5. Hostility towards women	.15***	.27***	.19***	.27***	1.00												
6. Rape-supportive beliefs	.17***	.18***	.09*	.31***	.62***	1.00											
7. High-risk drinking	.11**	.22***	.22***	.04	.14***	.04	1.00										
8. Sexual abuse	.13**	.09*	.14***	.10*	.16***	.08	.18***	1.00									
9. Interparental conflict	.12**	.11*	.12b	.07	.13b	.04	.06	.07	1.00								
10. Pressure for sex	.18***	.24***	.23***	.28***	.26***	.20***	.37***	.12**	.12**	1.00							
11. Peer approval forced sex	.26***	.23***	.24***	.27***	.32***	.28***	.36***	.19***	.18***	.59***	1.00						
12. # sexual partners	.19***	.21***	.29***	.09**	.14***	.02	.48***	.28***	.15***	.27***	.28***	1.00					
13. Perceived sanctions	-.16***	-.08	-.07	-.20***	-.18***	-.22***	-.20***	-.10*	-.13**	-.12**	-.26***	-.05	1.00				
14. Pornography	.21***	.27***	.16***	.29***	.13**	.12**	.31***	.01	.04	.25***	.24***	.13***	-.21***	1.00			
15. Fraternity	.03	.09*	.07	-.05	.08	.02	.44***	.14***	.02	.18***	.11**	.25***	-.07	.16***	1.00		
16. Varsity sports	.11*	.08	.09*	.07	.04	.02	.01	.10*	.13**	.08	.09*	.14***	.02	.01	-.05	1.00	
17. Student government	.11**	.10*	.10*	-.05	-.01	.03	.03	-.02	.09*	.05	.03	-.01	-.01	.05	.07	-.04	1.00
18. Religious groups	-.15***	-.11**	-.12**	.07	-.03	.06	-.37***	-.09*	-.09*	-.21***	-.19***	-.35***	.09*	-.25***	-.13**	-.01	.05

Notes:

* $p < .05$ (two-tailed);** $p < .01$ (two-tailed);*** $p < .001$ (two-tailed).TBC = Technology-based coercive behaviors; All variables except for TBC were based on Wave 1 assessments; $n = 571$

Table 4

Results from Multivariate Regression Models Predicting Technology-based Coercive Behaviors

Predictor	B	SE B	t	Semipartial r
Anger	-.05	.21	-0.22	-.01
Impulsivity	.03	.04	0.90	.04
Sexual compulsivity	.43	.37	1.17	.05
Hostility towards women	-.28	.20	-1.40	-.06
Rape-supportive beliefs	.59	.26	2.27*	.09
High-risk drinking	.01	.18	.07	.00
Sexual abuse	.65	.49	1.33	.05
Interparental conflict	.19	.23	.82	.03
Pressure for sex	-.14	.23	-.58	-.02
Peer approval of forced sex*	3.17	1.50	2.12*	.09
Number sexual partners*	.95	.44	2.16*	.09
Perceived negative sanctions	-.31	.21	-1.51	-.06
Pornography	.31	.14	2.14*	.09
Fraternity	-.05	.32	-.16	-.01
Varsity sports	.41	.62	.65	.03
Student government	2.08	.65	3.25***	.13
Religious group	-.53	.31	-1.70	-.07

Note.

*
 $p < .05$;***
 $p < .001$.*
variable transformed prior to analyses due to skewness $R^2 = .14$; $n = 571$