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Keeping tabs: Attachment anxiety and electronic intrusion in high school dating relationships

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ABSTRACT

Social media have become significant contexts for dating relationships among high school students. These media, which allow for increased visibility of dating partners' information and constant connectivity, may put teens at risk for problematic digital dating behaviors. This study sought to replicate and expand on research with college students to examine the association between attachment insecurity (relationship anxiety and avoidance) and electronic intrusion in high school dating relationships. Electronic intrusion (EI) is the use of social media to intrude into the privacy of a dating partner, monitor a partner's whereabouts and activities, and pressure a partner for constant contact. A survey study of 703 high school girls and boys found that higher levels of attachment anxiety were associated with more frequent perpetration of EI for both girls and boys. Therefore, especially for anxiously attached teens, social media may create a "cycle of anxiety" in which social media serve as both a trigger for relationship anxiety and a tool for partner surveillance in an attempt to alleviate anxiety.

Digital media use among adolescents is frequent, varied, and integrated into their daily life and relationships. Data indicate that 77% of adolescents have a cell phone, and that 95% of teens ages 12–17 are on the Internet (Lenhart, 2012). Teens are also avid users of social media, with data indicating that 80% of teens aged 12–17 have a profile on a social networking site (e.g., Twitter) (Lenhart et al., 2010). Forty percent of Facebook users visit the site several times a day (Duggan & Smith, 2013), and most adolescents report using social media daily (Lenhart et al., 2010).

Social media are particularly relevant for high school students' social relationships, during a developmental period in which emotional regulation is maturing and capacity for romantic intimacy is a primary concern (Collins, Welsh, & Furman, 2009; Furman & Buhrmester, 2009). We posit that attachment orientation, a universal underlying system of emotional regulation and orientation towards intimacy, may influence the experience and interpretation of digital dating behaviors among high school students. The nature of social media may put teens, especially teens with insecure attachment orientations, at risk for problematic dating behaviors. Previous research on college students has found that social media may serve as a trigger for relationship jealousy and anxiety *and* provide opportunities and tools for surveillance (Marshall, Bejanyan, Di Castro, & Lee, 2013; Reed, Tolman, & Safyer, 2015).

In our previous study, we found that college women and men reporting higher levels of attachment anxiety were more likely to engage in electronic intrusion (EI) in their dating relationships, and college women reporting higher levels of avoidance were less likely to engage in EI (Reed, Tolman, & Safyer, 2015). Electronic intrusion is a common form of "digital dating abuse," which is the repeated use of social media to harass, pressure, threaten, or coerce a dating partner (Futures without Violence, 2009; Reed, Tolman, & Ward, in press). EI is an umbrella term for all digital dating abuse meant to monitor or invade the privacy of dating partners using digital media (Reed, Tolman, & Safyer, 2015; Reed, Tolman, & Ward, in press). Problematic dating behaviors and abuse in early dating relationships have been linked to experiencing further relationship abuse across the lifespan (see Shorey, Cornelius, & Bell, 2008 for a review). Therefore, we sought to replicate and build on previous work with college students to investigate whether the association between

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attachment insecurity and EI occurs in a younger sample of high school students.

1. Attachment orientation and dating relationships

One important developmental factor that may contribute to the likelihood to engage in electronic intrusion behaviors is romantic attachment orientation. Attachment theory provides a useful theoretical framework for understanding the relationship schemas adolescents might carry into their dating relationships that influence the way they interact with and experience on-line and off-line romantic experiences. Along with gender, attachment orientation may be a useful developmental lens for exploring the context and meaning ascribed to digital dating behaviors.

Attachment theory is a framework for the development of relational patterns across the lifespan (Bowlby, 1969). Based on the qualities of the caregiver–infant relationship, distinct attachment classifications emerge that shape the infant's expectations of close relationships (Ainsworth, Blehar, Waters, & Wall, 1978). Inconsistent or unavailable caregivers may cause infants to utilize dysfunctional regulation schemas in an attempt to reduce their anxiety, and this results in their developing anxious or avoidant attachments (Izard & Kobak, 1991). These internal working models developed in childhood become the way in which an individual cognitively interprets intimacy throughout the lifespan (Bowlby, 1979; 1980).

Hazan and Shaver (1987) conceptualized adult romantic attachment through the use of a self-report questionnaire to measure individual's attachment insecurity on two dimensions: anxiety and avoidance. Hazan and Shaver (1987) characterized individuals with an anxious attachment style as quick to fall in love but constantly worrying that their partner does not feel the same. In contrast, in their conceptualization, avoidant adults distanced themselves from potential partners in an attempt to soothe their apprehension about depending on another person.

Research on adult attachment among adolescents finds that attachment anxiety and avoidance influence the characteristics and quality of romantic relationships. Adolescents with insecure attachment often seek out dating relationships, but once they are in a relationship, tend to experience emotional distress from struggling to trust their partner or see themselves as worthy of love (Davila, Steingberg, Kachadourian, Cobb, & Fincham, 2004). Shorey et al. (2008) further posited that individuals with insecure attachment orientation are especially at risk for dating violence because their relationship templates often include dominance, control, and jealousy.

Attachment theory does not predict differences in attachment orientation based solely on gender, and research often finds no significant gender differences in attachment orientation (Hazan & Shaver, 1987; Rothbard & Shaver, 1994; Van IJzendoorn & Bakermans-Kranenburg, 2008). However, some evidence supports that the quality of women's sexual relationships is more strongly associated with attachment anxiety, whereas the experience of men's sexual relationships is associated with their reported level of attachment avoidance (Cooper et al., 2006; Del Giudice, 2009). Research has also found links between attachment anxiety and avoidance and aspects of femininity and masculinity, respectively (Collins & Read, 1990; Shaver, Collins, & Clark, 1996; Shaver, Papalia, Clark, Koski, Tidwell, & Nalbonem, 1996).

Among adolescents and young adults, insecure attachment styles tend to be associated with negative relationship characteristics and lower satisfaction with relationships (Bartholomew & Horowitz, 1991; Mikulincer & Erev, 1991). Theoretically, anxious individuals, who are accustomed to inconsistent caregiving, engage in intimacy-seeking behaviors and are preoccupied with ensuring fidelity and closeness with their partner. In addition, anxiously attached adolescents may escalate conflict, perceive conflict to be more severe, be more distressed by relationship conflict, and experience more jealousy in their relationships (Campbell, Simpson, Boldry, & Kashy, 2005; Downey, Bonica, & Rincon, 1999; Hazan & Shaver, 1987). Avoidant individuals, who may attempt to alleviate anxiety about intimacy in relationships by engaging in behaviors that create distance and avoid closeness, have been found to provide less emotional support to partners and respond to jealousy with fear and sadness (Buunk, 1997; Collins & Feeney, 2000; Feeney & Collins, 2001; Gentzler & Kerns, 2004; Hazan & Shaver, 1987; Sharpsteen & Kirkpatrick, 1997). This body of research suggests that insecure attachment styles are associated with negative relationship characteristics.

2. Digital media use in dating relationships

With their widespread daily use, digital media have become a significant context for dating relationships (e.g., Carpenter & Spottswood, 2013; Fox, Osborn, & Warber, 2014; Fox, Warber, & Makstaller, 2013; Trepte & Reinecke, 2013). Digital media are influential for initiating new relationships, promoting communication and closeness between dating partners, terminating romantic relationships, and integrating partners' social lives (Caughlin & Sharabi, 2013; Fox et al., 2014; Pascoe, 2011). Digital media allow dating partners to instantly communicate with their entire social network, gain greater access to information about their dating partners' whereabouts and activities, and maintain constant contact with dating partners at any hour. Dating interactions that were once private are now moved into public spaces. Media theorists discuss these digital media characteristics in terms of greater visibility of information, persistence of content once it is posted or sent, and connectivity to partners at any time and from any location (Fox et al., 2014; Treem & Leonardi, 2012).

Research has found both positive and negative effects of digital media on dating relationships, and has often restricted these analyses to examining a single media platform. Instant messaging and texting have been associated with positive relationship quality and closeness among both adolescents and college students (Blais, Craig, Pepler, & Connolly, 2008; Morey, Gentzler, Creasy, Oberhauser, & Westerman, 2013; Pettigrew, 2009). However, online gaming or using the Internet for entertainment has been shown to have a negative effect on relationship quality with romantic relationships (Blais et al., 2008). Because media platforms are rapidly changing, and patterns of use are evolving, it may be premature to characterize the impact of any particular platform in terms of its association with relationship behavior and satisfaction. The current study, therefore, used an inclusive definition of digital media to study digital dating behaviors.

3. Electronic intrusion and related digital dating experiences

The connectivity, visibility, and persistence of digital media communication also puts adolescents at risk for several types of negative digital dating experiences (Bennett, Guran, Ramos, & Margolin, 2011; Borrajo, Gámez-Guadix, & Calvete, 2015; Borrajo, Gámez-Guadix, Pereda, & Calvete, 2015; Burke, Wallen, Vail-Smith, & Knox, 2011; Draucker & Martsolf, 2010; Reed, Tolman, & Ward, in press). Adolescents may feel pressure to be “perpetually connected” to dating partners via digital media, making it difficult to maintain boundaries and independence (Duran, Kelly, & Rotaru, 2011; Fox et al., 2014). Public exposure of dating interactions may cause embarrassment or humiliation, and digital media can act as both the trigger for and the context in which dating conflicts occur (Fox et al., 2014; Melander, 2010). Research has also shown that

digital media (in particular, Facebook) contribute to relationship jealousy (Muise, Christofides, & Desmarais, 2009).

Some of the most common problematic uses of digital media in relationships involve monitoring a dating partner's activities and whereabouts and using digital media to invade a partner's privacy (e.g., Bennett et al. 2011; Borrajo, Gamez-Guadix, & Calvete, 2015; Reed, Tolman, & Ward, in press). Previous research used terms such as interpersonal electronic surveillance (Fox & Warber, 2014; Tokunaga, 2010), electronic intrusiveness (Bennett et al., 2011), online obsessive relational intrusion (Chaulk & Jones, 2011), cyberstalking (e.g., Southworth, Finn, Dawson, Fraser, & Tucker, 2007; Spitzberg & Cupach, 2007), and electronic intrusion (Reed, Tolman, & Safyer, 2015) to describe these behaviors. A study of DDA among adolescents found that 17% of teens were afraid of their partner's response if they did not respond to a digital media message (Picard, 2007). Among college students, Bennett et al. (2011) found that 73.5% of their sample of 437 college students experienced electronic intrusiveness (e.g., intrusively calling or messaging) in the past year from a dating partner, Borrajo, Gamez-Guadix, & Calvete (2015) found that 38.6% of participants experienced controlling behaviors, and Burke et al., (2011) found that 50% of their sample of 804 college students engaged in control behaviors using digital media. Reed, Tolman, & Ward (in press) also found that monitoring and snooping behaviors were the most common form of digital dating abuse among their sample of 365 college students.

In the current study, we will use the term “electronic intrusion” (EI) to describe a set of behaviors aimed at monitoring a partner's digital media activity and invading a partner's digital privacy (Reed, Tolman, & Safyer, 2015). These behaviors include monitoring a partner's whereabouts and activities, monitoring a partner's social relationships, looking at private digital information without permission, sending so many messages that a partner feels uncomfortable, pressuring a partner to respond quickly to calls and messages, and pressuring a partner for access to passwords to their phone or online accounts. Therefore, EI is an umbrella term for digital dating behaviors that – while not necessarily illegal or criminal in nature – are meant to exert power and control over a dating partner through the use of monitoring and intrusions into privacy. Depending on the context, EI behaviors may be distressing or harmful when they occur once, or may only be distressing when occurring in a repeated pattern in a dating relationship.

4. Gender and digital media use in dating relationships

Although both girls and boys must navigate digital boundaries in dating relationships, preliminary evidence suggests that there are gender differences in the way that the digital media environment is experienced (Kimbrough, Guadagno, Muscanell, & Dill, 2013; Muscanell, Guadagno, Rice, & Murphy, 2013). Several studies have found that women and girls are more frequent users of digital media than men and boys (e.g., Kimbrough et al., 2013; Marshall et al., 2013). Muscanell and Guadagno (2012) found that motivations for using social media differ for women and men, as women tend to use these technologies to maintain social relationships, whereas men often use social media to build new relationships and for career purposes. Blais et al. (2008) proposed a “rich get richer” hypothesis, suggesting that because girls report higher levels of relationship quality off-line than boys, the use of digital media allows them to expand their tools of reinforcing off-line friendships.

Research also indicates that women may experience more jealousy and distress from relationship issues on social media (Marshall et al., 2013; Muscanell et al., 2013). One study found that even though men spent more time than women looking at their partner's Facebook profiles, women reported higher levels of jealousy about things they viewed on Facebook (Marshall et al., 2013). A qualitative study of teens with dating experience found that girls and boys conceptualized digital monitoring differently (Lucero, Weisz, Smith-Darden, & Lucero, 2014). In this study, young women discussed digital monitoring, surveillance, and sharing passwords as acceptable relationship behaviors that were warranted by the need to protect and maintain a dating relationship. They acknowledged, however, that these behaviors are more acceptable with a partner's permission. Young men did not discuss their own monitoring behaviors, but rather discussed how frequently their female partners monitor them. This literature supports that girls and boys may experience digital dating, and digital monitoring, differently in their relationships. In the current study, we will therefore explore the association between attachment insecurity and electronic intrusion separately by sex.

5. Romantic attachment insecurity and digital media use

With the heightened connectivity, visibility, and persistence of digital dating communication, adolescents with higher levels of attachment anxiety and avoidance may struggle with dating in the digital world. Research on digital dating communication and attachment insecurity has found that anxiously attached college students experience social media use as a tool for increasing closeness and intimacy in dating relationships, whereas avoidant individuals were less likely to use more “intimate” digital media platforms in their relationships such as cell phones and texting (Morey et al., 2013).

Research on attachment insecurity and digital dating has focused on relationship jealousy, digital partner surveillance, and electronic intrusion as outcomes. Marshall et al. (2013) demonstrated that among adults, attachment anxiety was associated with more Facebook relationship jealousy and with monitoring a partner's Facebook profile. Avoidant attachment was associated with less Facebook jealousy and less frequent monitoring of a partner's profile. Research has found that anxiously attached partners may respond to jealousy by engaging in surveillance behaviors (Guerrero, 1998; Guerrero and Afifi, 1999). Surveillance behaviors could include spying on, checking up on the activities and whereabouts of their partner, and looking through their belongings (Guerrero, Andersen, Jorgensen, Spitzberg, & Eloy, 1995). A study of 328 college students found that attachment insecurity was associated with greater Facebook surveillance of their dating partner (Fox & Warber, 2014).

In our previous study, we expanded on the “feedback loop” of Facebook jealousy proposed by Muise et al. (2009) by adding an attachment framework (Reed, Tolman, & Safyer, 2015). Our concept of a “cycle of anxiety” posited that anxiously attached individuals are more likely to experience digital interactions with a dating partner as a trigger for anxiety, and then attempt to alleviate their anxiety by engaging in EI to monitor their partner, ensure fidelity, and maintain feelings of intimacy. However, these EI behaviors may yield additional anxiety triggers that perpetuate the cycle.

6. Relationship characteristics and electronic intrusion

This study also built upon our previous work on attachment insecurity and EI by considering additional factors that might contribute to individuals' perpetration of EI in high school dating relationships. Previous work on problematic digital dating behaviors often asked participants to report on incidents that have occurred in their relationship over the past year, or ever in the past (e.g., Bennett et al., 2011; Reed, Tolman, & Ward, in press). These behaviors are therefore devoid of a relationship context; they could

have occurred in one or multiple relationships.

We propose that the relationship context could impact the likelihood for problematic relationship behaviors to occur. For example, relational uncertainty has been linked to social media surveillance in dating relationships (Fox & Warber, 2014). Relational uncertainty may occur for several reasons. A partner could be uncertain about a new relationship before a commitment has been formally made, or a partner could also be uncertain after a break up about whether the relationship will continue. Therefore, whether participants are reporting about EI behaviors that occurred in their current or former relationship could be relevant to EI frequency. The length of the relationship could also be relevant, as newer relationships may be more uncertain, but longer relationships provide more time for partners to engage in problematic behaviors. Finally, EI may be especially relevant as a means of fidelity assurance and relationship maintenance in circumstances where a significant power dynamic difference exists between two partners. To assess one possible type of power difference, we will be examining the age difference between high school dating partners as a potential factor in frequency of EI.

7. The current study

In the current study, we sought to build on past work by utilizing a large sample of high school students and investigating an expanded list of EI behaviors occurring in participants' current or most recent dating relationship. As much of the literature on attachment insecurity and digital dating has been conducted among college students, the current study makes an important developmental contribution. Patterns of attachment and digital dating may differ in a younger developmental period in which adolescents are having their first dating experiences in a digital media-saturated social environment.

The primary research question for the current study was: Is attachment insecurity (anxiety or avoidance) associated with the frequency of electronic intrusion (EI) perpetration among high school girls and boys? We predicted that 1) girls would report more EI perpetration than boys, 2) attachment anxiety would be positively associated with electronic intrusion perpetration frequency for both girls and boys, and 3) attachment avoidance would be negatively associated with EI. Based on our findings with a college sample, we expected that there would be a stronger association between attachment anxiety and EI than attachment avoidance and EI.

8. Method

8.1. Design

We conducted a self-report cross-sectional survey study of 9th–12th grade students on a large Michigan suburban high school campus. This was a convenience sample, with effort taken to get a representative sample of students across all grade levels who were enrolled in both required core curriculum courses and elective courses. Demographic statistics for the school population are provided for comparison (See Table 1).

8.2. Procedure

Data were collected between December 2013 and March 2014. Using convenience sampling, we sought teacher permission for class participation. All Health classes participated, which is a required course for students and typically taken in the 9th grade. Once permission was granted, we visited classrooms prior to data collection to distribute parent/guardian consent forms. Only students who returned a signed form had the opportunity to provide their assent to participate in the study. The surveys were completed online in the library media center.

Of the total number of students who were given consent forms to take home, 67.28% received parent/guardian consent (or were over 18 years old and did not require parent/guardian consent) and participated in the study. Only seven parents/guardians indicated on the signed consent form that they refused to let their student participate. Student participation was voluntary and anonymous, and students received a $5 gift card as compensation.

8.3. Sample

The sample included 947 students who began the survey. Of these students, 881 (93.03%) completed the entire survey. Partial surveys were included in the analyses. Seven cases were deemed invalid and removed because of duplication due to technical difficulties or mistakenly repeating the survey.

Participants ranged in age from 13 to 19, with 91.6% of participants age 14–17. Table 1 shows demographic characteristics for the survey sample and the high school campus population for comparison, including sex, grade level, racial/ethnic identification, and eligibility or participation in a reduced or free lunch program. Almost all participants in the survey sample (96.2%) own a cell phone, 90.7% of cell phone users have a "smartphone," and 97.4% have access to a home computer. Three quarters (74.2%) reported that they have had at least one dating partner, and 27.1% were currently in a dating relationship at the time of the survey. Two survey participants identify as transgender or gender queer, and 4.7% of girls and 2.2% of boys are in a relationship with or had their most recent relationship with a same-sex partner.

8.4. Measures

Demographics. Students were asked to report their age, gender identification, race/ethnicity, religiosity, whether they participate in a free or reduced lunch program (as a proxy for socioeconomic status), and whether they have access to digital media devices.

Digital Media Use. The survey included several measures of cell phone and Internet use, focusing on social media use.

Cell phone use and texting. Frequency of text messaging was assessed through three items created for this study. Participants were asked, "On an average day, would you say you send or receive…" with a 7-point response scale ranging from "No text messages" and "1 to 10 text messages" to "More than 300 text messages." There was also the option of "I don't know." Participants with dating experience responded to, "How often do you/did you text message with your current/most recent dating partner on a typical day?" with a 6-point response scale ranging from "Never" to "Several times an hour."

Internet and social media use. We assessed general Internet use with three items. First, participants were given the prompt, "How often do you use the Internet? (on both computers and cell phones)." The prompt was followed by an item asking, "How many hours on a typical weekday do you spend social networking?" with response options ranging from "0" to "10+." We asked participants to respond to two additional items inquiring about their social networking use on a typical Saturday and on a typical Sunday. Responses about weekday use were multiplied by five, and added to responses about weekend use to create a variable of "hours spent per week social networking."

Participants responded to several items assessing their preferences and use of various social media. First, participants were asked, "How often do you use each of the following social media? (including logging on to check updates, posting, reading your feed,

Table 1
Demographic characteristics of sample and population.

	Survey sample	High school campus population
Sex		
Female	56%	50%
Grade level		
9th grade	29.3%	26.7%
10th grade	12.8%	24.4%
11th grade	20.1%	23.9%
12th grade	29.2%	24.8%
Race/Ethnicity		
American Indian/Alaska Native	.1%	.2%
Middle Eastern	4.7%	–
Asian/Pacific Islander	6.7%	11.9%
Black	7%	10.2%
Latino(a)/Hispanic	1.7%	2.7%
White	72.2%	72%
Multiracial	5.6%	2.9%
Free/reduced lunch program	Participated: 12.7%	Eligible: 15.8%

Note. Data for the high school campus sample was provided by the National Center for Education Statistics Common Core of Data Public School Data (2014) and represents statistics for the 2012–2013 school year. Data for the high school sample was collected during the 2013–2014 school year. Data not available for Middle Eastern racial/ethnic identification for the high school campus.

Table 2
Electronic intrusion perpetration items and percent of girls and boys reporting each behavior.

	Girls (N = 375)	Boys (N = 301)
1. Sent so many messages (like texts, e-mails, chats) that it made my partner feel uncomfortable.	5.3%	10.3%
2. Pressured my partner for a password to access their phone or online account(s).	7.0%	5.4%
3. Pressured my partner to respond quickly to calls, texts, or other messages.	28.2%	21.4%
4. Monitored my partner's whereabouts and activities.	33.7%	23.3%
5. Monitored who my partner talks to and is/was friends with.	33.7%	25.3%
6. Looked at my partner's private information (text messages, emails, etc.) to check up on them without their permission.	16.9%	13.0%

etc.)." Several popular social media sites were listed, including Facebook, Twitter, Snapchat, and Instagram. For each site, participants could select an option on an 8-point scale from "Never" to "Several times a day."

Dating experience. Dating partner was defined in this survey as "…ANY of the following: a boyfriend or girlfriend, someone you are a 'thing' with, someone you have dated or are currently dating (e.g., going out with without being supervised), someone who you like or love and spend time with, or a relationship that might involve sex." After presenting this definition, participants were first asked, "Have you ever had a dating partner?" with response options "Yes" and "No." If participants responded "No," they were not given additional questions about dating and electronic intrusion experience, and were excluded from analysis in the current study. If participants responded, "Yes," they were given additional items asking about their dating experience. We asked, "Are you CURRENTLY in a dating relationship?" with response options "Yes" and "No." The response to this item was recoded into the dummy variable current relationship status, with "0" indicating that participants are not currently in a relationship, and "1" indicating that participants are currently in a relationship.

If participants reported dating experience, they were asked follow-up questions about their current or most recent relationship. The two items "How long have you been in this relationship?" and "How long was your last relationship?" were recoded to create a variable relationship length that described how long participants have been/were in their current or most recent relationships with a 5-point response scale ranging from "Less than a month" to "More than a year."

We also asked participants, "How old is your current/most recent partner?" with a 5-point response scale of "−2" meaning "more than a year younger than me," "−1" meaning "one year younger than me," "0" meaning "same age as me," "1" meaning "one year older than me," and "2" meaning "more than a year older than me." The response to this item created the variable relative age of partner. Finally, participants were asked to report, "What is the gender of your current/most recent dating partner?" with response options, "Young woman," "Young man," and "Transgender/gender queer."

Romantic attachment insecurity. Romantic attachment insecurity was measured using the Experiences in Close Relationships scale-Short Form (ECR-S; Wei, Russell, Mallinckrodt, & Vogel, 2007). This measure, adapted from the original version by Brennan, Clark, and Shaver (1998), is widely used in research with high school and college students. This 11-item measure was used to compute continuous scores on two dimensions of attachment insecurity: attachment anxiety and attachment avoidance. The avoidance dimension refers to how much a person distances himself/herself from relationship partners, lacks trust for relationship partners, and attempts to maintain emotional distance from others (Shaver & Fraley, 2008). The anxiety dimension reflects the extent of dependency on relationship partners, and anxiety about separation from and availability of a relationship partner (Shaver & Fraley, 2008). Response options range from "1" meaning "Strongly disagree" to "7" meaning "Strongly agree." An example item for anxiety is "I need a lot of reassurance that I am loved by my partner," and an example of the avoidance subscale is "I try to avoid getting too close to my partner." See Table 3 for Chronbach's alphas of all scales used. To account for the minimal amount of missing data in the attachment anxiety and attachment avoidance subscales, mean scores were imputed for those participants that responded to more than half of the items in each subscale.

Electronic intrusion. The current study utilized a 6-item EI perpetration subscale ($\alpha = .76$) and the 6-item EI victimization subscale ($\alpha = .83$) from a longer 36-item measure assessing digital dating abuse victimization and perpetration, modified

Table 3
Zero-order correlations between variables of interest with descriptive statistics.

		1	2	3	4	5	6	7	8	α
1.	**Attachment Anxiety Scale**									.684
	Girls									.714
	Boys									.643
2.	**Attachment Avoidance Scale**	−.04								.641
	Girls	.04								.665
	Boys	**−.14***								.643
3.	**Electronic Intrusion Victimization**	**.13****	.01							.827
	Girls	.10	.04							.817
	Boys	**.17****	−.05							.839
4.	**Electronic Intrusion Perpetration**	**.28*****	−.03	**.51*****						.762
	Girls	**.30*****	−.05	**.50*****						.752
	Boys	**.24*****	−.01	**.51*****						.776
5.	**Length of Relationship**	−.02	**−.20*****	**.23*****	**.23*****					N/A
	Girls	−.05	**−.26*****	**.27*****	**.28*****					
	Boys	.00	**−.12***	**.18****	**.16****					
6.	**Relative Age of Partner**	.04	−.03	.02	**.10****	**.10****				N/A
	Girls	.04	−.05	**.11***	**.16****	**.15*****				
	Boys	−.06	.03	**−.13***	**−.11***	.03				
7.	**Current Relationship Status**	**−.08***	**−.29*****	.04	**.10***	**.20*****	.09			N/A
	Girls	**−.10***	**−.29*****	.08	**.12***	**.20*****	.09			
	Boys	−.04	**−.31*****	.00	.07	**.21*****	.00			

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .000$. Significant correlations are shown in bold.

from Reed, Tolman, & Ward (in press) and Reed, Tolman, & Safyer, 2015. Participants were asked to respond to EI items to indicate how frequently each behavior occurred in their current or most recent dating relationship. The four-point scale ranged from "0" meaning "Never" to "3" meaning "Very often." Means of responses to the six perpetration items and six victimization items were computed to create EI victimization and perpetration mean scores. See Table 2 to view the EI perpetration items. The victimization subscale was comprised of the same behaviors worded differently to reflect victimization.

9. Results

9.1. Preliminary analyses

All analyses were conducted only with those participants that have had dating experience. Participants who responded, "yes" to the item, "Have you ever had a dating partner?" were therefore included in our final sample of 703 participants (54.3% girls, Mean age = 16.40, 75.6% White). The distribution of participants in each grade level in this smaller sample mirrored the larger sample: 27.6% freshmen, 11.9% sophomores, 20.5% juniors, and 30.3% seniors. We then conducted preliminary analyses on the dating experiences and digital media use of these participants.

Of the 703 participants with dating experience, 36.4% were in a dating relationship at the time of the survey. Most participants reported heterosexual dating behavior, with 7.2% of girls and 5.2% of boys reporting that they have typically engaged in same-sex dating behavior. We asked participants to focus on their current or most recent relationship for most items on the survey. The length of these dating relationships varied; those currently in a dating relationship reported relationship lengths ranging from less than a month (18.4%), 1–3 months (19.9%), 3–6 months (13.3%), 6–12 months (17.6%), and more than a year (30.9%). Those reporting on a former dating partner reported that this relationship ended less than a month ago (13.5%), 1–3 months ago (14.6%), 3–6 month ago (16%), 6–12 months ago (21.4%), 1–2 years ago (25.7%), and more than two years ago (7.9%). These past relationships also varied in length from less than a month (16.7%), 1–3 months (36%), 3–6 months (20.9%), 6–12 months (14.6%), and more than a year (10.8%).

Participants were frequent users of a variety of digital media. Of the sample of 703 participants with dating experience, 96.2% own a cell phone and 97.4% have access to a computer at home. Participants reported sending and receiving an average of 51–100 text messages per day, and spent an average of 22.4 hours per week using social media. Most participants reported that they text/texted their current or most recent dating partner frequently; 18.5% text daily, 26.1% text several times a day, and 40.2% text several times an hour. There were no gender differences in reported frequency of texting, but girls spent more hours (M = 27.16, SD = 19.44) per week on social media than boys (M = 16.85, SD = 16.72), $t(689) = 7.39$, $p < .000$.

As shown in Table 2, EI perpetration was common in this sample for both girls and boys. Monitoring a partner's whereabouts and activities using social media, monitoring who a partner is friends with/talks to, and pressuring a partner to respond quickly to calls and messages were the most common EI behaviors. We conducted crosstab analysis on these six items, and there were no significant sex differences in reporting perpetration of any of the EI behaviors within a current or most recent relationship.

9.2. Sex differences and inter-correlations between variables of interest

See Table 3 for the zero-order correlations between the continuous variables of interest, both for the overall sample and for girls and boys separately. To investigate sex differences for each variable of interest, we also performed independent sample t-tests (see Table 4). Significant sex differences were found for attachment anxiety, such that girls reported higher levels of anxiety than boys. Girls also reported more frequent EI perpetration and hours spent social networking than boys. For relationship characteristics variables, girls were more likely to have a current or most recent dating

Table 4
Sex differences in variables of interest.

	Girls mean	Boys mean	T-test
Attachment anxiety	**22.47 (6.71)**	21.42 (5.69)	2.19*
Attachment avoidance	14.74 (5.09)	14.98 (4.84)	−.615
Electronic intrusion perpetration	**.31 (.44)**	.24 (.42)	2.14*
Electronic intrusion victimization	.39 (.56)	.41 (.59)	−.26
Length of relationship	2.89 (1.38)	2.85 (1.36)	.30
Relative age of partner	**.48 (.87)**	−.08 (.57)	9.79***
Current relationship status	.41 (.49)	**.49 (.46)**	2.84**
Hours spent social networking	**27.16 (19.44)**	16.85 (16.72)	7.39***

Note. Note. *$p < .05$, **$p < .01$, ***$p < .000$. Bolded means indicate that there is a significant gender difference, with the higher mean shown in bold.

partner that was older than them, and boys were more likely to be currently in a relationship at the time of taking the survey.

Zero-order correlations were also conducted between the variables of interest and demographic variables including age, same-sex dating behavior, participation in free/reduced lunch program (proxy for socioeconomic status), racial/ethnic identification, grade point average, and religiosity. These tests were conducted to assess whether demographic variables were significantly associated with variables of interest and should be included into regression models as covariates. To account for multiple comparisons, significance tests were restricted to $p < .01$. For girls, age was positively associated with EI perpetration, $r(375) = .14$, $p = .009$. Girls were more likely to report EI perpetration as they got older in high school. For boys, identifying same-sex dating behavior was positively associated with attachment anxiety mean scores, $r(304) = .18$, $p = .002$. Boys who have engaged in same-sex dating behavior were more likely to report higher attachment anxiety scores. Therefore, "age" and "same-sex dating" were added to regression models as demographic correlates.

9.3. Regression analyses predicting electronic intrusion perpetration

To examine the contribution of attachment anxiety and attachment avoidance to the perpetration of EI behaviors, hierarchical multiple regressions were performed for girls and boys. The inter-correlations between the independent variables were at an acceptable level. Results of the variation inflation factor (all less than 1.361), and collinearity tolerance (all greater than .735) suggest that there are not significant issues with collinearity in this model.

We chose to perform separate analyses for women and men rather than examining sex as a moderator. Previous research has shown sex differences in digital communication and the impact of EI behaviors (Bennett et al., 2011; Blais et al., 2008; Kimbrough et al., 2013; Muscanell & Guadagno, 2012; Reed, Tolman, & Safyer, 2015). In our previous study, there were different patterns of association between attachment insecurity and EI perpetration for college women and men, and we sought to explore whether we could replicate these results in a high school sample. Because the experience of EI perpetration, and digital dating more broadly, may be qualitatively different for women and men, analyses were run separately rather than including gender as a moderator in a single model.

We entered variables into the two regression models in four steps. In step 1, we entered the demographic correlates "age" and "same-sex dating behavior." In step 2, we entered the relationship characteristics variables "relationship length," "relative age of partner," and "current relationship status." In step 3, "hours spent per week social networking" and frequency of EI victimization were added as controls. Finally, in step 4, the mean scores for attachment anxiety and attachment avoidance were entered as our independent variables. The regression results are provided in Table 5.

In the girls' model, age was a significant predictor of EI perpetration in step 1. In step 2, the relationship characteristic correlates relationship length and relative age of partner were significant predictors of EI perpetration. In step 3, these relationship characteristics remained significant in the model and EI victimization was also a signification predictor of EI perpetration. In the final step, the significant predictors of EI perpetration were relationship length, current relationship status, frequency of EI victimization, and attachment anxiety. Therefore, higher levels of attachment anxiety were associated with greater frequency of EI perpetration among girls in our sample, even when controlling for relationship characteristics and EI victimization.

The boys' regression model results were similar to the girls' model. Neither of the demographic correlates were significant predictors of EI perpetration in step 1. In step 2, relationship length and relative age of partner were both significant predictors of EI perpetration. In step 3, relative age of partner remained significant in the model, and EI victimization also emerged as a significant predictor of EI perpetration for boys. In the final step, relative age of partner, EI victimization, and attachment anxiety were significant predictors of EI perpetration frequency. Therefore, as with the girls in our sample, higher levels of attachment anxiety were associated with greater frequency of EI perpetration among boys, even when controlling for relationship characteristics and EI victimization. Attachment avoidance was not significantly associated with EI perpetration for girls or boys.

10. Discussion

Consistent with our hypothesis, high school girls reported more electronic intrusion (EI) perpetration than boys. Regression analyses revealed that attachment anxiety was associated with frequency of electronic intrusion perpetration for both girls and boys. Attachment anxiety was a significant predictor of EI even after controlling for demographic variables, relationship characteristics, hours spent social networking, and frequency of EI victimization. Attachment avoidance was not a significant predictor of EI perpetration in the girls' or boy's models.

In our previous work with college students, we proposed that digital dating communication creates a "cycle of anxiety" for anxiously attached individuals (Reed, Tolman, & Safyer, 2015). The cycle includes three phases: A social media trigger, an anxiety response, and engagement in electronic intrusion behaviors to attempt to relieve anxiety. The cycle begins with a social media trigger. This trigger could be a range of social media information or behaviors including delayed responses to text messages, pictures on Facebook of their partner at a party, or public messages from others posting or "tweeting" on their partner's social media profile. This trigger causes anxiety, possibly leading to an individual wondering if their partner is cheating on them, or wondering if their partner has romantic feelings for other people. This individual may then engage in EI to attempt to calm this anxiety. For example, they may send their partner repeated messages asking where they are and who they are with, or may look at their partner's text messages from the night before without permission. Due to relational schemas associated with attachment anxiety, the new knowledge gained through monitoring and looking at private information is more likely to be interpreted in a way that perpetuates more relationship anxiety instead of providing relief or soothing the individual. Therefore, this new information is instead another social media trigger that perpetuates the cycle.

As we have replicated our previous findings among high school students, it appears the cycle of anxiety can be applied across

Table 5
Hierarchical multiple regressions predicting frequency of electronic intrusion perpetration for girls and boys.

	Girls (N = 356)				Boys (N = 288)			
	Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 1 β	Step 2 β	Step 3 β	Step 4 β
Age	.13*	.01	.00	.00	−.01	−.03	−.03	−.03
Same-sex dating behavior	−.03	−.04	−.04	−.05	.06	.10	.09	.06
Length of relationship		.25***	.14**	.16**		.14*	.05	.05
Relative age of partner		.13*	.10*	.08		−.19**	−.13*	−.12*
Current relationship		.05	.07	.09*		.06	.07	.10
Hours SN			.02	−.01			.05	.04
EIV			.43***	.41***			.50***	.47***
Anxiety				.23***				.18**
Avoidance				−.01				.04
Adj. R2	.01	.10	.27	.35	−.00	.05	.29	.31
F Change	3.21*	11.03***	44.45***	20.62***	.53	6.10***	48.84***	6.00**

Note. Hours SN = hours spent per week social networking, EIV = Frequency of electronic intrusion victimization, Anxiety = Attachment anxiety mean score, Avoidance = attachment avoidance mean score.
*$p < .05$, **$p < .01$, ***$p < .001$.

adolescent and young adult dating relationships. Digital media have many positive impacts on dating relationship quality and closeness, but for anxiously attached individuals, access to digital information about a dating partner coupled with the capability for constant contact may make it difficult to negotiate digital boundaries. Although anxious teens may or may not be intending to harm their partner with their EI tactics, EI behaviors may negatively impact both partners' mental health and feelings of security in their relationship. If these behaviors occur as a pattern or within a constellation of other on-line or off-line tactics to exert control over a partner (e.g., pressure for sexual behavior, hostility or aggression) then concern is raised for these behaviors to escalate to emotional abuse and dating violence.

Although not all EI tactics may be intended to harm or exert pervasive control, anxious attachment may interact with other factors (e.g., gender beliefs, history of abuse or witnessing abuse) to produce such a pattern (e.g., Sousa et al., 2011). Indeed, research has supported the link between childhood exposure to intimate partner violence, childhood maltreatment, and insecure attachment (Morton & Browne, 1998; Rikhye et al., 2008). Research has also suggested that insecure attachment is associated with perpetration of violence, bullying, and other anti-social behaviors in adolescence (Catalano & Hawkins, 1996; Egeland, Yates, Appleyard, & van Dulman, 2002; Maas, Herrenkohl, & Sousa, 2008). Therefore, the current study may be particularly relevant for those anxiously attached adolescents with abuse or trauma histories. These adolescents are especially at risk for repeating patterns of coercive control through their use of digital media in relationships.

Although we predicted that attachment avoidance would be negatively associated with EI perpetration, levels of avoidance were not significantly associated with EI perpetration. We have now seen that across high school and college samples, there are few associations between attachment avoidance and EI perpetration. Further research is needed on how avoidant individuals negotiate digital dating, as digital media increase connectivity between dating partners through frequent technology-mediated contact. However, digital media also provide a means of less intimate communication behind a cell phone or computer screen.

At least one of the relationship characteristics variables – relationship length, relative age, and current relationship status – was significantly associated with EI perpetration in the final models for girls and boys. This pattern indicates that the relationship context is indeed important to consider when investigating factors that influence the frequency to engage in EI behaviors. For girls, being currently in a relationship at the time of survey and the length of their relationships were positively associated with EI perpetration in the final step of the regression model. For boys, relative partner age was negatively associated with EI perpetration in the final step, meaning that when their relationship partners were younger than them, they reported more frequent EI perpetration.

These differing gender patterns suggest EI perpetration may serve varying functions for high school girls and boys. Qualitative research on problematic digital dating behaviors demonstrated that teens, especially girls, often do not view violations of digital boundaries (e.g., password sharing) to be problematic (Lucero et al., 2014). Rather, girls seemed to view behaviors related to EI as necessary and adaptive components to relationship maintenance. Lucero et al. (2014) found that boys in their study, however, did not view their female partners' monitoring/control behaviors as favorably, and rather, found these behaviors to be largely annoying but benign. In our study, we found that girls were more likely to report EI perpetration when currently in longer relationships. Therefore, EI may function for girls as a relationship maintenance tactic as Lucero et al. (2014) suggest. Boys, who are more likely to perpetrate EI when their partner is younger than them, may be using EI to maintain control from a relative position of power in their dating relationships. Girls, conversely, could be using EI as a reaction to feeling out of control in their relationships.

As in our study with college students, EI victimization was also a strong predictor of EI perpetration, indicating that EI victimization and perpetration co-occur in high school dating relationships. Research on sex differences in the experience of EI behaviors found that teen girls and boys experience EI at similar rates, but girls may be more upset by these behaviors (Bennet et al., 2011). Others have suggested that boys may be annoyed by EI victimization, whereas girls view EI as either threatening or an opportunity for engagement with their partner (Lucero et al., 2014). Therefore, although EI victimization and perpetration are strongly correlated, victimization and perpetration may not mean the same thing for girls and boys. Differences in girls' and boys' motivation for engaging in EI perpetration may influence how these behaviors are experienced in dating relationships, with girls experiencing more emotional consequences from victimization. Because teen girls and boys may interpret, experience, and label EI victimization and perpetration experiences differently, further research is needed to elucidate the dynamics of the presumed "co-occurrence" of EI victimization and perpetration.

Several study limitations should be considered. This study relies on self-report of both romantic attachment insecurity and EI perpetration, and could therefore be susceptible to bias and social desirability factors. Collecting data from other sources including dating partner reports, peer reports, or interviews could address

this issue. Future research could also control for social desirability bias. Although widely used with high school age samples, the reliability statistics for the attachment avoidance and anxiety measures are acceptable but not high, raising some concern about the use of this measure for high school students. The measure prompt tells participants, "We are interested in how you generally experience relationships, not just in what is happening in a current relationship… If you have never had a romantic relationship, answer how you think you might feel if you were in a relationship." High school students having their first dating experiences have less relationship experience to draw from when responding to these items. Finally, because our sample was majority white, heterosexual high school students from a suburban area of Southeast Michigan, we cannot generalize to other populations.

Taken together, the findings from the regression models predicting girls' and boys' perpetration of EI support the importance of considering the circumstances in which EI behaviors are interpreted as problematic, and the role that attachment anxiety may play in these interpretations and in the likelihood to engage in EI behaviors in the future. In this study, we have identified two significant individual factors that influence EI perpetration: gender and attachment anxiety. These factors are likely to interact in high school dating relationships. For example, higher levels of attachment anxiety could lead to girls' use of EI perpetration for relationship maintenance and distress from EI victimization. Both gender and attachment anxiety should be considered when assessing the motivation and experience of EI in dating relationships, and in examining the dynamics of digital dating in teen and young adults' relationships. Anxiously attached girls and boys could be more at risk for experiencing distress and anxiety as a result of digital dating communication, and could especially benefit from interventions aimed at improving partner communication about negotiating digital boundaries and online conflict management.

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