Trajectories and Predictors of Sexually Aggressive Behaviors During Emerging Adulthood

Martie P. Thompson
Clemson University

Kevin M. Swartout
Georgia State University

Mary P. Koss
University of Arizona

Objective: To assess longitudinal trajectories of college males' sexually aggressive behaviors and determine time-varying individual- and peer-level risk factors that differentiate men who follow these different paths. ***Method:*** Our analytic sample consisted of 795 men who participated in a longitudinal study on high-risk behaviors among college students. The sample was surveyed at the end of each of their 4 years at university on a variety of measures, including sexual aggression (SA) and its hypothesized risk factors (hostile masculinity, number of sexual partners, alcohol misuse, and peer norms). ***Results:*** Using latent growth mixture modeling, we found four distinct SA trajectories: (a) consistently high, (b) decreasing, (c) increasing, and (d) consistently low. Multinomial logistic regression revealed that hostile masculinity and peer norms positively predicted trajectory membership at times when each trajectory reflected a high level of SA. ***Conclusions:*** Our study adds to the knowledge base by elucidating the different ways sexually aggressive behaviors change during emerging adulthood and how confluence-model-derived factors predict the different trajectories. The finding that changes over time in these risk factors correspond with SA perpetration risk informs prevention programming by illuminating the importance of *continual* focus on these risk factors throughout the college years, perhaps through annual self-assessments.

Keywords: sexual aggression, latent class growth analysis, college students, sexual violence, aggressive behavior

Sexual aggression (SA) is a significant public health problem among college students. In the past year, prevalence of rape was estimated as 5% for college women and 1% for women in the general population, and this difference was even greater for alcohol- or drug- facilitated rape (Kilpatrick, Resnick, Ruggiero, Conoscenti, & McCauley, 2007). There are limited national data on SA perpetration. A 1987 national survey found that among college men, 4% reported they had committed completed rape, 3% attempted rape, 7% sexual coercion, and 10% unwanted sexual contact since age 14 years (Koss, Gidycz, & Wisniewski, 1987). Similar rates have been found in more recent studies, with 11% to 14% of male students reporting some form of SA over the preceding year (Abbey & McAuslan, 2004; Monson & Langhinrichsen-Rohling, 2002; Thompson, Koss, Kingree, Goree, & Rice, 2011; White & Smith, 2004). The purpose of our study was to extend the research base by assessing SA behaviors among men as they transitioned through their 4 years in college and by determining risk factors

that differentiate men who follow different trajectories.

Confluence Model—Risk Factors

A variety of risk factors for SA perpetration among college students has been identified. The confluence model (Malamuth, Linz, Heavey, & Barnes, 1995) is the most widely used integrative theoretical model of SA and identifies two primary risk factors—hostile masculinity and impersonal sex. Several different types of risk factors related to the construct of hostile masculinity have been found to be associated with the likelihood of SA perpetration, specifically, general hostility and irritability (Malamuth et al., 1995; Schumacher, Feldbau-Kohn, & Slep, 2001), hostile views of women (Abbey & McAuslan, 2004; Abbey, McAuslan, Zawacki, Clinton, & Buck, 2001; Knight & Sims-Knight, 2004), and rape-supportive beliefs (Lonsway & Fitzgerald, 1995). Further, several risk factors related to the impersonal sex construct have been found to be associated with the likelihood of SA perpetration, including impersonal sex (Abbey, Jacques-Tiura, & LeBreton, 2011; Calhoun, Bernat, Clum, & Frame, 1997; Malamuth, Sockloskie, Koss, & Tanaka, 1991), sexual compulsivity (Knight & Sims-Knight, 2004), and exposure to pornography (Davis, Norris, George, Martell, & Heiman, 2006; Malamuth, Addison, & Koss, 2000).

Recent research has extended the confluence model by incorporating the constructs of heavy alcohol use (Abbey et al., 2011) and peer norms (K. M. Swartout, in press). The addition of heavy alcohol use to the confluence model was based on research indicating that perpetrators who had consumed alcohol during a SA incident were more likely than nonperpetrators and sober perpetrators to report higher levels of monthly alcohol consumption and drinking in sexual situations (Zawacki, Abbey, Buck, McAuslan, & Clinton-Sherrod, 2003). Our own research also indicates that heavy alcohol use increases SA perpetration risk, in part, due to the mediating role of perceived peer norms supportive of SA (Thompson, Koss, Kingree, Goree, & Rice, 2011). The addition of the peer norms variable was based on extant research indicating consistently strong associations between a male's likelihood of engaging in SA

and perception of the peers' attitudes toward women and sex (K. M. Swartout, in press).

Importance of a Longitudinal Perspective

Despite the recognized magnitude of SA, there is limited information on the longitudinal trajectories of SA. The small number of studies on the developmental course of aggressive behaviors has indicated that some men engage in persistent aggressive behaviors, whereas others manifest time-limited aggressive behaviors (Moffitt, 1993; Moffitt, Caspi, Harrington, & Milne, 2002). A similar developmental model for SA has been proposed (Seto & Barbaree, 1997) although empirical tests have been limited, due to the dearth of longitudinal data on SA (Abbey, Wegner, Pierce, & Jacques-Tiura, 2012; Prentky & Knight, 1993). Findings from two different studies examining patterns of sexually coercive behaviors among college men over a 1-year period support a developmental framework: some men persisted and others desisted in their SA behaviors (Abbey & McAuslan, 2004; Hall, DeGarmo, Eap, Teten, & Sue, 2006). In both studies, between-subjects categories were formed to reflect four groups based on two time points; these groups were nonperpetration, persistence, desistence, and initiation. The studies found that most men (59% to 63%) were nonperpetrators, 21% to 26% engaged in SA at Time 1 only (desistors), 6% to 7% engaged in SA at Time 2 only (initiators), and 9% engaged in SA at both time points (persistors). Using this same typology, fairly similar proportions were found in a community sample of men, although there were twice as many men in the persistence group and fewer in the nonperpetration group (Abbey et al., 2012). These studies offer information beyond cross-sectional studies because they identify patterns of perpetration across two time periods. A forthcoming study assessed male college students across four time periods (adolescence through 3 years of college) to extend this group-based approach and apply a person-centered analysis of SA trajectories (K. M. Swartout, Swartout, & White, in press). Results suggested four distinct trajectories, consisting of men who perpetrated SA at low (72%), moderate (21%), decreasing (4%), and increasing (3%) frequencies across time. A similar approach has been previously applied to other

samples of longitudinal data on violence against women and yielded distinct trajectories of SA victims (A. G. Swartout, Swartout, & White, 2011).

Risk Factors in Longitudinal Studies

A small body of research indicates confluence-model-derived risk factors differentiate men who persist, desist, and initiate SA over a 1-year period. Hall and colleagues (2006) found that persistent sexual coercers were higher than the other groups in hostile attitudes toward women. Abbey and McAuslan (2004) found that certain risk factors differentiated the four groups previously described (e.g., hostile attitudes toward women, number of consensual sexual partners, heavy alcohol use). Neither of these studies determined how changes in risk factors across time coincided with changes in perpetration risk.

Emerging Adulthood

A person-centered longitudinal perspective is particularly important when examining the transition from adolescence to young adulthood (Hall et al., 2006). This time period between the ages of 18 and 25 years has been referred to as "emerging adulthood" and represents a key developmental transition for youth as they explore their identities and experience increased opportunities for making life choices that set them on certain trajectories (Arnett, 2000). This transition period may be characterized by frequent changes in life goals, romantic attachments, work aspirations, and worldviews. For many, emerging adulthood is a time of decreased "institutional structure" (Schulenberg & Zarrett, 2006), spurred mostly by when youth move out of their parents' homes. The college setting also can present a context-driven set of risk factors for SA that vary between and within young men, including peer influences and high-risk drinking (O'Malley, Bachman, Johnston, & Schulenberg, 2004).

Purpose

Our study extends the research base in several ways. It used eight referent periods across four waves of data from men across their 4 years in college, focused on perpetration specif-

ically, and applied a person-centered analytic approach to examine time-varying key constructs from the most prominent current theory of SA. The study addressed the following research questions: (a) what are the different trajectories of SA behaviors among men over the course of their college years, and (b) do time-varying levels of hostile masculinity, number of sexual partners, alcohol misuse, and peer norms predict the different trajectory classes? Based on prior research, the following hypotheses were made: (a) there would be four classes of SA behaviors—consistently low, consistently high, decreasing, and increasing; (b) high levels on the risk factors at both Waves 1 and 4 would predict membership in the consistently high SA group; (c) high levels of the risk factors at Wave 4 would predict membership in the increasing trajectory group; and (d) high levels of the risk factors at Wave 1 would predict membership in the decreasing trajectory group.

Method

Sample

The original sample included 800 males who were recruited from a population of 1,472 men enrolled as first-year, full-time students at a large southeastern university. Participants were, on average, 18.56 years of age at Wave 1 ($SD = 0.51$) and 89% were White. The sample was representative of the population of first-year male students in terms of age and race based on data provided from the university's Office of Institutional Research. Attrition was unrelated to respondents' SA trajectory class, race, age, hostile masculinity, peer norms, or alcohol misuse. However, attrition was related to number of sexual partners, such that males with a higher number of sexual partners at Wave 1 were less likely to complete Wave 4 surveys ($M = 2.90$) than males with fewer sexual partners at Wave 1 ($M = 1.80$), $F(1, 794) = 11.89$, $p < .001$.

Procedures

Recruitment for the study involved sending an electronic mail message to each male student at the university who was ending his first year in college, posting an announcement in the student newspaper, and distributing flyers around campus. All methods of communication invited the

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-min self-report survey on men's attitudes and behaviors regarding relationships with women. Wave 1 data were collected over a 1-week period in March through April of 2008. Data collection ended once the target sample size of 800 was achieved. Five individuals were excluded from the study because they were not 18 years of age at the time of Wave 1 data collection. Thus, the analytic sample included 795 males.

In March through April 2009, 2010, and 2011, men who completed Wave 1 surveys were contacted via e-mail to participate in follow-up surveys. Eighty-two percent of the original respondents completed the Wave 2 survey, 75% completed the Wave 3 survey, and 72% completed the Wave 4 survey. Study procedures were similar for data collection at all four waves. At Wave 1, when men arrived at the health center, their names were checked off a master list of names of full-time, first-year male students. At Waves 2, 3, and 4, participants were provided with a survey that had a confidential, unique code that linked their surveys. Prior to completing surveys, men provided written informed consent. Local institutional review board 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 their surveys (without consent forms attached) into a locked box. Then they received payment for their participation and were provided a referral sheet of counseling resources. Respondents were paid $20.00 for their participation at Waves 1 and 2, and $25.00 at Waves 3 and 4.

Measures

Sexual aggression. The revised Sexual Experiences Survey (SES; Koss et al., 2007) was used to assess for SA. The SES is the most widely used measure of perpetration among college students. Internal consistency reliability for the previous version has been found to be good, and validity studies have shown that responses to the instrument are highly correlated with subsequent responses obtained in face-to-face interviews (Koss et al., 1987; Koss & Gidycz, 1985; Koss & Oros, 1982). An advantage of the SES is its use of behaviorally specific questions that help to combat the potential for underreporting SA (Crowell & Burgess, 1996; Fisher & Cullen, 2000).

The scale includes seven behaviorally specific questions, and within each question, five items assessing strategies for engaging in that behavior. Across the 35 items, five items assessed for unwanted sexual contact, 12 items assessed for sexual coercion, nine items assessed for attempted rape, and nine items assessed for completed rape. We used a scoring method that accounted for both the severity and frequency of SA. Our severity scoring used the hierarchical scoring system proposed by the Sexual Experiences Survey (SES) Collaboration (Koss et al., 2007), whereby if several acts of aggression occurred in the same incident, the respondent was classified according to the most severe type of SA, with higher scores reflecting more severe forms of SA (i.e., in order of unwanted sexual contact, attempted or completed coercion, attempted rape, and completed rape). Frequency assessment followed the procedures of Malamuth and colleagues (1991) and entailed assigning frequency scores within each type of unwanted sexual experience. Possible scores ranged from 0 (nonperpetrators) to 15 (perpetrators of three incidents of completed rape). Perpetrators of one incident of unwanted sexual contact were given scores of 1, those with two incidents of unwanted sexual contact were given scores of 2, and those with three or more acts of unwanted contact were assigned scores of 3. Perpetrators of one incident of attempted coercion were given scores of 4, perpetrators of two incidents of attempted sexual coercion were given scores of five, and so on, with perpetrators of three or more incidents of completed rape being assigned scores of 15. Correlation between this measure that combined severity and frequency scores with the traditional ordinal scoring was .98.

At each of the four waves of data collection, men responded to the SES using two different time boundaries for recall. At Wave 1, the two time frames were (a) prior to entering college and (b) during the first academic year. At Wave 2, the two reporting timeframes were (c) summer between first and second academic year and (d) during second academic year. At Wave 3,

the two reporting timeframes were (e) summer between second and third academic year and (f) during the third academic year. At Wave 4, the two reporting timeframes were (g) summer between third and fourth academic year and (h) during the fourth academic year.

Hostile masculinity. We used two measures to operationalize hostile masculinity. First, we used an 8-item scale adapted by Koss and Gaines (1993) from the Hostility Toward Women Scale (Check, Malamuth, Elias, & Burton, 1985; sample item: "Many times a woman appears to care, but really just wants to use me"). Second, we used the 19-item Rape Supportive Beliefs Scale (Lonsway & Fitzgerald, 1995; sample item: "When women talk and act sexy, they are inviting rape"). For both scales, items were answered using a 5-point response format, with higher scores reflecting higher levels of hostility and rape supportive attitudes. At Wave 1, no reporting time period was specified, and at Wave 4, respondents were asked about their attitudes and opinions over the past year. Total scores for each scale were calculated by averaging participants' responses. Composite scores for the hostile masculinity constructs at Waves 1 and 4 were calculated by z-scoring and then averaging the total scores at each wave. The composite scores showed good internal consistency at both Wave 1 ($\alpha = .93$) and Wave 4 ($\alpha = .94$).

Number of sexual partners. At both Waves 1 and 4, respondents were asked how many people they had had vaginal or anal sex with since the age of 14 at both the first and fourth waves. Due to a high degree of covariation between the two scores, responses at Wave 1 were subtracted from responses at Wave 4 to compute a Wave 4 difference score. Number of sexual partners at Wave 4 therefore represents participants' number of sexual partners since Wave 1.

Alcohol misuse. At both Waves 1 and 4, respondents were asked how often, in the past 30 days, they "drank enough to get drunk" (defined for participants as "unsteady, dizzy, or sick to stomach"). Prior research found that this measure of alcohol misuse was more strongly associated with a composite index of self-reported injuries than was a traditional measure of binge drinking (O'Brien et al., 2006). The item had a 7-point response format, with options of 0 (*not at all*), 1 (*1 to 2 occasions*), 2 (*3 to 5 occasions*), 3 (*6 to 9 occasions*), 4 (*10 to 19 occasions*), 5 (*20 to 39 occasions*), and 6 (*40 or more occasions*). This variable was recoded to more accurately reflect the number of occasions participants became drunk (i.e., $0 = 0$, $1 = 1.5$, $2 = 4$, $3 = 7.5$, $4 = 14.5$, $5 = 29.5$, and $6 = 40$).

Peer norms. At both Waves 1 and 4, respondents answered six items about their perceptions of their current set of friends' approval and pressure for engaging in various coercive strategies to have sex with women (Abbey & McAuslan, 2004; sample item: "Do your friends approve of getting a woman drunk or high to have sex"). Items were answered on a 4-point response format ranging from 1 (*not at all*) to 4 (*a lot*). Higher scores indicated greater perceptions that peers would approve of engaging in forced sex with a woman. The scale showed good internal consistency at both Wave 1 ($\alpha = .78$) and Wave 4 ($\alpha = .78$).

Data Analytic Strategy

Our primary data analytic strategy was latent class growth analysis (LCGA), which is a member of the more general family of growth mixture models (GMM). The rationale for these analyses stems from the person-centered assumption that there are qualitatively different or latent subgroups within some populations (B. Muthén & Shedden, 1999; B. Muthén, 2004; B. Muthén & Asparouhov, 2009). In GMM, an intercept and linear slope are estimated for each latent class; nonlinear change across time can also be modeled, such as quadratic or cubic effects. This modeling of change across time allows the classes to be interpreted as discrete trajectories of the endogenous construct—in our case, SA. GMM is positioned to handle skewed and categorical data (Feldman, Masyn, & Conger, 2009), which are often characteristics of data collected on SA (K. M. Swartout, Swartout, & White, 2011). An underlying assumption is that once latent heterogeneity is modeled in the form of a class structure, each class will be normally distributed. However, within-class normality cannot always be assumed, as is often the case when modeling classes of relatively infrequent behaviors such as SA. For these cases, LCGA proves very useful, as within-class variances are fixed at zero (Feldman et al., 2009; Nagin, 1999; Roeder, Lynch, & Nagin, 1999). When there is no within-class variability,

individual differences are attributed to trajectory membership (B. Muthén & Muthén, 2000). This class structure forms a categorical variable that can be regressed on exogenous variables used to predict trajectory membership.

All models were tested using MPlus v. 6.1 (L. K. Muthén & Muthén, 1998–2010) with maximum likelihood estimation and robust standard errors to account for missing data (i.e., Full Information Maximum Likelihood). In the first step we estimated one-, two-, three-, four-, and five-class models of SA. These variables are positively skewed—because they represent frequencies of risky behaviors during a given timeframe—therefore, we designated them all as count variables within the analysis. By designating these dependent variables as count, a Poisson distribution is estimated where the conditional mean equals the conditional variance (Long, 1997).

Our first step was to evaluate the fit of each hypothesized SA model to our data using the Bayesian Information Criterion (BIC) and Lo-Mendell-Rubin adjusted Likelihood Ratio Test (L. K. Muthén & Muthén, 1998–2010; Nagin, 1999). We used entropy estimates and posterior probabilities to compare how cleanly each model classified cases into discrete SA trajectories (B. Muthén, 2004). Posterior probabilities are likelihoods of cases being assigned to each discrete latent class across multiple estimations;

therefore, posterior probabilities sum to 1.0 for each person. Entropy is an overall summary measure of classification accuracy ranging from 0 to 1.0, with scores close to 1.0 being desirable. Our second step was to determine the utility of the risk factors assessed at Waves 1 and 4 in predicting SA trajectory membership; predictors were converted to z-scores for interpretability. The analysis assigns cases to their most likely trajectory class based on the highest posterior probability and then uses multinomial logistic regression to predict class membership.

Results

Thirty percent of our sample reported engaging in at least one SA act across the eight referent periods; 16% reported engaging in behavior that meets legal definitions for rape or attempted rape. The annual rate of SA remained quite consistent across the study beginning with 14.6% at Time 1 and ending with 12% at Time 8. Table 1 displays descriptive statistics associated with all of the variables used in this study. Analyzing the data using four time points (combining summer and academic time points within each wave), as well as omitting the first time point, resulted in the same pattern of findings as those reported here. Breaking the data into eight referent periods allowed for the data to be fit to

Table 1

Descriptives for Variables Used in the Modeling Process Before Standardization

Variable	Referent period	Min–max	*M*	*SD*
Frequency/Severity	1: Prior to college	0–12	.98	2.66
	2: First academic year	0–12	.80	2.46
	3: Summer before second year	0–12	.74	2.30
	4: Second academic year	0–11	.96	2.59
	5: Summer before third year	0–11	.75	2.26
	6: Third academic year	0–12	.80	2.34
	7: Summer before fourth year	0–12	.58	2.02
	8: Fourth academic year	0–12	.78	2.37
Hostility toward women	1	0–4	1.60	.82
	8	0–4	1.46	.84
Rape myth acceptance	1	0–3.3	1.24	.62
	8	0–4	2.03	.61
Number of sexual partners	1	0–58	2.59	4.10
	8	0–100	5.75	8.39
Alcohol misuse	1	0–40	3.72	6.40
	8	0–40	4.93	6.39
Peer norms	1	0–3	.28	.40
	8	0–3	.38	.49

more complex models (e.g., estimating a five-class model).

Model Estimation and Selection

All models were estimated with and without quadratic and cubic effects to determine if change was nonlinear; model fit and classification quality did not substantially change with the addition of these effects and none were statistically significant at $\alpha = .05$. Therefore, only intercepts and linear slopes were estimated in the final SA trajectory model. Each of the one- through five-class models was successfully estimated without errors associated with misspecification; model fit and classification statistics are presented in Table 2. As hypothesized, based on model fit, classification quality, and interpretability, the four-class model was determined to fit the data best. All five models cleanly classified the cases with entropies > .95; and, although we found a modest improvement in model fit from the four- to the five-class model (BIC: 9565.38 vs. 9344.00), the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LRT) indicated this is not a significant improvement (adj. LRT: 229.964, $p = .79$). The five-class model estimated two conceptually similar "decreasing" trajectories that we interpreted as redundant. The average posterior probabilities for each class of the four-class model ranged from .961 to .991.

Latent Trajectories of SA

Trajectory 1 had the highest proportion of membership, with approximately 70% of our sample ($n = 567$). The Trajectory 1 intercept was significantly lower than average and its linear slope was not significantly different than the av-

Table 2
Fit Statistics for Each Class Structure Estimated

Model	BIC	Adj. LRT	Entropy
One-class	20913.28	—	1.000
Two-class	11775.77	8722.60 ($p < .001$)	0.987
Three-class	10402.63	1327.02 ($p = .01$)	0.984
Four-class	**9565.38**	**816.59 ($p < .01$)**	**0.965**
Five-class	9344.00	229.964 ($p = .79$)	0.954

Note. Adj. LRT = Lo-Mendell-Rubin adjusted Likelihood Ratio Test; BIC = Bayesian Information Criterion. Bold type indicates the selected model.

Table 3
Characteristics of the Four-Class Model of Sexual Aggression

Latent trajectories	% of sample	Sexual aggression	
		Intercept (*SE*)	Linear slope (*SE*)
1. Low/None	70.9	−6.24 (.79)***	−.02 (.22)
2. Increasing	8.1	−1.36 (.58)*	.41 (0.10)***
3. Decreasing	12.4	1.39 (.10)***	−.42 (.06)***
4. High	8.6	1.77 (.09)***	−.02 (.23)

Note. Standardized estimates and effect sizes are not computable for models with count outcomes.
* $p < .05$.   ** $p < .01$.   *** $p < .001$.

erage for the sample (see Table 3 for parameter estimates of each latent trajectory). This consistently low pattern of SA across the eight referent periods, depicted in Figure 1, led us to interpret Class 1 as the stable *low or none* trajectory. Because participants categorized in Trajectory 1 reported little to no SA across the study, this trajectory was used as a reference group for the subsequent multinomial logistic regressions to predict latent trajectory membership.

Trajectory 2 accounted for approximately 8.1% of our sample ($n = 65$). The intercept of Trajectory 2 was significantly lower than average and the linear slope was significantly higher than average (see Table 3). Figure 1 depicts this class as having a low to moderate frequency of SA during adolescence that consistently increased across the subsequent seven time points, ending at a relatively high frequency of SA during the fourth year of college. This led to interpretation of Class 2 as the *increasing* trajectory.

Trajectory 3 accounted for approximately 12.5% of our sample ($n = 99$). The intercept of Trajectory 3 was significantly higher than average and the linear slope was significantly lower than average (see Table 3). Figure 1 illustrates how this trajectory had a high level of SA during adolescence but a steady decline across the subsequent seven time points, leading to a relatively low level of SA during the fourth year of college. This led to interpretation of Class 3 as the *decreasing* trajectory.

Trajectory 4 accounted for approximately 8.6% of our sample ($n = 69$) with a significantly higher intercept than the sample average but not a significantly different linear slope (see
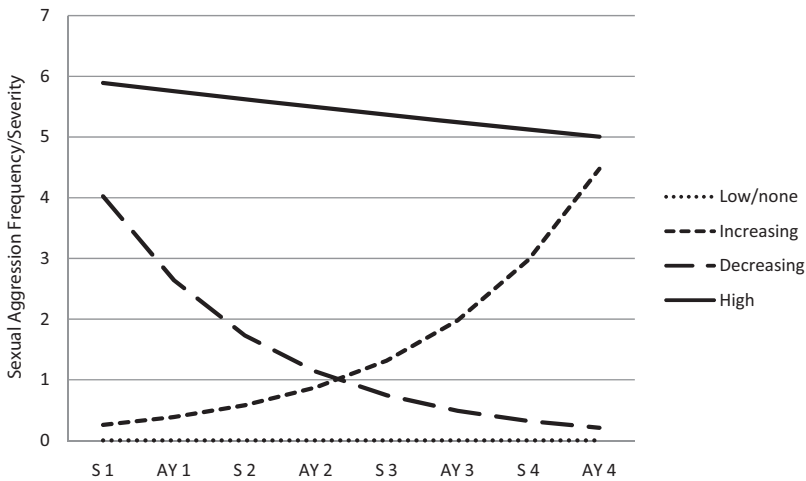
Figure 1. Plot of estimated latent sexual aggression trajectories. *Note:* S1= prior to college; AY1 = first academic year; S2 = summer between first and second academic years; AY2 = second academic year; S3 = summer between second and third academic years; AY3 = third academic year; S4 = summer between third and fourth academic years; AY4 = fourth academic year.

Table 3). Figure 1 indicates that, on average, members of this trajectory started off with a high degree of SA in adolescence that remained stable across their college years. Figure 1 illustrates this trend, with mean SA estimates for Trajectory 4 exceeding those of other classes at each time point of the study. These men composed the most frequently, severely, and consistently aggressive class within our sample; this led to interpretation of Class 4 as the persistent *high* trajectory.

Predicting Trajectory Membership

To determine if established predictors of SA were also predictive of SA patterns over time,

Wave 1 and Wave 4 risk factor variables— hostile masculinity, number of sexual partners, alcohol misuse, and peer norms—were modeled as predictors of trajectory membership. Table 4 presents intercorrelations between predictors before *z*-transformations and before the two scales measuring hostile masculinity were combined. Table 5 presents the results of a multinomial logistic regression to predict trajectory membership, with the "low or none" trajectory as a reference group. High levels of both hostile masculinity and peer norms at Wave 4 predicted membership in the increasing trajectory. Low levels of hostile masculinity and peer norms at Wave 1 and alcohol misuse at Wave 4 signifi-

Table 4
Intercorrelations Between Latent Trajectory Class Predictors

Predictor	1	2	3	4	5	6	7	8
1. HM (Wave 1)	—	.58**	.07*	.11**	.07*	−.02	.32**	.18**
2. HM (Wave 4)		—	.05	.02	.10*	.12**	.25**	.31**
3. Sexual partners (Age 14 to Wave 1)			—	.29**	.27**	.20**	.23**	.21**
4. Sexual partners (Wave 1 to 4)				—	.25**	.27**	.19**	.12**
5. Alcohol misuse (Wave 1)					—	.51**	.35**	.32**
6. Alcohol misuse (Wave 4)						—	.16**	.27**
7. Peer norms (Wave 1)							—	.46**
8. Peer norms (Wave 4)								—

Note. HM = hostile masculinity composite.
* *p* < .05 (two-tailed).   ** *p* < .01 (two-tailed).

Table 5
Logistic Regressions Predicting Latent Trajectory Membership

Latent trajectory	Wave	Variable	*b*	*SE*	*Odds ratio*	*OR 95% CI*	Change in probability of membership[a]
Increasing		Intercept	−2.14***	.18			
	1	HM	.03	.21	1.03	.68, 1.55	3%
		Alcohol misuse	.16	.18	1.18	.83, 1.68	16%
		Peer norms	.19	.20	1.21	.82, 1.80	19%
		Sex partners	−.08	.24	.92	.58, 1.49	−7%
	4	HM	.54**	.20	1.72	1.16, 2.55	60%
		Alcohol misuse	.07	.18	1.08	.76, 1.53	7%
		Peer norms	.61***	.17	1.84	1.32, 2.55	69%
		Sex partners	.12	.14	1.13	.86, 1.47	11%
Decreasing		Intercept	−1.79***	.15			
	1	HM	.60**	.19	1.82	1.26, 2.63	63%
		Alcohol misuse	.18	.16	1.20	.88, 1.64	17%
		Peer norms	.72***	.15	2.06	1.53, 2.78	79%
		Sex partners	.13	.15	1.14	.86, 1.53	12%
	4	HM	−.08	.17	.92	.66, 1.29	−7%
		Alcohol misuse	.34*	.15	1.40	1.05, 1.89	33%
		Peer norms	.12	.15	1.13	.81, 1.58	11%
		Sex partners	−.16	.14	.85	.64, 1.13	−13%
High		Intercept	−3.02***	.29			
	1	HM	.64*	.26	1.89	1.14, 3.15	82%
		Alcohol misuse	.31	.17	1.36	.97, 1.92	34%
		Peer norms	.52**	.19	1.69	1.16, 2.45	63%
		Sex partners	.32*	.15	1.37	1.03, 1.83	35%
	4	HM	.72**	.24	2.05	1.27, 3.32	96%
		Alcohol misuse	.21	.20	1.24	.84, 1.83	22%
		Peer norms	.81***	.18	2.25	1.58, 3.20	112%
		Sex partners	−.09	.17	.92	.65, 1.28	−8%

Note. Reference group = low or none trajectory. HM = Hostile masculinity.
[a] Change in predicted probability of membership in the respective class from the *M* to +1 *SD* of the exogenous variable, all other covariates held at their *M*s.
* *p* < .05.   ** *p* < .01.   *** *p* < .001 (all two-tailed).

cantly predicted membership in the decreasing trajectory. Finally, number of sex partners reported at Wave 1 as well as hostile masculinity and peer norms—both at Waves 1 and 4—predicted membership in the high trajectory.

Discussion

The purpose of this longitudinal study was to build upon prior research by (a) assessing discrete trajectories of sexually aggressive behaviors among men over the course of their college years using eight referent periods across four waves, and (b) determining if time-varying levels of hostile masculinity, number of sexual partners, alcohol misuse, and peer norms predicted the different trajectory classes. In terms of our first research question, our longitudinal design, combined with our analytic approach of growth mixture modeling, revealed that there were four distinct temporal patterns of SA among men as they transitioned into young adulthood: 71% showed a stable low-to-none pattern in SA throughout their four years of college, 9% maintained persistently high levels of SA throughout their college years, 12% showed decreasing patterns of SA, and 8% showed steadily increasing patterns of SA over time. These findings point out that most men are not sexually aggressive and that among those who are, not all are alike. Some appear to learn to be less aggressive as they mature, others become more aggressive, and others maintain their SA tendencies. This four-trajectory class model corresponded with recent findings on trajectories of SA using a different sample and only modeling SA frequency (K. M. Swartout et al., in press). These results, taken along with the

results of the current study, lend strong evidence for heterogeneity of sexually aggressive behavior across time.

In terms of our second research question, our study filled a gap in the literature by elucidating time-varying risk factors that correspond to SA trajectories. We found that high levels of hostile masculinity and peer norms at both Waves 1 and 4 predicted membership in SA trajectories that were also high at those times. Thus, these findings extend upon prior research that either assessed risk factors at one time only or assessed SA at one time only. The identification of risk factors that correspond temporally with the likelihood of SA perpetration holds promise for interventions to prevent SA, as research suggests that these factors are amenable to change (Gallagher & Parrott, 2011; Wood, 2000).

Hostile masculinity and peer norms across time were the most consistent predictors of SA; specifically, higher levels of hostile masculinity and peer norms at the beginning of college, but not at the end of college, increased the likelihood of membership in the decreasing SA trajectory; higher levels of hostile masculinity and peer norms at the end of college, but not at the beginning of college, increased the likelihood of membership in the increasing trajectory; and higher levels of hostile masculinity and peer norms at both the beginning and end of college predicted membership in the consistently high SA trajectory. Fewer significant effects emerged for number of sexual partners, indicating that changes on this risk factor were not significantly responsible for varying trajectories, with the exception that a higher number of sexual partners at the beginning of the study were associated with membership in the consistently high SA trajectory. These findings are important because they indicate that hostile masculinity levels and peer norms predicted membership in highly aggressive trajectories at both the beginning and end of the study.

Limitations

Our study had some limitations that should be noted. First, the study was limited by its inclusion of male students from only one university. Despite this, the rates of SA found in our sample were similar to rates reported from comparable studies with college men. Second,

although the statistical modeling approach used in our study is supported by recent dialogue that calls for a change in focus among research psychologists away from null hypothesis toward statistical modeling (Rodgers, 2010), we were not able to assess predictors of SA trajectories experimentally. However, our study entailed model testing that incorporated ecologically valid measures and temporality considerations, and was able to reveal important information on trajectories and predictors of trajectories that would not have been possible to discern with an experimental design. Third, we did not assess for sexual orientation in the study, and thus do not know the proportion of males in our sample who would have self-identified as homosexual or bisexual, or how this might have affected study findings. Lastly, there was differential attrition in our sample such that males with more sexual partners were less likely to be retained in the study at Wave 4. This might explain why the variable assessing number of sexual partners at Wave 4 did not differentiate the no-to-low SA trajectory from the other SA trajectories.

Research Implications

Our study extends the literature on risk factors for SA by elucidating not only the different ways sexually aggressive behaviors change during emerging adulthood but also how risk factors predict the different SA trajectories. Findings that levels of certain risk factors corresponded to changes in SA perpetration across time suggest some avenues for future areas for research investigation. First, more longitudinal research is needed as we move beyond cross-sectional studies on SA perpetration. Our assessment of males as they transitioned through their college years allowed us to apply a longitudinal, person-centered approach. It would be even more informative for future research to assess risk factors and SA before males matriculate into college in order to determine how these variables change and covary during this time period. Further, it would be informative to follow males for a longer period of time after college in order to assess if the four trajectory classes that we identified in our study are supported with more years of data. Second, our findings suggest some avenues for future research on the design of prevention programs. Given that hostile masculinity and peer norms

positively predicted trajectory membership at times when each trajectory reflected a high level of SA, future research should determine if prevention programs are effective in changing these risk factors. Some prior work suggests these variables are amenable to change, but more work is needed to substantiate their malleability. Also related to prevention programming, our findings suggest the importance of a *continual* focus on these risk factors throughout the college years. The dosage and timing of intervention strategies targeting these risk factors is another area for future research.

Clinical and Policy Implications

The goal of all research on SA is ultimately to decrease or even prevent it. Heterogeneous patterns of SA have clear implications for prevention programs. A one-size-fits-all approach is not likely to meet the needs of these diverse subgroups. Rather, prevention programs may benefit from tailoring content and focus for specific subgroups based on their patterns of SA. Optimal factors to target in primary, secondary, and tertiary prevention programs would depend on if the SA behavior has been repetitive, one-time, or intermittent. Our results suggest that SA trajectories are not inevitable or fixed. Thus, strategies aimed at shifting all males, regardless of initial levels of SA, to no or low levels of SA (i.e., shifting men into the decreasing trajectory who otherwise might be in the high trajectory, and shifting men into the low or none trajectory who otherwise might be in the increasing trajectory) by reducing males' hostile masculinity and peer norms holds promise as a SA prevention approach. A particular challenge will be how to alter the trajectory course of males who evidence persistent hostile masculinity and perceptions of peer norms tolerant of SA and concurrently evidence consistently higher levels of SA. It will be important to pay particular attention to this group and determine what other variables might be associated with membership in this trajectory group and how best to reduce levels on these identified risk factors among men in this group.

Although many prevention approaches have focused on changing unhealthy attitudes and sexual behaviors, this study elucidates the importance of *continual* focus on these risk factors throughout the college years, as our findings indicate that they change over time and, as they do, so, too, does SA perpetration likelihood. SA cannot be prevented in a 1-hr presentation at the beginning of the first year of college or during orientation (Gidycz, Orchowski, & Edwards, 2011). One possible strategy is to ask first-year students to engage in self-assessments that require them to think about what can happen during their next four years (e.g., type of partners they want to be, attitudes toward women and sexual behaviors they would like to have). Engaging males in this type of self-reflection has the potential to be perceived as providing more personal value to them than standardized information delivered in lecture formats. Using self-assessments in the context of group settings can prompt individuals to think retrospectively about how they have changed each year and then guide them in goal setting for what their relationship goals are for future years. This approach, whereby prevention efforts continue as men transition through college and whereby self-assessments are revisited, might hold promise for SA prevention. We would also need to assess the effects of prevention efforts across the college years, with the goal being both the prevention of the onset of SA as well as the reduction or desistance of SA if it has already occurred.

References

Abbey, A., Jacques-Tiura, A. J., & LeBreton, J. M. (2011). Risk factors for sexual aggression in young men: An expansion of the confluence model. *Aggressive Behavior, 37,* 450–464. doi:10.1002/ab .20399

Abbey, A., & McAuslan, P. (2004). A longitudinal examination of male college students' perpetration of sexual assault. *Journal of Consulting and Clinical Psychology, 72,* 747–756. doi:10.1037/0022-006X.72.5.747

Abbey, A., McAuslan, P., Zawacki, T., Clinton, A. M., & Buck, P. O. (2001). Attitudinal, experiential, and situational predictors of sexual assault perpetration. *Journal of Interpersonal Violence, 16,* 784–807. doi:10.1177/0886260010016008004

Abbey, A., Wegner, R., Pierce, J., & Jacques-Tiura, A. J. (2012). Patterns of sexual aggression in a community sample of young men: Risk factors associated with persistence, desistance, and initiation over a 1-year interval. *Psychology of Violence, 2,* 1–15. doi:10.1037/a0026346

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twen-

ties. *American Psychologist, 55,* 469–480. doi: 10.1037/0003-066X.55.5.469

Calhoun, K. S., Bernat, J. A., Clum, G. A., & Frame, C. L. (1997). Sexual coercion and attraction to sexual aggression in a community sample of young men. *Journal of Interpersonal Violence, 12,* 392–406. doi:10.1177/088626097012003005

Check, J. V. P., Malamuth, N. M., Elias, B., & Burton, S. A. (1985). On hostile ground. *Psychology Today, 19,* 56–61.

Crowell, N. A., & Burgess, A. W. (1996). *Understanding violence against women.* Washington, DC: National Academy Press. doi.org/10.1037/10204-000

Davis, K. C., Norris, J., George, W. H., Martell, J., & Heiman, J. R. (2006). Men's likelihood of sexual aggression: The influence of alcohol, sexual arousal, and violent pornography. *Aggressive Behavior, 32,* 581–589. doi:10.1002/ab.20157

Feldman, B. J., Masyn, K. E., & Conger, R. D. (2009). New approaches to studying problem behaviors: A comparison of methods for modeling longitudinal, categorical adolescent drinking data. *Developmental Psychology, 45,* 652–676. doi.org/10.1037/a0014851

Fisher, B. S., & Cullen, F. T. (2000). Measuring the sexual victimization of women: Evolution, current controversies and future research. *Measurement and Analysis of Crime and Justice, 4,* 317–390.

Gallagher, K. E., & Parrott, D. J. (2011). What accounts for men's hostile attitudes toward women? The influence of hegemonic male role norms and masculine gender role stress. *Violence Against Women, 17,* 568–583. doi:10.1177/1077801211407296

Gidycz, C. A., Orchowski, L. M., & Edwards, K. M. (2011). Primary prevention of sexual violence. In M. P. Koss, J. W. White, and A. Kazdin (Eds.), *Violence against women and children. Vol. 2, Navigating solutions* (pp. 159–180). American Psychological Association: Washington, DC.

Hall, G. C. N., DeGarmo, D. S., Eap, S., Teten, A. L., & Sue, S. (2006). Initiation, desistance, and persistence of men's sexual coercion. *Journal of Consulting and Clinical Psychology, 74,* 732–742. doi:10.1037/0022-006X.74.4.732

Kilpatrick, D. G., Resnick, H. S., Ruggiero, K. J., Conoscenti, L. M., & McCauley, J. (2007). *Drug-facilitated, incapacitated, and forcible rape: A national study. National Institute of Justice report (219181).* National Institute of Justice, Rockville, MD.

Knight, R. A., & Sims-Knight, J. E. (2004). Testing an etiological model for male juvenile sexual offending against females. *Journal of Child Sexual Abuse: Research, Treatment, & Program Innovations for Victims, Survivors, & Offenders, 13,* 33–55. doi:10.1300/J070v13n03_03

Koss, M. P., Abbey, A., Campbell, R., Cook, S., Norris, J., Testa, M., . . . White, J. (2007). Revising the SES: A collaborative process to improve assessment of sexual aggression and victimization. *Psychology of Women Quarterly, 31,* 357–370. doi:10.1111/j.1471-6402.2007.00385.x

Koss, M. P., & Gaines, J. A. (1993). The prediction of sexual aggression by alcohol use, athletic participation, and fraternity affiliation. *Journal of Interpersonal Violence, 8,* 94–108. doi:10.1177/088626093008001007

Koss, M. P., & Gidycz, C. A. (1985). Sexual Experiences Survey: Reliability and validity. *Journal of Consulting and Clinical Psychology, 53,* 422–423. doi:10.1037/0022-006X.53.3.422

Koss, M. P., Gidycz, C. A., & Wisniewski, N. (1987). The scope of rape: Incidence and prevalence of sexual aggression and victimization in a national sample of higher education students. *Journal of Consulting and Clinical Psychology, 55,* 162–170. doi:10.1037//0022-006X.55.2.162

Koss, M. P., & Oros, C. J. (1982). Sexual Experiences Survey: A research instrument investigating sexual aggression and victimization. *Journal of Consulting and Clinical Psychology, 50,* 455–457. doi:10.1037/0022-006X.50.3.455

Long, J. S. (1997). *Regression models for categorical and limited dependent variables.* Thousand Oaks, CA: Sage.

Lonsway, K. A., & Fitzgerald, L. F. (1995). Attitudinal antecedents of rape myth acceptance: A theoretical and empirical reexamination. *Journal of Personality and Social Psychology, 68,* 704–711. doi:10.1037/0022-3514.68.4.704

Malamuth, N. M., Addison, T., & Koss, M. P. (2000). Pornography and sexual aggression: Are there reliable effects and can we understand them? *Annual Review of Sex Research, 11,* 26–91.

Malamuth, N. M., Linz, D., Heavey, C. L., & Barnes, G. (1995). Using the confluence model of sexual aggression to predict men's conflict with women: A 10-year follow-up study. *Journal of Personality and Social Psychology, 69,* 353–369. doi:10.1037/0022-3514.69.2.353

Malamuth, N. M., Sockloskie, R. J., Koss, M. P., & Tanaka, J. S. (1991). Characteristics of aggressors against women: Testing a model using a national sample of college students. *Journal of Consulting and Clinical Psychology, 59,* 670–681. doi:10.1037/0022-006X.59.5.670

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100,* 674–701. doi:10.1037/0033-295X.100.4.674

Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26

years. *Development and Psychopathology, 14,* 179–207. doi:10.1017/S0954579402001104

Monson, C. M., & Langhinrichsen-Rohling, J. (2002). Sexual and nonsexual dating violence perpetration: Testing an integrated perpetrator typology. *Violence and Victims, 17,* 403–428. doi:10.1891/vivi.17.4.403.33684

Muthén, B. (2004). Latent variable analysis: Growth mixture modeling and related techniques for longitudinal data. In D. Kaplan (Ed.), *Handbook of quantitative methodology for the social sciences* (pp. 345–368). Newbury Park, CA: Sage. doi:10.4135/9781412986311.n19

Muthén, B., & Asparouhov, T. (2009). Multilevel regression mixture analysis. *Journal of the Royal Statistical Society, 172,* 639–657. doi:10.1111/j.1467-985X.2009.00589.x

Muthén, B., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research, 24,* 882–891. doi:10.1111/j.1530-0277.2000.tb02070.x

Muthén, B., & Shedden, K. (1999). Finite mixture modeling with mixture outcomes using the EM algorithm. *Biometrics, 55,* 463–469. doi:10.1111/j.0006-341X.1999.00463.x

Muthén, L. K., & Muthén, B. (1998–2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Author.

Nagin, D. (1999). Analyzing developmental trajectories: A semiparametric group-based approach. *Psychological Methods, 4,* 139–157. doi:10.1037/1082-989X.4.2.139

O'Brien, M., McCoy, T., Champion, H., Mitra, A., Robbins, A., Teuschler, H., . . . Durant, R. (2006). Single question about drunkenness to detect college students at risk for injury. *Academy of Emergency Medicine, 13,* 629–636. doi:10.1111/j.1553-2712.2006.tb01023.x

O'Malley, P. M., Bachman, J. G., Johnston, L. D., & Schulenberg, J. (2004). Studying the transition from youth to adulthood: Impacts on substance use and abuse. In J. S. House, F. T. Juster, R. L. Kahn, H. Schuman & E. Singer (Eds.), *A telescope on society: Survey research and social science at the University of Michigan and beyond* (pp. 305–329). Ann Arbor, MI: University of Michigan Press.

Prentky, R. A., & Knight, R. A. (1993). Age of onset of sexual assault: Criminal and life history correlates. In G. C. N. Hall, R. Hirschman, J. R. Graham, & M. S. Zaragoza (Eds.), *Sexual aggression: Issues in etiology, assessment and treatment* (pp. 43–62). Washington, DC: Taylor and Francis.

Rodgers, J. L. (2010). The epistemology of mathematical and statistical modeling. *American Psychologist, 65,* 1–12. doi:10.1037/a0018326

Roeder, K., Lynch, K. G., & Nagin, D. S. (1999). Modeling uncertainty in latent class membership:

A case study in criminology. *Journal of the American Statistical Association, 94,* 766–776. doi:10.1080/01621459.1999.10474179

Schulenberg, J., & Zarrett, N. R. (2006). Mental health during emerging adulthood: Continuity and discontinuity in courses, causes, and functions. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 135–172). Washington, DC: American Psychological Association. doi:10.1037/11381-006

Schumacher, J. A., Feldbau-Kohn, S., & Slep, A. M. S. (2001). Risk factors for male-to-female partner physical abuse. *Aggression and Violent Behavior, 6,* 281–352. doi:10.1016/S1359-1789(00)00027-6

Seto, M. C., & Barbaree, H. E. (1997). Sexual aggression as antisocial behavior: A developmental model. In D. M. Stoff, J. Breling, & J. Maser (Eds.), *Handbook of antisocial behavior* (pp. 524–533). New York, NY: John Wiley.

Swartout, A. G., Swartout, K. M., & White, J. W. (2011). What your data didn't tell you the first time around: Advanced analytic approaches to longitudinal analyses. *Violence Against Women, 17,* 309–321.

Swartout, K. M. (in press). The company they keep: How peer networks influence male sexual aggression. *Psychology of Violence*.

Swartout, K. M., Swartout, A. G., & White, J. W. (2011). A person-centered, longitudinal approach to sexual victimization. *Psychology of Violence, 1,* 29–40. doi:10.1037/a0022069

Swartout, K. M., Swartout, A. G., & White, J. W. (in press). Male trajectories of sexual aggression from adolescence through college: A latent class growth analysis. *Aggressive Behavior*.

Thompson, M. P., Koss, M. P., Kingree, J. B., Goree, J., & Rice, J. (2011). A prospective mediational model of sexual aggression among college men. *Journal of Interpersonal Violence, 26,* 2716–2734. doi:10.1177/0886260510388285

White, J. W., & Smith, P. H. (2004). Sexual assault perpetration and re-perpetration: From adolescence to young adulthood. *Criminal Justice and Behavior, 31,* 182–202. doi:10.1177/0093854803261342

Wood, W. (2000). Attitude change: Persuasion and social influence. *Annual Review of Psychology, 51,* 539–570. doi:10.1146/annurev.psych.51.1.539

Zawacki, T., Abbey, A., Buck, P. O., McAuslan, P., & Clinton-Sherrod, A. M. (2003). Perpetrators of alcohol-involved sexual assaults: How do they differ from other sexual assault perpetrators and nonperpetrators? *Aggressive Behavior, 29,* 366–380. doi:10.1002/ab.10076