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Latent profiles of risk among a community sample of men: Implications for sexual aggression

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Abstract

Of the proposed theoretical explanations for the perpetration of sexual assault, Malamuth's (1991) confluence theory remains one of the most widely tested. Further development of this theory has incorporated alcohol use into the original pathways of impersonal sex and hostile masculinity. This study uses data from a nationwide online survey ($n = 289$) to examine the relationship of these three risk factors to sexual aggression using person-oriented methods, specifically Latent Profile Analysis (LPA). Four statistically significant risk profiles were identified: Low Risk, Moderate Impersonal Sex, High Hostile Masculinity, and High on all Risk. All groups with elevated risk factors reported increased levels of sexual aggression. The High Hostile Masculinity and High on all Risk groups reported the highest levels of sexual aggression on all subscales. Implications for intervention and research are discussed.

Keywords

Confluence model; sexual assault; sexual risk behavior; alcohol; person-oriented methods

Latent profiles of risk among a community sample of men: Implications for sexual aggression

Despite decades of research and activism, incidence of sexual assault of women in the U.S. remains high, with 18% to 44% of women reporting some form of victimization in their lifetimes (Russell & Bolen, 2000; Tjaden & Theonnes, 1998). Young adulthood is the peak period of both victimization and perpetration (Bureau of Justice Statistics, 2006), which has resulted in a surplus of research that examines both within college students populations. College students are clearly at high-risk for sexual assault perpetration and victimization (Bureau of Justice, 2000); however, a substantial proportion of young adults do not attend college. The last census found that only 30.3% of individuals aged 25–39 had obtained a bachelor's degree (US Census Bureau, 2005). Thus, the need for research on community samples of men is strong, particularly due to the narrow age range and non-representative demographics of college students.

Additionally, strong theory-based understanding of sexual assault perpetration is needed to effectively prevent and intervene with at-risk individuals. One of the most widely-tested theories of sexual assault perpetration that has been proposed to date is the Confluence Model (Malamuth, Sockloskie, Koss, & Tanaka, 1991). Malamuth and colleagues postulated that two characteristics—impersonal sex and hostile masculinity—could lead to sexually aggressive behavior, but that the combination of the two would be most likely to lead to violence. This model has been replicated in multiple reports with diverse populations (e.g., Hall, Teten, DeGarmo, Sue, & Stephens, 2005; Martin, Vergeles, Acevedo, Sanchez, & Visa, 2005; Parkhill & Abbey, 2008).

The specific constructs used in testing the Confluence Model have varied. Hostile masculinity has been operationalized as rape myth acceptance, sexual dominance, adversarial beliefs about heterosexual relationships and misogyny (Hersh & Gray-Little, 1998; Lanier, 2001; Malamuth, 1986; Wheeler, George, & Dahl, 2002). Impersonal sex originally included age at first intercourse and number of intercourse partners, but has also included attitudes towards casual sex, frequency of masturbation, and pornography use (Malamuth et al., 1995; Malamuth, Addison, & Koss, 2000). The flexibility of the model shows the powerful salience of the central constructs in both pathways.

An important modification of the Confluence Model is the addition of alcohol (Parkhill & Abbey, 2008). Alcohol is involved in at least half of all sexual assaults (Abbey, 2002; Testa, 2002), thus its absence in Malamuth's model was a serious theoretical omission. Recently, Parkhill and Abbey tested a version of the Confluence Model with a third pathway for alcohol use in sexual situations (Parkhill & Abbey, 2008). Results showed that situational alcohol use independently predicted intoxicated, but not sober, sexual aggression. Surprisingly, sober and intoxicated assaults were uncorrelated; approximately one quarter of perpetrators had committed assaults both with and without alcohol. No interactions between hostile masculinity, impersonal sex, or alcohol were found. These findings confirmed the importance of alcohol in some assaultive situations, but left unanswered questions about how alcohol interacts or combines with the other components of the model.

Statistical Approaches

In most of the papers examining the Confluence Model, structural equation modeling (SEM) or path analysis has been employed to examine the "pathways" to sexual aggression. SEM is a correlation-based technique that involves partitioning variance based on the covariance matrix. It is one of a handful of so-called "variable-centered" techniques that describe relationships between variables of interest within a sample. In contrast, "person-oriented" techniques seek patterns or clusters of individuals based on selected variables (Bergman & Trost, 2006). Latent Profile Analysis (LPA) is a person-oriented method that tests for statistically significant groups of individuals based on differences using a set of predictors (Everitt, Landau, & Morven, 2001; Lanza, Flaherty, & Collins, 2003). Whereas SEM can speak to multivariate associations between predictors and an outcome of interest, LPA can test whether groups of individuals manifest the predicted attributes, such as impersonal sex and/or hostile masculinity, and how those different groups behave on an outcome of interest, such as sexual aggression.

As in other SEM reports, the "pathways" in the Confluence Model are referring to correlational variance pathways, as opposed to individual trajectories. Implicit in the Confluence Model, however, are predictions of groups of individuals that have a higher propensity for sexual violence. Specifically, individuals who reported either high hostile masculinity or high impersonal sex would report more sexual aggression. Most importantly would be the prediction that individuals with both high hostile masculinity and high impersonal sex would report the highest levels of sexual aggression. Individuals who do not report elevated levels of either constructs would be anticipated to report the lowest levels of aggression. In order to understand the individual consequences of high levels of these risk factors, the existence of these groups must be verified. Information about at-risk individuals, as opposed to information about variables, is essential to inform intervention programs.

The present study seeks to verify the conceptual model in the Confluence Model using LPA. In addition to hostile masculinity and impersonal sex, we included alcohol use when testing for significant groups of individuals. Group membership was used to predict sexual aggression as measured by the revised Sexual Experiences Survey (Koss et al., 2007), which provides results for different aggressive acts based on the use of tactics, such as coercion,

force, or alcohol-related impairment (Abbey, BeShears, Clinton-Sherrod, & McAuslan, 2004).

Methods

Procedure

Following IRB approval, invitations to participate in the survey were posted on Craigslist in the “Volunteers Wanted” section in 29 locations across the United States. Four additional nationwide ads were placed on Facebook. In order to increase the diversity of respondents, the text of the ads invited all single men over the age of 18 to participate in a survey about sexual decision making. Respondents were then screened based on the following eligibility criteria: unmarried, male, between ages 18 and 35, primarily heterosexual dating experiences, and some social drinking. Participants were compensated with a \$40 electronic gift card for their participation. The survey was delivered through the University of Washington’s Catalyst survey program. Participants were assured of confidentiality and given the option to decline any question.

1164 individuals completed the online screening information form. Of those, 521 were excluded because they were married, reported only homosexual experiences, were over the age cut-off, or were female. Of the 643 eligible respondents, 299 participants completed the survey. Of these 10 were later dropped from the analyses due to their age or their marital status. The final sample size was 289. All data were cleaned and prepared using SPSS 15.0; LPA analyses were conducted with MPlus 5.21.

The median income bracket of the final sample was \$31,000–40,999 per year, with 77.6% reporting an annual income under \$61,000. 14.8% of the sample had a high school diploma or less. 42.6% reported some college, 32.9% had a college degree, and the remainder had a trade school or graduate school degree. 46.0% were currently in school. 57.1% had a full time job, and 25.3% worked part-time. The sample was moderately ethnically diverse: 11.8% were Hispanic, 13.8% were Asian or Pacific Islanders, 8.3% were African American, 66.1% were Caucasian, and 6.6% were multiracial or other. The specific ages of participants were not recorded, but all were between the ages of 18 and 35.

Measures

Hostile masculinity was measured in two ways. The Adversarial Heterosexual Beliefs Scale (Lonsway & Fitzgerald, 1995) is a mean of 15 items ($M = 3.05$, $SD = 1.06$, $\alpha = 0.88$) that measures cynicism and suspicion about heterosexual relations in personal and work life (e.g., “In the work force, any gain by one sex means a loss for the other”). The Hostility to Women Scale was originally developed by Check and colleagues (1985). The version used here is the revised scale with ten items ($M = 2.61$, $SD = 0.98$, $\alpha = 0.87$; Lonsway & Fitzgerald, 1995) that taps resentment and mistrust towards women, particularly in romantic contexts (e.g., “Many times women flirt with men just to tease or hurt them”). Answers for both scales were given on a seven point Likert scale where 1 = Strongly disagree and 7 = Strongly agree.

Impersonal sex—Two scales were used to measure an impersonal or unrestricted orientation to sex. The first scale, Partners, was a mean-based scale assessing of the number of lifetime partners with whom respondents reported having oral, vaginal, or anal sex ($M = 5.38$, $SD = 3.61$, $\alpha = 0.89$). This scale is not a count, and the upper tail was truncated to reduce skew (0 partners = 1, 1 partner = 2, 2 partners = 3, 4 partners = 5, 5 partners = 6, 6 partners = 7, 7 partners = 8, 9 partners = 10, 10 partners = 11, 11–15 partners = 12, 16–20 partners = 13, 21–25 partners = 14, 26–30 partners = 15, 31–40 partners = 16, 41–50

partners = 17, 51–60 partners = 18, and more than 60 partners = 19). The second scale used was the Attitudes towards Casual Sex subscale from the Sociosexual Orientation Inventory (three items, $M = 5.50$, $SD = 2.31$, $\alpha = 0.79$; Simpson & Gangestad, 1991) that assessed the respondents' willingness to engage in sex outside of a committed relationship (e.g., "Sex without love is OK."). Answers were given on a nine-point Likert scale where 1 = Strongly disagree and 9 = Strongly agree.

Drinking habits were measured with a drinking calendar (Collins, Parks, & Marlatt, 1985). Respondents were asked to consider the number of drinks they had each day for a typical week. These answers were summed and divided by seven to compute an average number of drinks per day ($M = 2.76$, $SD = 1.67$, $\alpha = 0.81$).

Sexual aggression—Koss and colleagues recently reported an updated and revised version of the commonly used Sexual Experiences Survey (Abbey, Parkhill, & Koss, 2005). The measure for aggression (SES-A) reflects two components—acts and tactics—and was designed to assess an increased level of behavioral specificity, as well as to capture the full spectrum of unwanted sex from coercive to forced. Acts assessed were divided into four categories: 1) Fondling, kissing, touching; 2) Oral sex, anal sex, or penetration with an object or finger; 3) Attempted rape; 4) Completed rape. For each of these acts, respondents could report using different tactics: 1) Arguments or pressure; 2) Lies or false promises; 3) Guilt, sulking or anger; 4) Intoxication of the victim; 5) Some degree of physical force. All answers were given as 1 = never, 2 = one time, 3 = two times, and 4 = 3 or more times.

Data Analytic Method

LPA uses maximum likelihood estimation to determine the probabilities of mutually exclusive profiles, or groups, based on the variables of interest (Everitt et al., 2001; Lanza, et al., 2003). A categorical latent variable is estimated that distinguishes the profiles (Vermunt, 2004), and overall statistics that assess fit with each additional profile are produced and compared to determine the number of profiles that best fit the data. Probabilistic means for each profile of the indicator variables allows interpretation of the profiles produced. In most LPA studies that examine outcome variables, each case is assigned into the most likely profile, and means are tested using ANOVA or similar. However, assignment to profiles is probabilistic; ANOVA tests assume no classification error, and so are not the most appropriate tests to use (Nagin, 1999). Software is now available that allows for testing of covariates simultaneously with latent profile calculation (Muthén, 2007). This method employs the Wald test on the covariate means generated from a series of pseudo-draws from the posterior profile distributions. We used this technique to determine if profile membership was significantly related to sexual aggression measures.

Results

Model estimation was conducted by adding one profile at a time until estimation failed or an additional profile demonstrated no significant improvement. Up to six profiles were calculated, and the six-profile solution was disregarded because the matrix was non-positive definite. We examined multiple fit statistics to determine the most likely number of profiles, as there is no consensus on the single best indicator (Nylund, Asparouhov, & Muthén, 2007). Table 1 presents the results of these different fit statistics for the one- through five-profile solutions. The information criteria (AIC and BIC) are expected to decrease as the model improves. Both of these statistics decreased consistently through each of the five models tested. The Lo-Mendell-Rubin (LMR) compares the improvement in fit as an additional profile is estimated, and produces a p value that is used in determining if the improvement is statistically significant (Lo, Mendell, & Rubin, 2001). Improvement was

observed until the fifth profile was added. Finally, the bootstrap likelihood ratio test (BLRT), which uses bootstrapped sampling techniques to estimate the difference in log likelihoods when a new profile is added, again produces a p value. With these results, the BLRT showed a significant improvement with each additional group, however the fifth group generated inconsistent results that suggested local maxima. Taken together, these results suggested that the four-profile solution was optimal. Although entropy was not used as a criterion to determine the number of profiles, the entropy measure of the final four-group model was satisfactory, at 0.751. The average latent profile probabilities (shown in Table 2) were also satisfactory, and ranged from 0.825 to 0.941.

Means and standard deviations of the four profiles are shown in Table 2. The first profile, termed “Low All,” had the lowest scores on all measures, and comprised 24.8% of the sample. The second profile was low on hostile masculinity, average on drinking, but above average on measures of impersonal sex. This “Moderate Impersonal Sex” profile contained 33.1% of the sample. The third profile had the highest reported levels of hostile masculinity, and approximately average levels of impersonal sex and drinking. This group, termed “High Hostile Masculinity,” contained 31.4% of the sample. Finally, the fourth group had extremely high levels of impersonal sex and drinking, and levels of hostile masculinity slightly below the third profile. This “High All” group was the smallest, with only 10.7% of the sample. A visual presentation of z-scores for all measures used in LPA is presented in Figure 1.

All subscales of the SES-A showed significant omnibus tests of mean differences (see Table 3). The Low All group predictably had the lowest reported levels of all acts and tactics. The Moderate Impersonal Sex group was significantly higher than the Low All group on most acts, but only reported significantly higher coercive tactics, specifically lies/false promises and continual pressure. These two profiles were significantly lower than profiles 3 and 4 on all but one pair-wise comparison (Moderate Impersonal Sex did not differ from High All on the Use of Intoxication as a tactic). Although there was a trend for the High All group to report higher levels of aggression than the High Hostile Masculinity group, none of the pair-wise comparisons were significant.

Discussion

This study sought to use person-oriented methods to test whether the hostile masculinity and impersonal sex elements of the Confluence Model with the addition of alcohol use were correct in the prediction of groups with higher rates of sexual aggression. Significant differences for sexual aggression were found between groups, with the highest rates found among individuals who reported high levels of hostile masculinity with and without high drinking and impersonal sex. A group with elevated levels of impersonal sex only also reported more sexual aggression than a group low on all three factors, but well below the levels of the other two groups. This report provides strong support for the concepts of the Confluence Model, with the caveat that impersonal sex appears to be a less important factor for violence than hostile masculinity. The use of LPA instead of SEM in the present study confirms the existence of groups of aggressors, rather than mere variable associations. Specific conclusions and implications will be discussed with each group.

Low All

The profile with the lowest rates of risk factors predictably reported the lowest rates of sexual aggression on all measures. Surprisingly, this group comprised only one quarter of the sample, which was not recruited on the basis of risk for sexual assault. Additionally, this group did report some sexual aggression. This affirms that sexual aggression is to some degree normative within the US (Koss et al., 1994), and supports the continued need to build

awareness and provide universal prevention programming. Alternatively, there may be other variables important for sexual assault perpetration that are not included in this model, such as peer networks, like fraternities, that support violence (e.g., Loh, Gidycz, Lobo, & Luthra, 2005). Prevention efforts should continue to consider violence potential among those who display minimal impersonal sex, hostile masculinity, and drinking.

High Impersonal Sex

The profile reflecting high levels of impersonal sex and low levels of drinking and hostile masculinity was the largest group, containing a full third of the sample. The levels of sexual aggression reported were higher than Low All, and they were more likely to use coercive methods. The incidence of aggression within this group could be result of increased opportunities for sexual coercion, rather than predisposition. Alternative explanations of the impersonal sex “pathway” in the Confluence Model suggest that these men may be interested in sexual gratification at any cost (Kanin, 1967; Malamuth, 1991); this notion is belied, however, by their low endorsement of the force and intoxication tactics in the present study. The number of partners this group reported was above the mean, but not substantially—less than half a standard deviation. Taken together, these aspects likely reflect some combination of increased opportunities and willingness to coerce. Although we did not examine cognitive factors around risk-taking, it is possible that this group has a lower appraisal of risk in impersonal sex; these individuals may not view sex as having negative potential consequences to the same extent as other groups, particularly the Low All group. Important interventional implications for this group would be the need to reduce risks associated with promiscuous sex, particularly considering the transmission of HIV and other sexually transmitted illnesses. Additionally, interventions would need to address coercive tendencies of these individuals, although more research is needed to explore coercion in impersonal sexual situations (DeGue & DeLillo, 2005).

High Hostile Masculinity

This was the second largest group, and these individuals endorsed the highest levels of hostility to women and adversarial heterosexual beliefs. Sexual aggression reported was statistically equivalent—although slightly lower—to the High All group on every measure. This group verifies the existence of individuals who do not engage in risky behaviors (impersonal sex and drinking), but perpetrate a great deal of assaults. Although this group is predicted by the Confluence Model, it is somewhat contradictory to other research that suggests strong connections between risk-taking and sexual assault (e.g. Raj et al., 2006). Interventions with these individuals would not need to reduce risky behaviors like drinking or promiscuous sex, but should instead work to change attitudes towards women.

High All

These individuals reported high levels of all risk constructs, and not unexpectedly reported high sexual aggression. Aggression counts were typically slightly higher than the High Hostile Masculinity group, although no significant differences were found. Additional statistical power would be necessary to verify if these two groups are equivalent for assaultive tendencies. This group verifies the combinational component of the Confluence Theory, and suggests that the highest risk individuals on hostile masculinity and impersonal sex are also using alcohol at very high rates—an average of more than six drinks a day. Interventions with this group would need to address all aspects of risk—impersonal sex, alcohol use, and hostile attitudes towards women.

Limitations and Conclusions

The primary limitation of this study is the self-reported nature of the survey, although this remains the most useful method to study sexual assault perpetration, as official records are well known to be vastly lower than actual rates (Bureau of Justice, 2002). Although this sample was moderately diverse in terms of education, income, and geography, recruitment through online venues is relatively new and likely to select for certain segments of the population. An additional limitation is that alcohol variables were studied in general, and not specifically in the situations involving assault.

Despite these limitations, this study has considerable strengths. It is the first report to verify the theoretical basis of the Confluence Model using a model-based technique to investigate the prevalence of groups of individuals manifesting the hypothesized characteristics. It provides strong evidence that the constructs in the model—impersonal sex and hostile masculinity—have independent contributions to sexually aggressive tendencies. Additionally, we report the novel finding that individuals with both risk factors also exhibit the highest alcohol use as well as the highest levels of sexual aggression. Taken together, these findings have strong implications for prevention and intervention. Specifically, they highlight the need to target interventions to address specific combinations of risk, as well as illustrate the continuing need for universal prevention programs that address the less severe forms of violence perpetrated by low risk groups. Future research that further advances our knowledge of the specific risk profiles underlying men's likelihood of sexual assault perpetration are critical to the development of targeted, tailored, and effective sexual assault prevention efforts.

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Figure 1.
Z-scores of variables used to create latent profiles

Table 1

Fit statistics by number of profiles in tested model

	AIC	BIC	LMRT	BLRT	Entropy
1-profile	5591.17	5627.83	NA	NA	
2-profile	5437.74	5496.41	160.70 ($p<.0001$)	138.99 ($p<.0001$)	0.778
3-profile	5371.33	5382.23	76.17 ($p=.0035$)	72.91 ($p<.0001$)	0.799
4-profile	5327.94	5341.81	53.807 ($p=.0108$)	55.39 ($p<0.0001$)	0.751
5-profile	5315.92	5332.76	23.33 ($p=.4786$)	55.56 ($p<.0001$)	0.758

Table 2

Profile group descriptions

	Group:			
	Low all	Moderate impersonal sex	High hostile masculinity	High all
Latent profile counts	71.63	95.74	90.77	30.86
Latent profile proportions	24.8%	33.1%	31.4%	10.7%
Average latent profile probabilities	0.835	0.825	0.905	0.941
Means (<i>S.E.</i>):				
Hostility to women	2.79 (0.19)	2.28 (0.12)	3.88 (0.10)	3.59 (0.19)
Adversarial heterosexual beliefs	2.16 (0.14)	1.88 (0.08)	3.54 (0.11)	3.19 (0.16)
SOI attitudes	3.10 (0.43)	6.53 (0.33)	5.97 (0.28)	6.55 (0.39)
Number of partners	2.85 (0.29)	6.00 (0.56)	5.62 (0.47)	8.53 (0.83)
Drinking habits	1.59 (0.09)	2.47 (0.17)	2.69 (0.19)	6.32 (0.37)

Table 3

Sexual Experiences Survey for Aggressive Acts: Average counts for groups

	Low all	Moderate impersonal sex	High hostile masculinity	High all	χ^2
Forced act:					
Fondle/kiss	0.63 ^a	1.24 ^b	2.35 ^c	2.48 ^c	12.98**
Oral sex	0.24 ^a	0.55 ^b	1.47 ^c	1.65 ^c	14.38**
Attempted intercourse	0.36 ^a	0.70 ^a	1.42 ^b	1.67 ^b	11.43**
Intercourse	0.22 ^a	0.56 ^b	1.38 ^c	1.45 ^c	12.88**
Tactic:					
Physical force	0.04 ^a	0.04 ^a	0.64 ^b	0.54 ^b	18.04***
Intoxication	0.12 ^a	0.27 ^{a, b}	1.00 ^c	0.77 ^{b, c}	12.35**
Guilt	0.30 ^a	0.79 ^b	1.46 ^c	1.57 ^c	9.67*
Lies	0.39 ^a	0.97 ^b	1.55 ^c	2.17 ^c	14.23**
Pressure	0.53 ^a	0.77 ^a	1.69 ^b	1.70 ^b	10.82*
Total SES-A	1.45 ^a	3.05 ^b	6.62 ^c	7.26 ^c	14.21**

Note: Entries with different superscripts are significantly different at $p < .05$.