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Predicting Sexual Aggression: The Role of Pornography in the Context of General and Specific Risk Factors

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The main focus of the present study was to examine the unique contribution (if any) of pornography consumption to men's sexually aggressive behavior. Even after controlling for the contributions of risk factors associated with general antisocial behavior and those used in Confluence Model research as specific predictors of sexual aggression, we found that high pornography consumption added significantly to the prediction of sexual aggression. Further analyses revealed that the predictive utility of pornography was due to its discriminative ability only among men classified (based on their other risk characteristics) at relatively high risk for sexual aggression. Other analyses indicated that the specific risk factors accounted for more variance in sexual aggression than the general risk factors and mediated the association between the general risk factors and sexual aggression. We illustrate the potential application of the findings for risk assessment using a classification tree. Aggr. Behav. 33:104–117, 2007. © 2006 Wiley-Liss; Inc.

INTRODUCTION

This study is part of a line of research, particularly that pertaining to the Confluence Model of Sexual Aggression, designed to identify the factors predicting sexually aggressive behavior among men. In particular, we focus here on whether heavy consumption of pornography may be a risk factor for some individuals and not for others. The term pornography is used here to refer to sexually explicit media designed to sexually arouse the consumer without any pejorative meaning necessarily intended.[1] In order to identify the individual differences that may interact with pornography to increase the likelihood of sexual aggression, we shall now turn to review some of the major predictors of sexual aggression.

Prediction of Sexual Aggression

The literature on the prediction of sexual aggression may be organized according to how sexual aggressors are identified: Based on convicted sexual crimes or based on self-report data from men in the general population. Research relying on self-report data of non-incarcerated men has mainly focused on relatively "specialized" characteristics specifically associated with the incidence of sexual aggression, such as attitudes supporting sexual aggression, hostility toward women, dominance as a motive for sexual aggression, impersonal sexuality, and heavy consumption of pornography. This literature, though, has included to a lesser degree some factors that might be considered more general risk factors, such as delinquent tendencies in adolescence. Meanwhile, the literature that examines convicted sexual aggressors has focused predominantly on more

[1]Although research indicates that important distinctions need to be made between various types of pornography, it is difficult in research focusing on consumption in naturalistic settings to meaningfully distinguish among the various types of pornography usage. Typically, sexually explicit magazines and other media contain a variety of types of pornography that consumers attend to. Since research has indicated that if distinctions are made, the sexually violent content has more powerful effects, the fact that we are assessing consumption generally without such distinctions probably "stacks the cards" against finding a significant effect. If significant associations are found, therefore, it is particularly likely that an even stronger association would be found with sexually violent content only [for a review see Malamuth et al., 2000].

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general characteristics that relate to a broader range of antisocial behaviors, including impulsivity and callousness [for a more detailed description, see Malamuth, 2003]. These two spheres of literature on sexual aggression have developed rather independently, examining seemingly different characteristics in samples of criminals and non-criminals.

Non-Criminal Sexual Aggressors

The "Confluence Model" of sexual aggression was originally developed by Malamuth et al. in order to condense the large number of correlates of sexual aggressive behavior. Factor analyses showed that these correlates could be meaningfully organized into two main clusters of characteristics paths labeled "Hostile Masculinity" (HM) and "Impersonal Sex" (IS) [Malamuth et al., 1991]. The HM Path is described as a personality profile combining two inter-related components: (a) an insecure, defensive, hypersensitive, and hostile-distrustful orientation, particularly towards women, and (b) sexual gratification from controlling or dominating women. The IS pathway is characterized by a promiscuous, non-committal, game-playing orientation towards sexual relations, which is statically predicted by certain early familial aggression and adolescent delinquency. Moreover, it has been shown that the interaction of these two clusters or "paths" is highly predictive of sexually aggressive behavior[2] in both cross-sectional and longitudinal prediction [Dean and Malamuth, 1997; Malamuth et al., 1995, 1991]. These findings have been successfully replicated in both the United States [e.g., Wheeler et al., 2002] and in other countries [e.g., Lim and Howard, 1998; Martin et al., 2005]. Both HM and IS were assessed in the present study.

Criminal Sexual Aggressors

Studies of criminal sexual aggressors seeking to identify their attributes [e.g., Prentky and Knight, 1991] have often emphasized characteristics generally associated with antisocial criminals, such as "lifestyle impulsivity" [Prentky et al., 1995]. In keeping with this emphasis, Hare et al. [2000] argued that the construct of psychopathy might be useful for the study of sexual aggressors as well as other criminals. The Psychopathy Checklist-Revised (PCL-R) scale [Hare et al., 1990] has been used with noted success in samples of incarcerated men to assess prototypical characteristics of psychopathy [Harpur et al., 2002]. In a study by Porter et al. [2000], it was found that 35.9% of rapists and 64% of rapists/child molesters scored high (30 or above) on the PCL-R scale of psychopathy. Several of the key characteristics measured by the PCL-R scale [Hare et al., 1990] were assessed in the present study: grandiosity and arrogance, lack of empathy, and short-temperedness or impulsive irritability.

Similar personality characteristics reflecting "callousness and lack of emotionality" have also been emphasized by Knight and Sims-Knight [2003, 2004] as important predictors of sexual aggression in non-criminal populations. These investigators have argued that there is a need to add to the Confluence Model a third path reflecting such personality characteristics and have interpreted their data using samples of adult and juvenile offenders as well as community samples as showing that the three-path model better predicts sexual aggression than the Confluence two-path model. However, their results actually show that only two paths have direct links to sexual aggression and that the characteristics associated with Callousness/Unemotional (which we label General Hostility) may, as elaborated upon below, be considered "antecedents" that only have indirect links to sexual aggression mediated by characteristics already included in the Confluence Model.

Integrating Criminal and Non-Criminal Samples

Malamuth [2003] has recently sought to integrate the findings of these two lines of research by arguing that incorporating both general antisocial characteristics and characteristics specifically used to predict sexual aggression can most successfully statistically predict which men are sexually aggressive. This approach is in contrast to those arguing that sexual aggression is essentially but one manifestation of general antisocial characteristics and that there is little need to incorporate any relatively "special" factors particularly relevant to sexual aggression [e.g., Felson, 2002; Lussier et al., 2005]. The Hierarchical-Mediational Confluence (HMC) model described by Malamuth [2003] incorporates relatively specific predictors associated with sexual aggression, including HM, IS, and Pornography use, as well as general antisocial characteristics associated with psychopathy, including grandiosity and arrogance, lack of empathy, and short-temperedness or impulsive irritability. The HMC model

[2]The Confluence Model predicts that while each of the paths may show a "main effect" on sexual aggression, the interaction is crucial to the occurrence of such aggression. In particular, it has been emphasized that increased Impersonal Sex alone is not sufficient to produce increased sexual aggression [e.g., Malamuth, 1998].

[Malamuth, 2003] proposes two hypotheses that will be tested in the present study: (1) The combination of general and specific characteristics offers the best statistical prediction of sexual aggression, and (2) that HM mediates the relationship between General Hostility and sexual aggression. Although some previous Confluence Model studies have incorporated aspects of general antisocial characteristics [e.g., Lim and Howard, 1998; Malamuth et al., 1995], the present study will be the first to systematically test the role of pornography consumption within the predictions of the more developed HMC model described by Malamuth [2003].

Pornography and Sexual Aggression

The scientific literature on the relationship between pornography and sexual aggression has been summarized in various meta-analyses [Allen et al., 1995a,b, 2000; Oddone-Paolucci et al., 2000] and integrative summaries [e.g., Gunter, 2002; Malamuth, 2001]. As summarized by Ramasubramanian and Oliver [2003], these meta-analyses have generally reported that greater exposure to pornography (both violent and non-violent) is associated with increased acceptance of violence against women and aggression against women. Although experimental research that systematically separates the effects of violent vs. non-aggressive pornography generally indicates that the former has negative effects but the latter may not [e.g., Donnerstein and Linz, 1998], there is substantial evidence that in "the real world," even non-aggressive pornography may be associated with increased risk for sexual aggression [Gunter, 2002]. However, as elaborated upon by Malamuth et al. [2000], the actual number of studies that have investigated the association between pornography use and sexual aggression in naturalistic settings has been small, and while they generally indicate significant correlations, there have been some conflicting findings.

Any causal interpretation of correlational data must, of course, consider the possibility that pornography may be a spurious "marker" for other risk factors. For example, more generally hostile, antisocial individuals may be more likely to use aggression in sexual interactions and may also be drawn to pornography due to its impersonal opportunity to exert control over a member of the opposite sex. Therefore, any correlation between sexual aggression and pornography use may be fully explainable by a "third variable" such as generally hostility. Malamuth et al. [2000] addressed such a possibility to some degree when they demonstrated that even when the Confluence Model predictors of sexual aggression are considered in the equation, pornography remains a significant predictor of sexual aggression.[3] Using a large national representative sample of men in any form of post high school educational institution, this study showed that for those men who had high levels of HM and IS, the addition of high pornography consumption as a risk factor dramatically increased the likelihood of sexual aggression. In contrast, for men who had low risk for committing sexual aggression based on these factors, there was little increased risk even if the man was a heavy pornography consumer. Although these investigators found that pornography consumption was predictive of sexual aggression after controlling for the risk factors of the Confluence Model, they did not control for a certain set of critical factors, which may be responsible for a spurious association between pornography consumption and sexual aggression. The factors we are referring to are the components of psychopathy or general hostility/antisociality, which have been shown to predict sexual aggression within the criminal population and which, as noted above, various researchers are increasingly positing as sufficient to explain sexual aggression. Thus, our third but most important hypothesis was that the conclusions of Malamuth et al. [2000] regarding pornography association with sexual aggression would remain viable some of the key factors associated with General Hostility (or Psychopathy or Callousness/Unemotional construct) were also included in the analyses.

METHOD

Participants

A sample of 102 male college students from an Introductory Psychology course at the University of California, Los Angeles completed the survey in fulfilment of course requirements. Participants were recruited to participate in a general survey study and

[3]A key aspect of the Confluence Model in contrast to other approaches pertaining to sexually explicit media content is that this model emphasizes the importance of examining each variable's impact in interaction with other key factors. Whereas other approaches typically examine the amount of variance explained by each variable alone, the Confluence Model emphasizes that this is an incorrect strategy, and that no variable may be expected to explain much variance and can in fact have opposite effect depending on what other variables it may combine with. The Confluence Model emphasizes that relatively powerful association between consumption of sexually explicit media and aggression should only be expected when other key risk factors are also present.

signed consent forms indicating that the information requested may be of a sensitive nature and would be kept completely anonymous. The questionnaires were completed in small groups ranging from about three to ten persons. After completing the questionnaire, participants placed it directly into a sealed box and were assured that the box would not be opened until a considerable number of questionnaires had been deposited there, so that their anonymity could be guaranteed.

Measures

The survey, entitled "Sociosexuality Survey," included a large number of items, with accompanying five–seven-point scales. These items either included full versions of scales used in previous research or selected items, based on the findings of previous studies. Most of the constructs assessed by using the scales described below replicated previous assessments used in research on the Confluence Model of sexual aggression (see Malamuth et al. [1991, 1995] for a review of the theoretical conceptualizations that justify the use of these scales). The constructs assessed were characteristics of the "HM," and "IS" paths. We describe below the measures included in this assessment.[4]

I. *Hostile Masculinity*. In keeping with earlier research, the HM construct was created by summing the *z*-scores of the following three measures:

   1. *Attitudes supporting violence against women*. Burt [1980] theorized that certain attitudes play an important role in contributing to sexual aggression by acting as psychological releasers that turn off social prohibitions against injuring others. Three scales developed by Burt [1980] were used:

      a. *Acceptance of interpersonal violence scale for males* (AIV) (six items). This scale measures attitudes condoning the use of force in relationships (Burt, 1980]. Established standardized α reliability estimates for this relatively brief scale have consistently been reported to be about .60 [e.g., Burt, 1980; Malamuth, 1986].

      b. *Rape Myth Acceptance Scale for Males* (RMA) (five items). This scale measures the degree to which a person believes the false information concerning rape (i.e., "Women who get raped while hitchhiking get what they deserve"). Reliability assessments for this scale have consistently yielded a standardized α similar to the .88 initially reported by Burt [1980].

      c. *The Adversarial Sexual Beliefs Scale* (ASB) (10 items). This scale assesses the degree to which respondents perceive male and female relations to be "fundamentally exploitative" [Burt, 1980; p 218]. Responses are given on a seven-point scale. Burt [1980] reported an α score of .80 for this scale, which is very similar to that obtained in many other studies.

   2. *Hostility Toward Women Scale* (HTW) (10 items). The HTW scale assesses the respondent's degree of hostility specifically toward women. We selected these items from the original 30 items version of this scale. Previous research has shown high reliability for the full scale as well as for selected items from this scale [Check, 1985; Check et al., 1985]. For example, the α reliability coefficient reported for the 21 item version of this measure is .91 [Malamuth et al., 1995].

   3. *The Sexual Dominance Scale* (DOM). The Sexual Dominance scale is part of the more general Sexual Functions Inventory [Nelson, 1979] that asks respondents the degree to which various feelings and sensations are important to them as motives for sexual behavior. The subscale assessing dominance (eight items) refers to the degree to which feelings of control over one's partner motivate sexuality (e.g., "I enjoy the conquest"). Responses were given on a 7-point scale. The α reliability coefficient reported for this measure has typically been very similar to the .77 reported by Malamuth et al. [1995].

II. *Impersonal Sex*. The IS pathway has been characterized by association with delinquent peers, an impersonal orientation to sex that enables gratification from coercive sex, and having many sexual partners. Similar to previous research [e.g., Malamuth et al., 1991, 1995; Martin et al., 2005; Wheeler et al., 2002] the IS construct was computed by summing the *z*-scores of the following three measures:

[4]The data for this sample were retained at the level of the scales rather than individual items, so we cannot compute alpha coefficients for this particular sample. However, we report established reliability estimates. Such a report is recommended by Cronbach [2005] who notes that "Little interest attaches to the consistency among scores on a limited set of items and a particular group of people" (p 18).

1. *Impersonal Sex* (IS). The measurement of IS consists of the following two questions, which were developed to assess an individual's personal or impersonal orientation towards sex [Malamuth et al., 1995]. Two questions were rated on a five-point scale ranging from "never" to "every day": "How often do you become sexually stimulated when you see an attractive woman whom you do not know?" and "How often do you masturbate?" Although there have been relatively few items used in these assessments and correspondingly low reliability estimates have been obtained (e.g., Malamuth et al. [1995] reported an α coefficient of .33), the construct is central to the model and IS scores has performed as predicted in previous analyses as part of the interaction with HM [e.g., Malamuth et al., 1995].
2. *Sex Drive* (SD), five items. These assessments were included to assess high sex drive in the context of an IS orientation. The construct of sexual drive has been particularly emphasized by Ellis [1989, 1991] as a key predictor of sexual aggression.

   Four items were adapted from the Sexual Preoccupation subscale of the Sexuality Scale developed by Snell and Papini [1989], and included such questions as: "How often do you think about sex?" One item that focused on mutually consenting sex was taken from a scale developed by Greendlinger and Byrne [1987]: "How often do you have mutually consenting intercourse with a woman?"

3. *Delinquency* (DQ), four items. The DQ variable was composed of reports of childhood and early adolescent delinquent behavior. In keeping with Malamuth et al. [1995], this measure shows a strong relationship with early sex experience, which shows a strong relationship with sexual aggression, and sexual promiscuity. The established Cronbach's α reliability coefficient reported for the 17-item version of this measure has generally been about .80 [e.g., Malamuth et al., 1995].

III. *General Hostility*. Based on research with criminal samples and related research with non-criminals [see Malamuth, 2003], the following measures were used to assess characteristics associated with general antisocial behavior and often encompassed within the construct of psychopathy. However, recent research clearly indicates that there is no single taxon underlying these characteristics encompassed with the construct of psycopathy and the Hare's scale typically used to assess it [e.g., Guay et al., 2005]. The characteristics assessed here were included within what was labeled the "General Hostility" Constellation and are similar to those used by Knight and Sims-Knight [2003, 2004] in their assessment of the construct of Callousness/Unemotional personality characteristics:

1. *Impulsive Irritability Scale*, nine items. The irritability instrument was developed primarily for research on individual differences in reacting impulsively or rudely to slight provocations or disagreements, particularly the manifestation of impulsive aggression [Caprara et al., 1985]. Item examples include: "Sometimes when I am angry I lose control over my actions," "I am often in a bad mood," "I easily fly off the handle with those who don't listen or understand," "I often feel like a powder keg ready to explode." In keeping with other studies, Caprara et al. [1985] reported the established α coefficient for the irritability scale as .81.
2. *Negative Masculinity Scale*, 20 items. Spence et al. [1979] scale measures self-centeredness. Among men who display high orientation towards self, the link between the risk characteristics and sexual aggression is strong [Malamuth et al., 1995]. Item examples include: "I feel that 'I'm the greatest' and better than other people," and "I am a self-centered person." This measure has considerable overlap with assessments of a narcissistic personality [Malamuth, 2003]. Although this measure has formerly been included in the HM composite, based on the psychopathy conceptualization and the use of it in Knight and Sims-Knight [2003, 2004] we included it here as part of the General Hostility construct. The Cronbach's α coefficient reported for the Negative Masculinity measure is .79 [Malamuth et al., 1991], which is similar to that found in various other studies.
3. *Empathic Concern* (EC) is a subscale of the Interpersonal Reactivity Index (IRI) [Davis, 1983]. The IRI consists of four 7-item subscales, each of which measures a separate aspect of the global concept of empathy. Only the EC subscale was deemed directly relevant in the present study. The EC scale assesses feelings of warmth, compassion, and concern

for others (e.g., "I often have tender concerned feelings for people less fortunate than me."). Consistent with other studies, Davis [1980] reported the standardized α coefficient for EC for males as .68.

IV. *Pornography Consumption*. Frequency of pornography use was assessed by self-reported frequency of consumption of *Playboy*, *Penthouse*, and *Hustler* magazines. This form of mass media was chosen to replicate and extend the findings of Malamuth et al. [2000]. Although there are now many other media for the distribution of pornography, magazines constitute about a third of pornography sales [Ackman, 2001] and reach a diverse segment of the population, according to demographic profiles provided by *Playboy* and *Penthouse*.

Participants indicated on a 5-point scale ranging from "never" to "every issue" how often they read from a list of 15 magazines. Three of these were the sexually explicit magazines mentioned above. This procedure of embedding the assessment of pornography consumption with a broader survey of media use was used so as not to make salient the focus on pornography. Between the two extremes of "never" and "every issue," the intermediate labels indicated "rarely," "sometimes," and "often." Participants' responses were averaged together to create a single pornography score.

V. *Sexual Aggression*. *Sexual Experiences Survey for Males* (SES) (10 items). The dependent measure of this scale used the "perpetrator" version of this questionnaire [Koss and Dinero, 1988; Koss and Gidycz, 1985; Koss and Oros, 1982]. It asks male participants to report whether they have engaged in various sexual behaviors; specifically, it asks males to report their history of sexual aggression, including coercive and assault sexual behaviors legally within the definition of rape, attempted rape, and sexual harassment. The SES has been previously tested and shown to have good internal consistency (Cronbach's α .89 for men), test–retest reliability ($r = .93$), and external validity established through face-to-face interviews (Pearson $r = .61$, $P < .001$) [Koss and Gidycz, 1985]).

Participants in this study were asked how many times they had engaged in each act, and responded on a six-point scale ranging from "0 times" to "more than 4 times." This response format differs from the original dichotomous format used in Malamuth et al. [1995], and was intended to yield more sensitive differentiation in the range of sexual aggression. Various research studies have supported the validity of such reports with the type of anonymous procedures used in the present study and suggested that relevant associations with other measures are not primarily due to social desirability biases [e.g., Meston et al., 1998]. Participants' responses were averaged together to create a single SES score.

RESULTS

Correlational Analyses

The overall pattern of intercorrelations, presented in Table I, indicates that most of the predictor variables correlated significantly with the outcome variable of sexual aggression. The variable of particular focus in this research, pornography consumption, was strongly correlated with sexual aggression. The magnitude of this correlation is relatively high but similar to that obtained in some other studies and within the range that may be expected based on the national representative sample used by Malamuth et al. [2000].

One noteworthy measure that was not significantly correlated with sexual aggression was the measure of IS, which has also shown weak simple correlations in some previous research [e.g., Malamuth et al., 1995], although theoretically this measure is not expected to predict sexual aggression by itself [e.g., Malamuth, 1998].[5] Of the variables representing General Hostility, Negative Masculinity was significantly correlated with sexual aggression, but neither EC nor Impulsive Irritability showed significant simple correlations. The measure of Sex Drive by itself was also not significantly correlated with sexual aggression, which is also consistent with previous findings [e.g., Malamuth et al., 1995].

Factor Analyses

Although the composites created below were constructed a priori to be consistent with previous

[5]Despite some limitations of the IS assessment in this and some previous samples, the Confluence Model also replicated successfully in regression analyses in which HM and IS were the only predictors in the model. HM independently accounted for 29% of the variance, and the interaction between HM and IS accounted for an additional 4.5% of the variance for a total of 34% of the variance ($P < .05$).

TABLE I. Intercorrelations Among Predictor and Outcome Variables

	Correlations												
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Sexual aggression	1	.425**	−.137	.097	.329**	.542**	.344**	.383**	.482**	.315**	−.043	.065	.477**
2. Delinquency		1	−.192	.204	.239*	.412**	.402**	.437**	.314**	.304**	−.061	−.003	.345**
3. Impersonal sex			1	.202*	−.136	−.174	.016	−.114	−.201*	−.093	.264**	.092	−.119
4. Sex drive				1	−.025	.162	.087	−.072	−.032	.021	.030	−.119	.113
5. Hostility towards					1	.388**	.472**	.593**	.461**	.579**	−.309**	.460**	.266**
6. Acceptance of						1	.563**	.574**	.703**	.294**	−.162	.073	.345**
7. Sexual dominance							1	.544**	.482**	.476**	−.218*	.290**	.473**
8. Adversarial sexual								1	.614**	.455**	−.252*	.243*	.318**
9. Rape myth acceptance									1	.290**	−.240*	.001	.337**
10. Negative masculinity										1	−.324**	.403**	.282**
11. Empathic concern											1	−.138	−.107
12. Irritability												1	.161
13. Pornography													1

*Correlation is significant at the .05 level (2-tailed).
**Correlation is significant at the .01 level (2-tailed).

literature, we examined the underlying dimensionality of these scales using principle axis factor analyses. The extracted factor for the General Hostility items explained 38% of the variance, with item loadings of .439 for Irritability, .350 for Low EC, and .905 for Negative Masculinity. We considered these loadings to be high enough to justify collapsing these items into one scale. The extracted factor for the IS items explained 19% of the variance with item loadings of .487 for IS, .577 for Sex Drive, and .092 for DQ. Although the loading for DQ was particularly low, in order to be consistent with a substantial number of previous studies (see description in method section), we retained these three variables in the composite of IS.[6] Using the Kaiser criterion to extract as many factors as there are eigenvalues greater than 1, the five HM items produced one factor which accounted for 54% of the variance, with item loadings of .805 for ASB, .628 for HTW, 769 for AIV, .788 for RMA, and .680 for Dominance. These loadings are high enough to consider the items unidimensional.

z-scores of the items for each scale were summed together to construct three composite scores of General Hostility, HM, and IS.

Linear Regression: Model Comparisons

The analyses presented in this section are relevant to the first and third hypotheses described above. To reiterate, the first hypothesis was that the combination of general and Confluence-specific[7] characteristics offers the best statistical prediction of sexual aggression whereas the third and most important hypothesis was that pornography consumption would significantly predict sexual aggression even after including both general and other specific factors in the predictive equation. We tested three linear regression models consisting of: General Factors only, Specific Factors only, and both General and Specific Factors. Table II presents data for the three regression equations. The General Factors only model consisted of General Hostility and accounted for 4% of the variation in sexual aggression. This model was a marginally significant predictor of sexual aggression ($F = 3.924$, $P = .050$). The Specific Factors only model consisted of HM, IS and Pornography as predictors of sexual aggression. All interactions were then also allowed to "free-enter" stepwise using F probability criteria of .05 for entry and .10 for removal. The final Specific Factors model accounted for 52% of the variation in sexual aggression, and was a significant predictor of sexual aggression ($F = 25.972$, $P < .001$).

Finally, the model composed of both general and specific factors was tested. General Hostility, HM, IS, and Pornography were "force-entered" into the linear regression equation, and all lower order interactions were allowed to "free-enter" stepwise using F probability criteria of .05 for entry and .10 for removal. The combined General and Specific

[6]In light of the low loadings on this composite, we also conducted some of the regression analyses reported below with certain key individual measures rather than using the composite. As reported below, the conclusions did not change.

[7]These will be referred to below as the "Specific Factors" and "General Factors" models.

TABLE II. Multiple Regression Analyses on Sexual Aggression Using General Factors, Specific Factors, and the Combination of General and Specific Factors as Predictors

Regression results								
Model						Overall prediction equation		
Variable:	*b*	SE	β	*t*	*p*	R^2	*F*	*p*
General factors								
General hostility	.043	.022	.194	1.981	.050	.038	3.924	.050
Specific factors								
Hostile masculinity	.046	.011	.378	4.085	.000	—	—	—
Impersonal sexuality	.019	.032	.053	.607	.545	—	—	—
Pornography	.219	.067	.297	3.250	.002			
Hostile masculinity × pornography	.071	.012	.475	5.741	.000	.517	25.972	.000
General and specific factors								
General hostility	−.023	.021	−.104	−1.101	.274	—	—	—
Hostile masculinity	.070	.012	.570	5.787	.000	—	—	—
Impersonal sexuality	.035	.033	.096	1.068	.288	—	—	—
Pornography	.222	.067	.302	3.302	.001	.361	13.703	.000
Hostile masculinity × pornography	.070	.012	.471	5.684	.000	.522	20.963	.000
General hostility × pornography	−.067	.028	−.202	−2.401	.018	.549	19.297	.000
Hostile masculinity × imp. sexuality	.013	.006	.148	2.046	.044	.569	17.693	.000
Final model	—	—	—	—	—	.569	17.693	.000

Factors model accounted for 57% of the variation in sexual aggression and was a significant predictor of sexual aggression ($F = 17.693$, $P < .001$). HM and Pornography were significant main predictors ($\beta = .429$, $P = .000$; $\beta = .302$, $P = .001$, respectively). The interaction between HM and Pornography was significant ($\beta = .471$, $P = .000$), as was the interaction between General Hostility and Pornography ($\beta = -.202$, $P = .018$).[8] The interaction between HM and IS was also significant ($\beta = .148$, $P = .044$).

To reiterate, the General Factors model accounted for only 4% of the variance in sexual aggression, while the Specific Factors model accounted for 52% and the General and Specific Factors model accounted for 57%. An *F*-test of the increment change in R^2 revealed that the combined General and Specific factors model accounted for significantly more variation in sexual aggression than the General Factors model, $F\ (6, 96) = 19.67$, $P < .01$, and the Specific Factors model, $F\ (3, 96) = 3.647$, $P < .05$. These data therefore support the first hypothesis described above. The fact that Pornography entered significantly both as a main effect and in interaction with other variables supports the third hypothesis described above.[9]

Linear Regression: Mediation Analysis

We next tested the second hypothesis described above, namely that HM mediates the relationship between General Hostility and sexual aggression. To assess this hypothesis, we performed three linear regression analyses according to the guidelines provided by Baron and Kenny [1986]. The four criteria necessary to claim mediation were all met. In the first analysis, General Hostility was a marginally

[8]A one-way factorial analysis of variance was conducted to explore the significant interaction between General Hostility and Pornography. The variables of Pornography and General Hostility were divided into three levels each: Participants in the bottom 25% were coded 1, participants in the mid 50% were coded 2, and participants in the top 25% were coded 3. The General Hostility variable yielded significant main effects, $F = 4.774$, df = 2, $P < 0.05$ ($\eta p2 = 0.093$), as did the pornography variable, $F = 4.440$, df = 2, $P < 0.05$ ($\eta p2 = 0.087$). The significant interaction between these two variables $F = 3.747$, df = 4, $P < 0.05$ ($\eta p2 = 0.139$) followed the same trend as the interaction between the Hierarchical Confluence Model Risk Score and pornography, described above. Among men who scored in the top 25% level of General Hostility, men who indicated never using pornography reported a mean sexual aggression level of 1.1 ($N = 9$). Among men who demonstrated high General Hostility and who very frequently used pornography, mean sexual aggression increased to 2.02 ($N = 10$). Since other analyses showed that the HM construct was the more proximate predictor of sexual aggression, we consider that association to be of greater importance.

[9]Since the loadings found in the factorial analyses were in some cases not as high as desired, we also re-did the regression analyses using individual scales. For example, in one regression analysis we used only the individual measures which were significantly correlated with the dependent measure of sexual aggression. In all of these analyses, the major variable of focus here, pornography consumption, remained a significant and strong predictor of sexual aggression.

significant predictor of sexual aggression ($\beta = .194$, $P = .05$). In the second analysis, General Hostility was a significant predictor of HM ($\beta = .502$, $P < .001$). Finally, General Hostility and HM were included together in the regression equation to predict sexual aggression. HM remained a significant predictor of sexual aggression ($\beta = .570$, $P < .001$) while General Hostility did not ($\beta = -.092$, $P = .351$). Since the direct link from General Hostility to Sexual Aggression dropped to non-significance when HM was introduced, all of the impact of General Hostility could be explained by HM.

Pornography Interaction Effects within the Broader Context of the HMC Model

In light of the analyses showing that the General and Specific Factors model was the best predictor of sexual aggression and that these may be organized in accordance with the HMC Model, we conducted additional analyses to specifically examine the role of pornography within this model. An important goal of these analyses was to examine the conditions under which pornography consumption may or may not be an important statistical predictor of sexual aggression. We conducted a factorial ANOVA similar to previous risk analyses conducted by Malamuth et al. [2000]. In the present analysis, we included both general hostility and specific predictors of sexual aggression in the risk model whereas Malamuth et al. [2000] had not included these general personality predictors.

A single "risk score" for sexual aggression was obtained based on the confluence of the key composite predictors of General Hostility, HM, and IS. These three continuous variables were divided into three levels each by separating them into those scoring in the lowest 25% of the distribution, the middle 50%, and the top 25%. Cases in the lower third were assigned a 1, cases in the 25–75th percentile range were assigned a 2, and cases in the upper third were assigned a 3. Computing the product of the three scores, HM, IS, and GH, yielded ten levels of risk scores (1, 2, 3, 4, 6, 8, 9, 12, 18, and 27). To maintain adequate cell sizes, the four lowest levels were coded as "Low Risk," the next four levels of 6–12 were coded as "Medium Risk," and the highest two risk levels were coded as "High Risk." Pornography consumption scores were divided at the median and the 75th percentile such that scores below the median were assigned a 0, scores in the range of the 50th and 75th percentiles were assigned a 1, and scores above the 75th percentile were assigned a 2. Men who scored in the top 25% reported an average of reading pornographic magazines "sometimes," "often," or "every issue." An ANOVA was conducted to test for interaction effects between the 3-level Hierarchical Model "risk variable" and three levels of pornography consumption.

The results indicated the Risk Score based on the Hierarchical Model predicted sexual aggression ($F = 8.040$, df = 2, $P < .01$, $\eta p2 = .147$). The pornography variable also showed a main effect ($F = 3.295$, df = 2, $P < .05$, $\eta p2 = .066$). The interaction between the Risk Score and pornography was also significant ($F = 6.298$, df = 4, $P < .001$), and accounted for 21% of the variability in the dependent variable ($\eta p2 = .213$). The R^2 term for the entire model was .462 (Table III).

Figure 1 shows the mean levels of sexual aggression for each of the cells used in this analysis. In keeping with a moderator approach of the findings

TABLE III. Analyses of Variance of Sexual Aggression Using Risk Score and Pornography Use

Tests of between-subjects effects[a]

Source	Type III sum of squares	df	Mean square	*F*	Sig.	Partial eta squared
Corrected model	10.957[b]	8	1.370	9.999	.000	.462
Intercept	86.792	1	86.792	633.592	.000	.872
Risk score	2.203	2	1.101	8.040	.001	.147
Pornography	.903	2	.451	3.295	.041	.066
Risk score × pornography	3.451	4	.863	6.298	.000	.213
Error	12.740	93	.137			
Total	169.246	102				
Corrected total	23.697	101				

Note: Risk score = Risk for sexual aggression based on General Hostility, Hostile Masculinity, and Impersonal Sex.
[a]Dependent variable: sexual aggression.
[b]$R^2 = .462$ (Adjusted $R^2 = .416$).

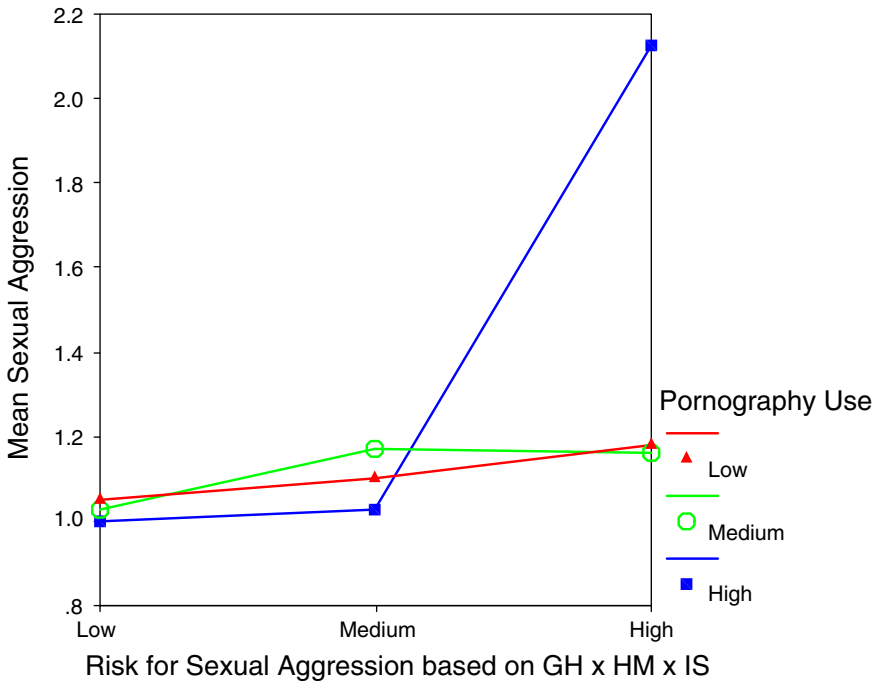

Fig. 1. Mean levels of sexual aggression as a function of Risk for Sexual Aggression (determined by General Hostility × Hostile Masculinity × Impersonal Sex), and Pornography Use.

of Malamuth et al. [2000], the data indicated that at the lower levels of risk, there were no differences in the levels of sexual aggression according to levels of pornography consumption. The mean sexual aggression scores for the low-risk level ranged from 1.00 (no sexual aggression) to 1.05. The average sexual aggression scores for moderate risk levels (i.e., 6 through 12) ranged from 1.03 to 1.17. At the high-risk level (i.e., 18 and 27), the mean scores of sexual aggression ranged from 1.18 ($N = 5$), for those indicating never reading sexually explicit magazines, to 2.13 ($N = 11$), for those who frequently used such magazines. This group appears primarily responsible for the interaction effect, suggesting an increased risk of sexual aggression when a high Hierarchical Model risk score is combined with high pornography consumption.

Applying the Hierarchical Model to Actuarial Risk Assessment

Finally, we sought to illustrate how the present actuarial findings might be translated into a practical classification tree designed for actuarial risk assessment, which has become a common tool in the prediction of criminal recidivism [e.g., Steadman et al., 2000]. Such Classification Tree Analysis (CTA) has been found in recent research to be a particularly valuable approach for the prediction of violence [e.g., Stalans et al., 2004]. We present our final classification tree model in Figure 2.

As shown in this figure, the overall mean of sexual aggression for the 102 participants was 1.30. Given the final model, a criminologist or clinician might use the classification tree in the following manner: First, the criminologist or clinician would assess the individual's level of General Hostility. If an individual scored low risk for General Hostility[10] (i.e., low Negative Masculinity or high empathy and low irritability), then he would be excluded from any further risk analysis and classified as low risk for sexual aggression. In the present study, the group of

[10]For the purposes of maximizing prediction in the CTAs, the General Hostility construct was constructed to maximize the possibility that it would account for as much variance as possible. Our logic in doing so was to create the best opportunity for these general risk variables to show their effects. Linear regression analyses were conducted to test the role of Empathy, Irritability, and Negative Masculinity in predicting sexual aggression. Results indicated that Negative Masculinity yielded a significant main effect ($\beta = 0.366$, $P < 0.01$), and that the interaction between Empathy and Irritability was also significant ($\beta = 1.366$, $P < 0.05$). The empathy–irritability interaction accounted for an additional 4% of the variance, while the total variance accounted for was 15%. Based on these linear regression analyses, we concluded that Empathy and Irritability were best used in the CTAs together as an interaction while Negative Masculinity was best considered alone as a main effect.

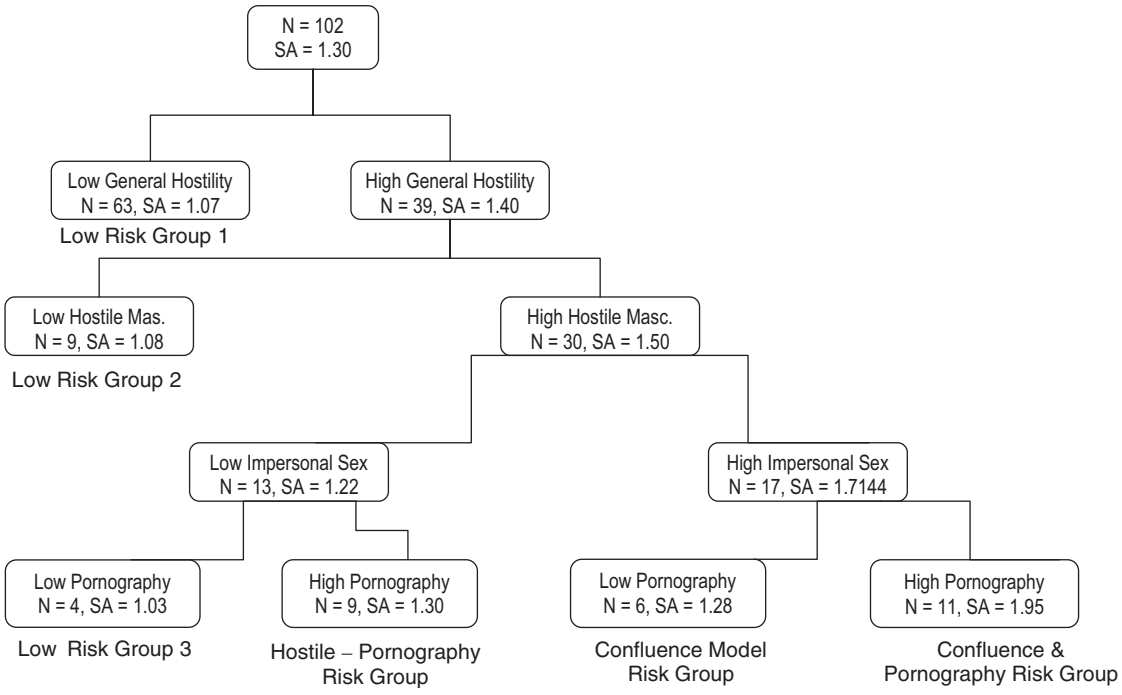

Fig. 2. Classification tree based on General Hostility, Hostile Masculinity, Impersonal Sex, and Pornography Use and mean levels of sexual aggression.

participants who indicated low levels of General Hostility demonstrated little sexual aggression ($N = 63$, $M = 1.07$). In contrast, an individual who demonstrated any degree of General Hostility (high levels of Negative Masculinity, or low empathy and high irritability) would be further assessed for HM, IS, and pornography consumption. The outcome of this assessment would result in the classification of the individual as a member of one of two high-risk groups or three low-risk groups. Using the classification tree to assess the participants of our present study resulted in the participants being classified into each one of the six end-nodes. A t-test indicated that the combined low- and high-risk groups differed significantly from each other ($t = 5.134$, $P < .001$).

DISCUSSION

In keeping with our third and most important hypothesis, we found that even after all of the factors encompassed by General Hostility, HM and IS were entered in the regression equation, pornography consumption contributed significantly to the prediction of sexual aggression both as a main effect and in interaction with other factors. Follow-up analyses indicated that the reason pornography contributed significantly to the overall equation is because of its importance in the context of men who are at relatively high risk for sexual aggression. It was found that among men who scored high on both general and specific risk characteristics, frequent pornography consumption increased the risk for sexual aggression. In contrast, amount of pornography consumption had little predictive value among men considered to be at relatively low risk for sexual aggression. While this supports the conclusions of Malamuth et al. [2000], the present findings go beyond that research in also controlling for the role of General Hostility characteristics as potential confounds with the pornography consumption variable.

In addition, key elements of earlier versions of the Confluence Model were successfully replicated here and new elements of the more developed HMC Model were given some support. In keeping with previous findings [e.g., Lim and Howard, 1998; Malamuth et al., 1991, 1995; Martin et al., 2005; Wheeler et al., 2002], the interaction between HM and IS predicted sexual aggression relatively well. In the current study, we also found some support for our first hypothesis that the addition of General Hostility characteristics to the Confluence Model would enable better prediction. However, the gain was only modest. Moreover, within the

characteristics encompassed by the General Hostility assessment used here, the Negative Masculinity measure clearly had the most important role, rather than the other two measures reflecting characteristics such as callousness and impulsive irritability. As noted earlier, in previous Confluence Model research [e.g., Malamuth et al., 1991, 1995], the Negative Masculinity measure was actually included as part of the HM construct. However, in the present study, because of its content and its use in previous research [i.e., Knight and Sims-Knight, 2003, 2004], we reasoned that the Negative Masculinity construct more properly belongs as part of the General Hostility constellation (e.g., general narcissistic qualities). The findings do provide further support for the importance of including such narcissistic characteristics [Baumeister et al., 2002; Bushman et al., 2003] regardless of whether included within General Hostility or HM. Future research should investigate more fully the reasons for the importance of this construct, including the potential role of a sense of sexual entitlement [Hill and Fischer, 2001].

In keeping with our third hypothesis, it was found that HM mediated the relationship between General Hostility and sexual aggression and that General Hostility did not have any direct link to sexual aggression. These data are more consistent with Malamuth's [2003] conceptualization of a two-path model wherein General Hostility characteristics increase the likelihood of the development of HM tendencies rather than supporting the need to add a third separate direct path to the prediction of sexual aggression, as suggested by Knight and Sims-Knight [2003, 2004].

There are some limitations of the present study that should be considered in the context of other research in this area. Despite the use of statistical controls, the fact that the data are correlational requires caution about any causal conclusions. However, there is considerable convergence between the present correlational findings about the role of individual differences in moderating the impact of pornography and experimental studies that have used random assignment to establish causation [see Malamuth and Huppin, 2005 for a review]. In addition, a related longitudinal study strongly implicates a causal impact of mass media exposure to sexual images on sexual attitudes and behaviors [Collins et al., 2004]. Although the current study is also limited in that it used a convenience sample, it is a successful replication and extension of research by Malamuth et al. [2000] that did use a large, representative sample of all US men in any form of post high school education.

IS scores have been characterized by low reliability estimates in various relevant research and need to be more reliably and comprehensively assessed. Despite the low reliability estimates, the IS construct has been a significant predictor of sexual aggression in prior research within the interactive framework hypothesized by the model used here [Kanin, 1984; Malamuth et al., 1991, 1995; Martin et al., 2005; Sarwer et al., 1993; Wheeler et al., 2002]. Nevertheless, future research should seek to better conceptualize, develop and assess this construct and the particular features responsible for its utility in the prediction of sexual aggression.

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