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Predictors of Naturalistic Sexual Aggression

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This research integrated within a theoretical and empirical framework varied predictor factors pertaining to males' sexual aggression against women. The selection of predictors was guided by theorizing that sexual aggression is caused by the interaction among multiple factors, including those creating the motivation for the act, those reducing internal and external inhibitions, and those providing the opportunity for the act to occur. The predictor factors assessed were sexual arousal in response to aggression, dominance as a motive for sexual acts, hostility toward women, attitudes accepting of violence against women, psychoticism, and sexual experience. A measure assessing self-reported sexual aggression (primarily among acquaintances) in naturalistic settings served as the dependent measure. The subjects were 155 males. As expected, nearly all the predictor factors significantly related to sexual aggression. In addition, much better prediction of such aggression was achieved by a combination of these factors than by any one individually. It was also found that including interactions among these predictors yielded a regression equation that was more successful in relating to sexual aggression than an equation using an additive combination only. The relevance of these data to the causes and prediction of violence against women is discussed.

Within the last decade, there has been increasing research on the causes of male sexual aggression against women, particularly rape. As described later, most of this research attempted to identify individual factors that may predict such aggression. More recently, however, there has been growing recognition of the need for multifactorial models.

The theoretical guidance for the present research was provided at the general level by Bandura's social learning theory of aggression (1973, 1978) and by various applications of it to sexual aggression (e.g., Earls, 1983; Malamuth, 1983b; Marshall & Barbaree, 1984). Also providing theoretical guidance was a recent model of the causes of child sexual abuse (Finkelhor, 1984; Finkelhor & Araji, 1983) and its extension by Russell (1984) to sexual aggression. These theories have several features in common. Most important, they emphasize that to understand the causes of sexual aggression it is essential to consider the role of multiple factors, such as those creating the motivation to commit the act, those reducing internal and external inhibitions that might prevent it from being carried out, and those providing the opportunity for the act to occur. Some of these multifactorial models propose additive (e.g., Earls, 1983) and others propose interactive (e.g., Bandura, 1978; Finkelhor, 1984; Malamuth, 1983b) combinations of the causal factors.

The research reported here compared empirically three alternative theoretical models regarding the causes of sexual aggression: The Single Factor model suggests that sexual aggression results from a single factor (e.g., hostility). The Additive model posits multiple factors combining in an additive manner (Earls, 1983). The Interactive model asserts that multiple factors (i.e., motivation, disinhibitory and opportunity) interact to produce sexual aggression, particularly at high levels. Although the dependent measure used here primarily assesses sexual aggression between acquaintances, as noted later, I suggest that considerable similarity may exist among the causes of such aggression and that committed against nonacquaintances.

In studying self-reported naturalistic sexual aggression, six predictors were used in the present study.[1] Three were intended to assess the motivation to commit sexual aggression. These were sexual arousal in response to aggression, the desire to be sexually dominant or powerful, and hostility toward women. In addition, two variables were included primarily to measure factors that may overcome internal and external inhibitions. These consisted of attitudes condoning sexual aggression and of antisocial personality characteristics. Finally, sexual experience was assessed because if a person did not engage in sexual acts generally, then the "opportunity" for sexual aggression would not exist. As discussed later, an additional reason for including this dimension relates to differences in the degree and nature of sexual experiences between relatively sexually aggressive and nonaggressive men. The following discussion expands on the rationale for the selection of the various predictors and describes previous research pertaining to each.

Sexual Responsiveness to Rape

The most widely studied response designed to differentiate rapists from nonrapists has been the penile tumescence rape

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[1] The term *predictor* is used here in the statistical sense and does not necessarily imply a temporal or causal relation with the criterion (or dependent) variable.

index, a ratio of sexual arousal to rape portrayals compared with arousal to consenting sex portrayals (Abel, Barlow, Blanchard, & Guild, 1977). With this index, a man whose penile tumescence to rape is similar to or greater than his tumescence to consenting depictions is considered to have some inclination to rape (see Quinsey, in press, for a review).

Dominance

The view has been widely expressed that the desire to dominate women is an important motive of sexual aggression both at the cultural (Brownmiller, 1975; Sanday, 1981) and individual (e.g., Scully & Marolla, 1985) levels. Based on clinical interviews with convicted rapists, Groth (1979) concluded that in all cases of forcible rape, three components are present: power, anger, and sexuality. Groth (1979) distinguished among several types of rapists depending on the primary element characterizing their motivation: the power rapist, the anger rapist, and the sadistic rapist. The most common type among the convicted rapists studied by Groth (i.e., 55%) was the power rapist. Here he suggests that the offender's desire is to conquer and sexually dominate his victim.

Hostility Toward Women

The second most frequent type of rapist, according to Groth (1979) (i.e., about 40% of those he studied) is the "anger" rapist, characterized by his hostility to women. In the present research, hostility toward women was studied primarily for its possible motivating functions. However, it may also discriminate between men who would and those who would not be inhibited by women's suffering from and resistance to sexual aggression. Research on the consequences of victims' reactions to nonsexual aggression indicates that the aggressors' hostile feelings may be a very important determinant. For those feeling relatively low hostility, the victim's suffering and resistance is likely to be unpleasant and therefore inhibit aggression (Geen, 1970; Rule & Leger, 1976). In contrast, for those with relatively high hostility, the victim's suffering may actually be reinforcing and thereby encourage further aggression in the face of resistance (Baron, 1974, 1977; Feshbach, Stiles, & Bitter, 1967; Hartmann, 1969).

Attitudes Facilitating Aggression

Burt (1978, 1980) theorized that certain attitudes that are widely accepted in Western culture but are particularly held by rapists and potential rapists play an important role in contributing to sexual violence by acting as "psychological releasers or neutralizers, allowing potential rapists to turn off social prohibitions against injuring or using others" (1978, p. 282). She developed several scales to measure attitudes that directly and indirectly support aggression against women. Data consistent with Burt's theorizing indicate that male college students' levels of sexual aggression are correlated with attitudes condoning violence against women (e.g., Koss, Leonard, Beezley, & Oros, 1985). In addition, it has been found that convicted rapists have relatively high acceptance of violence against women (e.g., Scully & Marolla, 1984).

Antisocial Personality Characteristics/Psychoticism

Rapaport and Burkhart (1984) recently suggested that, although certain factors may provide a context for coercive sexual behavior, the actual expression of aggression occurs only if the subject also has certain personality or characterological deficits. Although these investigators did not directly test this proposition, convicted rapists do sometimes show elevated scores on measures of psychopathic/antisocial characteristics (Armentrout & Hauer, 1978; Rada, 1977). Koss and Leonard (1984) point out, however, that a major problem in these studies has been the failure to control for demographic variables that could cause spurious elevation. Koss and Leonard (1984) found only very weak and/or nonsignificant relations in various studies assessing possible links between measures of psychopathy and sexual aggression among men from the general population.

Sexual Experience

As noted earlier, assessment of sexual experience may be useful to include in the prediction of sexual aggression due to *opportunity* or access. If powerful factors (e.g., religious convictions) prevented a person from participating in sexual relationships generally, he might not be sexually aggressive even if he has a high proclivity for such behavior. Particularly in the case of nonstranger sexual aggression, it is likely that the willingness and opportunity to engage in sexuality per se is an important factor distinguishing those who will and those who will not express an inclination to sexually aggress in actual behavior.

In addition to the opportunity function, an assessment of sexual experience was included in the present research in light of Kanin's (1957, 1983, 1984) studies of college males who have engaged in various degrees of sexual aggression. He found that more sexually aggressive men are more likely to view sexuality as a means of establishing their self-worth and as an arena for "conquest." They were also found to be more sexually experienced at younger ages, but less likely to view these experiences as satisfactory. Similar data with convicted rapists were recently reported by Langevin, Paitich, and Russon (1985).

Predicting Laboratory Aggression

Malamuth (1983a) assessed the extent to which two of the factors described earlier predicted males' laboratory aggression against women. Males' penile tumescence to rape portrayals as compared with mutually consenting depictions and their attitudes condoning violent acts such as rape and wife battering were assessed in one session. About a week later, subjects participated in what they believed was a totally unrelated experiment. In it they were first angered by a female confederate of the experimenter. Later, they could choose to aggress against her via the administration of aversive noise and other responses. It was found that the degree of both men's attitudes facilitating aggression and of their sexual arousal to rape predicted significantly the amount their laboratory aggression against the woman. In assessing one aspect of these findings, Malamuth and Check (1982) successfully replicated the relation between attitudes condoning aggression against women and laboratory aggression measured several days later in an ostensibly unrelated context.

The Present Research

The present study assessed empirically the prediction of sexual aggression in naturalistic settings using the factors described earlier. Sexual aggression was measured by a self-report inventory developed by Koss and Oros (1982). This measure asks male subjects whether they have engaged in a wide range of coercive sexual activities, ranging from trying to get intercourse by "threatening" to end the relationship, to actually using physical force, such as twisting a woman's arm, to coerce her into intercourse.

It is important to note that the two types of aggression measures used in our research program complement each other well, having opposite advantages and disadvantages. The advantage of the laboratory assessment of aggression (Malamuth, 1983a, 1984b; Malamuth & Check, 1982) is that it is an "objective" measure that does not rely on subjects' self-reports. However, it assesses behavior in a setting that some argue is artificial and low in ecological validity (e.g., Kaplan, 1983). The measure of naturalistic aggression has the advantage of assessing behavior occurring in nonartificial settings. Its disadvantage is in being a self-report measure. Consequently, considerable confidence in the validity of the relations would be gained if the predictors related to both of these aggression measures. Of course, although some similarity may be expected, conceptually there are also important differences between aggression in the laboratory, which does not contain any overt sexual elements (i.e., administering aversive noise to a person in the next room), and aggression in natural settings which occurs within a sexual context.

The factors studied in the present investigation are based on theory and research conducted either with convicted rapists or with subjects from the general population, particularly college students. One of the issues that the current data pertain to is the assertion (see Russell, 1984; Scully & Marolla 1985) that similar factors contribute to both the type of sexual aggression committed by incarcerated rapists (usually against nonacquaintances) and the type that does not receive legal attention, particularly that committed against acquaintances. If variables derived from work with convicted rapists and with sexual aggressors in the general population can be integrated within a unified empirical and theoretical framework, the findings will provide a firmer basis for understanding the causes of sexual aggression in both populations.

Based on the theory and research described, three interrelated questions were investigated in the present research:

1. Would the predictor factors relate significantly to naturalistic aggression against women?
2. If the factors related to sexual aggression against women, would they provide "redundant prediction" or would a combination of factors predict better than each alone?
3. If a combination of factors were superior, would the Additive or the Interactive models provide the best prediction of naturalistic aggression?

Method

Overview of Design

One hundred and fifty-five males participated in the first phase of the research. In this phase subjects completed various scales, including all the predictors except for the sexual arousal measure, as well as the dependent measure of sexual aggression.

The second phase consisted of the assessment of sexual arousal in response to rape portrayals and to consenting depictions. Ninety-five of those participating in Phase 1 also participated in Phase 2.

Subjects

Subjects were recruited from various sources: Several university courses, announcements displayed on university campuses and at a city summer employment center, and via newspaper ads.

The initial descriptions of the research indicated that applicants at or over the age of 18 were needed to participate in various unrelated experiments. They were told that they may sign up for a general subject pool. Experimenters would then select subjects from this list and invite them to participate in specific experiments. Participants were paid about $5.50 per hour.

When contacted by the different experimenters conducting each phase (presented to subjects as independent experiments), potential subjects were given general descriptions of the procedures and measures used. For example, in Phase 2 they were informed that genital measures of sexual arousal would be used. It was emphasized in each phase that subjects could leave at any time and that there would be no penalty whatsoever nor would any explanation be required. Subjects were paid upon arrival at each study and were told that they could keep the money irrespective of whether they completed the experiment or not. As an additional safeguard, an ombudsman, who was a Professor of Law, was hired for the project. All subjects were given his name and phone number upon signing up for the subject pool. They were told that he was completely independent of the staff conducting the research and that they could voice any complaints to him. No complaints were ever made.

At the end of Phase 2 subjects were given debriefings. They included segments emphasizing the horror of rape and presented several points designed to dispel rape myths. The effectiveness of such debriefings in counteracting some potential negative effects of exposure to sexually violent stimuli has been demonstrated in several studies (Check & Malamuth, 1984; Donnerstein & Berkowitz, 1981; Linz, 1985; Malamuth & Check, 1984).

Although subjects' names were not obtained, various background information that was gathered (e.g., date of birth) enabled exact matching of responses across the two research phases. The purpose of leading subjects to believe that these were independent studies was to reduce "demand characteristics" (Orne, 1962) and/or undue self-consciousness that might affect honest responding. Similar procedures have been used successfully in other studies (e.g., Malamuth, 1983a; Malamuth & Check, 1981). The two research phases were completed within 2 months for virtually all subjects.

Obtaining background information enabled a general description of the sample. Subjects were asked about their age, marital status, whether they were students, their major, religious affiliation, and their frequency of attendance of church or other religious institution. These variables were selected on the basis of previous research (e.g., Koss et al., 1985; Schulz, Bohrnstedt, Borgatta, & Evans, 1977) showing that factors such as religiousness and age may affect college students' sexual and sexually aggressive behavior. If the regression analyses reported later are computed by first partialing out the background factors, the relations are at least as strong as those reported without such partialing.

The average age of the 155 male subjects was 23, with a range between 18 to 47 years. Sixty-six percent of the sample were between the ages of 18 to 22, 24% between the ages of 23 to 30, and the remaining 10% were above the age of 30. Eight-seven percent of the sample were single, 8% were married, and the remaining 5% were separated or divorced. Eighty percent were university students, 20% were not. Of the students, 21% majored in the "pure" sciences, 13% in engineering, and 23% in the humanities and the social sciences (including psychology). The remainder

were distributed over a wide range of majors or as yet undeclared. Twenty percent were Catholics, 32% Protestants, 8% Jewish, and the remaining 40% listed no specific religious affiliation. Fifteen percent indicated that they visit a religious institution (e.g., church) at least once a week, 11% at least once a month, 8% approximately every two months, and the remaining 56% seldom or never.

Phase 1: Materials and Procedure

In the first phase, subjects completed a questionnaire administered by a male experimenter. While filling out this measure they were seated sufficiently apart to ensure confidentiality of responses. Embedded within other items on this questionnaire were the following measures:

Dominance as sexual motive. Part of a measure developed by Nelson (1979) assessed the function of or motivations for engaging in sexual acts. This measure asks respondents the degree to which various feelings and sensations are important to them as motives for sexual behavior. Nelson (1979) presented data concerning the reliability and validity of this scale, which yields scores on several functions of sexuality. The present study used the dominance segment (eight items) of the power function (composed of the dominance and submissiveness segments). This dominance component refers to the degree to which feelings of control over one's partner motivate sexuality (e.g., "I enjoy the feeling of having someone in my grasp"; "I enjoy the conquest"). It yielded an alpha coefficient of .78.

Hostility. The Hostility Toward Women (HTW) scale (30 items) was recently developed by Check and Malamuth, 1983 (see also Check, Malamuth, Elias, & Barton, 1985). Data concerning its reliability and validity were presented by Check (1985). Examples of items are "Women irritate me a great deal more than they are aware of," and "When I look back at what's happened to me, I don't feel at all resentful towards the women in my life." In the present study it had an alpha coefficient of .89.

Attitudes facilitating violence. The attitude measure used in this study was the Acceptance of Interpersonal Violence (AIV) against women scale developed by Burt (1980). Five of its six items measure attitudes supporting violence against women, whereas the sixth concerns revenge. An example of an item is "Sometimes the only way a man can get a cold woman turned on is to use force." This scale was selected because it measures attitudes that *directly* condone the use of force in sexual relationships. Two other scales developed by Burt (1980) assessing attitudes *indirectly* supportive of sexual aggression, the Rape Myth Acceptance and the Adversarial Sexual Beliefs scales, were also used. The findings with these measures were very similar to those with the AIV, but as expected the relations with sexual aggression were somewhat weaker. The results presented in this article are for the AIV scale only. It had an alpha coefficient of .61, which is similar to that originally reported by Burt (1980).

Antisocial characteristics/psychoticism. The Psychoticism (P) scale of the Eysenck Personality Questionnaire (EPQ) was used (Eysenck, 1978). As Eysenck makes abundantly clear, this scale purports to reflect a variable that stretches through the normal, nonpsychiatric population.

There were three reasons for selecting this particular measure to assess antisocial tendencies. First, Eysenck (1978) hypothesized that psychoticism may be particularly associated with interest in impersonal sex and in sexual aggression. He also reports the findings of an unpublished study that sex offenders are relatively high P scorers. Second, reviews of the literature pertaining to this measure (e.g., Claridge, 1983) concluded that rather than being a measure of psychoticism in the clinical sense, this scale primarily assesses antisocial traits that may relate to aggression. Third, recent research (Barnes, Malamuth, & Check, 1984; Linz, 1985) suggests that this measure may be particularly useful in predicting some sexually aggressive responses.

The alpha coefficient obtained herein was .49. Although Eysenck (1978) had originally reported relatively high alpha coefficients, other researchers have recently reported similar relatively low levels of internal consistency as found here (e.g., McCrae & Costa, 1985). Nevertheless, this measure was retained in the current analyses with the recognition that relatively low levels of internal consistency reduce the likelihood of obtaining statistically significant relations with other variables (Cohen & Cohen, 1983).

Sexual experience. The Sexual Behavior Inventory (SBI: Bentler, 1968) was used to assess sexual experience in conventional heterosexual acts. Subjects indicated whether they had engaged in various sexual behaviors including kissing, fondling of breasts, intercourse, and oral sex. The alpha coefficient for this scale was .97.

Naturalistic sexual aggression. As noted earlier, the self-report instrument used to measure sexual aggression was developed by Koss and Oros (1982). It assesses a continuum of sexual aggression including psychological pressure, physical coercion, attempted rape, and rape. Subjects are asked to respond to a sexual experience survey consisting of nine circumstances pertaining to the use of aggression in the context of sexuality (e.g., sexual, oral, or anal intercourse).[2] An example of an item is "I have had sexual intercourse with a woman when she didn't want to because I used some degree of physical force (twisting her arm, holding her down, etc.)." Respondents reply on a *true* versus *false* scale. Koss and Oros (1982) and Koss and Gidycz (1985) presented data regarding the reliability and validity of this scale. In the present study, it had an alpha coefficient of .83.

Phase 2: Materials and Procedure

In the second research phase, sexual arousal in response to rape and to mutually consenting depictions was assessed. In keeping with the accepted methodology and the empirical data in this area (e.g., Abel et al., 1977; Earls & Marshall, 1983), the primary assessment was direct genital arousal measured by penile tumescence. Subjects were seated in a comfortable chair located in a sound attenuated and electrically shielded room equipped with an intercom. Penile tumescence was measured by a mercury-in-rubber strain gauge (Davis Inc., New York City), a device recommended in analyses of various instruments (Laws, 1977; Rosen & Keffe, 1978). Changes in penile diameter that resulted in resistance changes in the mercury column of this strain gauge were amplified through a Wheatstone Bridge and recorded on a polygraph.

For comparison of consistency with the physiological measure, self-reported sexual arousal was assessed on an 11-point scale ranging from 0% (*not at all*) to 100% (very) in units of 10%. Subjects indicated their arousal immediately after reading each story.

Upon arrival at the laboratory, the subject was greeted by a male experimenter. He then was given a sheet reiterating the information provided on the phone regarding the sexual content of some stimuli and the use of genital arousal measures. After signing a consent form, which emphasized that the subject was free to leave at any time without any penalty and without having to provide any reason to the experimenter, he was escorted to the sound attenuated room. Further instructions were taped, although an intercom was available if communication between the subject and the experimenter was necessary.

The subject was instructed to place the penile gauge on. Following a baseline period, he was told to open a numbered envelope and read the story. Arousal to the stories was monitored by the polygraph in the adjoining room. After the subject read each story and indicated his sexual arousal on a scale, a resting period was interposed to ensure that arousal returned to baseline levels before proceeding to the next story.

There were three depictions read in order. The first described a woman masturbating. Its primary purpose was to generate some initial level of

[2] Although the scale used by Koss and Oros (1982) contains 10 items, 1 item judged ambiguous was not used in the analyses here. It asks whether the subject ever became so sexually aroused that he could not stop himself even though the woman did not want to. The ambiguity is in the lack of information regarding what sexual acts occurred and what type of coercion may have been used.

sexual arousal in light of data (Kolarsky & Madlafousek, 1977) suggesting that arousal levels are better differentiated if presented following the elicitation of some sexual arousal rather than immediately following the first baseline period. Additionally, this story was intended to strengthen the credibility of the experimental instructions that the research concerned responses to various types of stimuli. The second and third written stories depicted rape and mutually consenting sex, respectively. They were virtually identical to those used by Abel et al. (1977).

"Rape indices" were computed for each subject following Abel et al. (1977) by dividing maximum arousal to rape by maximum arousal to consenting sex for the tumescence data and for self-reported arousal.[3]

Results

Volunteers Versus Nonvolunteers

Comparisons were made between the 95 volunteers for the second research phase and the 60 who did not volunteer. These comparisons used the 5 predictors assessed in the first phase and the measure of sexual aggression. No significant differences or effects approaching significance were obtained in either a multivariate analysis of variance or in univariate analyses of variance (ANOVAS).

Intercorrelations Among Predictors

Simple Pearson correlations among the predictors are presented in Table 1. In general, these data are highly consistent with previous findings (e.g., Malamuth, 1983a; 1984a; Malamuth & Check, 1983), as well as revealing relations not examined in earlier studies. The tumescence index of sexual arousal (i.e., arousal to rape contrasted with arousal to nonrape) was highly correlated with the similar index based on self-reported arousal. To a large degree, these two sexual arousal indices showed similar relations with the other variables: Both indices were significantly associated with the dominance motive and neither related significantly to psychoticism nor to sexual experience. Although the reported arousal index significantly correlated with hostility toward women and with AIV, the tumescence index showed a marginally significant effect with hostility and no significant correlation with AIV.

The dominance motive related significantly to all of the other predictors, except for sex experience, where a marginally significant correlation occurred. Hostility toward women correlated with AIV and revealed a marginally significant relation with psychoticism. Hostility showed a nonsignificant inverse relation with sexual experience. AIV did not relate to either psychoticism or to sexual experience, nor were these two variables related to each other.

Naturalistic Aggression

The last column of Table 1 shows simple correlations between the predictors and self-reported naturalistic sexual aggression. All the predictors related significantly to sexual aggression, except for psychoticism which showed a marginally significant correlation.

Multiple regression analyses were conducted to address the issue of the combined success of the predictors to relate to sexual aggression. As recommended by Cohen and Cohen (1983), all the predictors were centered at their mean, a linear transformation that reduces multicollinearity that may occur with products such as interaction terms. In this analysis, I sought to compare the Single Factor, Additive, and the Interactive models. For the 155 participants in Phase 1, this regression analysis included dominance, hostility toward women, AIV, psychoticism, and sexual experience. For the 95 participants in both research phases, analyses were conducted with the addition of the tumescence rape index.

The regression analyses were performed in the following way: To test the Single Factor model versus the Additive model, each predictor was "forced entered" as a main effect and its unique contribution (i.e., that not shared with any other predictors) to the dependent variable was assessed by squared semipartial correlations (Cohen & Cohen, 1983). The results clearly showed that the predictors did not, in general, provide redundant information, but that their combined prediction was considerably greater than that achieved by any variable alone. More specifically, when the entire sample was used ($n = 155$) the HTW, AIV, and sex experience variables all had significant, unique contributions to the regression equation, whereas the unique contribution of dominance was marginally significant (see left columns of Table 2). The psychoticism variable did not make a significant, unique contribution. As indicated on the left side of Table 2, the Multiple R yielded by this equation assessing additive effects was .547.

When the regression analysis assessing additive effects was performed on the 95 participants in both research phases, the Multiple R was .619 (see left side of Table 3). As indicated in this table, the tumescence rape index, AIV, HTW and sex experience contributed significant, unique variance, whereas the dominance and psychoticism predictors did not.

Although these data show that a combination of predictor variables is superior to individual ones, an additional regression analysis compared the Interactive versus the Additive models for combining predictors. Although the Interactive model contends that several factors must interact for relatively high levels of sexual aggression to occur, the use of more than one variable within a given theoretical category (e.g., both the sexual arousal in response to aggression and hostility toward women variables were included as motivational factors) did not enable precise specification of which interaction set would best test this model. Rather than preferring a particular interaction, all possible interactions (i.e., the cross-products) were allowed "free entry" in a stepwise process after the "forced entry" of the main effects.[4]

The resulting equation for the 155 subjects yielded a Multiple R of .673 (see right side of Table 2). Contributing significant unique variance were a two-way interaction between the HTW and psychoticism, a three-way interaction among HTW, AIV,

[3] In some previous research (e.g., Malamuth, 1983a) a difference rather than a ratio score was used. The ratio was used here in keeping with the commonly accepted procedure. The findings are very similar if the difference score is used.

[4] Some statisticians might test the Interaction model by a fully hierarchical approach in which regression models with higher order interactions are assessed only in comparison to nested models including all the lower order interactions. The difference in such an approach as contrasted to that used here (i.e., allowing "free entry" to all the interactions) concerns only which interactions are most appropriate to include in the model and not whether some interactions account for additional variance.

Table 1
Simple Correlations Among the Predictor Variables and Sexual Aggression[a]

Predictors and dependent variable	1	2	3	4	5	6	7	8
Motivation predictors								
1. TUMRAPE	—	.66****	.25***	.19*	.13	.07	.06	.43****
2. REPRAPE		—	.23**	.26***	.22**	.06	.15	.33***
3. DOM			—	.37****	.36****	.19**	.15*	.38****
4. HTW				—	.37****	.16*	−.11	.30****
Disinhibiting predictors								
5. AIV					—	.08	−.08	.38***
6. PSYCH						—	−.03	.15*
Opportunity predictor								
7. SEXEXP							—	.32****
Dependent variable								
8. SEXAGG								—

Note. TUMRAPE = tumescence arousal to rape index; REPRAPE = reported arousal to rape index; DOM = dominance motive; HTW = hostility toward women scale; AIV = acceptance of interpersonal violence (against women) scale; PSYCH = psychoticism scale; SEXEXP = sexual experience measure; SEXAGG = sexual aggression.
[a] n = 155, except with sexual arousal measures where n = 95. * $p < .10$. ** $p < .05$. *** $p < .02$. **** $p < .001$.

and sex experience and a four-way interaction that contained these three variables as well as dominance (see Table 2). A hierarchical comparison of the model with the interactions (R^2 = .453) versus the model with the main effects only (R^2 = .300) yielded a significant effect, $F(3, 146) = 9.99$, $p < .001$.

With the 95 subjects participating in both research phases, the regression equation including interactions yielded a Multiple R of .865 (see right side of Table 3). The squared semipartial correlation coefficients indicated that contributing unique variance were a two-way interaction between AIV and sex experience a four-way interaction among the tumescence index, dominance, AIV, and psychoticism, a four-way interaction among the tumescence index, dominance, HTW, and sex experience, as well as a five-way interaction containing these four variables and AIV (see right columns of Table 3). A comparison of the models with and without the interactions yielded a highly significant difference, $F(4, 84) = 12.86$, $p < .001$. The results for both samples therefore, indicate that a regression model containing interactive relations among the predictors is preferable to a model containing additive relations only.

Table 2
Multiple Regression Analyses on Sexual Aggression Without Tumescence Index (n = 155)

	Without interactions		With interactions	
Predictor	Beta[a]	sr^2 [b]	Beta[a]	sr^2 [b]
DOM	.153	.017*	.078	.005
HTW	.198	.030**	.147	.017**
AIV	.205	.033***	.210	.032***
PSYCH	.073	.005	.102	.010
SEXEXP	.340	.109****	.257	.058****
HTW × PSYCH	—	—	.150	.022**
HTW × AIV × SEXEXP	—	—	.334	.092****
HTW × DOM × AIV × SEXEXP	—	—	.313	.078****
Multiple R	.547****		.673****	
R^2	.300		.453	

Note. DOM = dominance motive; HTW = hostility toward women scale; AIV = acceptance of interpersonal violence (against women) scale; PSYCH = psychoticism scale; SEXEXP = sexual experience measure.
[a] Standardized regression coefficient. [b] Squared semi-partial correlation coefficient indicating unique contribution of predictor variable to dependent variable. * $p < .06$. ** $p < .05$. *** $p < .01$. **** $p < .0001$.

To directly assess whether the tumescence rape index provided additional predictive information, it was necessary to compare regression models with and without this variable for the same 95 subjects. This comparison indicated that the regression model with this variable (Multiple R = .865) was significantly better than without it (Multiple R = .600), $F(3, 85) = 16.45$, $p < .00$.

To illustrate and further examine the data, the following analysis was performed: For each predictor a relatively high score was defined as above the median of its distribution. Subjects were then divided according to the number of predictors for which they scored *high* and *low*. This approach is analogous to classifying a characteristic as present or not by defining presence as a relatively high score. A person scoring above the median on all the variables would be considered as possessing all the characteristics. In keeping with the regression results, for the 15 subjects the dominance, HTW, AIV, psychoticism, and sex experience predictors were used for this classification, whereas for the 95 subjects these variables as well as the tumescence rape index were used.

Table 3
Multiple Regression Analyses on Sexual Aggression With Tumescence Index (n = 95)

Predictor	Without interactions		With interactions	
	Beta[a]	sr^{2} [b]	Beta[a]	sr^{2} [b]
TUMRAPE	.329	.100***	.206	.026**
DOM	.085	.006	.170	.017*
HTW	.209	.032*	.037	.001
AIV	.207	.035*	.168	.022*
PSYCH	.027	.001	.016	.000
SEXEXP	.267	.066**	.111	.010
AIV × SEXEXP	—	—	.166	.025**
TUMRAPE × DOM × AIV × PSYCH	—	—	.200	.029**
TUMRAPE × DOM × HTW × AIV	—	—	.493	.151****
TUMRAPE × DOM × HTW × AIV × SEXEXP	—	—	.445	.158****
Multiple				
R	.619****		.865****	
R^2	.383		.748	

Note. TUMRAPE = tumescence arousal to rape index; DOM = dominance motive; HTW = hostility toward women scale; AIV = acceptance of interpersonal violence (against women) scale; PSYCH = psychoticism scale; SEXEXP = sexual experience measure.
[a] Standardized regression coefficient. [b] Squared semi-partial correlation coefficient indicating unique contribution of variable. * $p < .05$. ** $p < .005$. *** $p < .001$. **** $p < .0001$.

Figure 1 shows the average level of sexual aggression according to this classification scheme, with the top graph showing the results for the entire sample of 155 subjects and the bottom graph for the 95 participants in the two research phases. In both instances, ANOVAs performed on these data yielded highly significant ($p < .0001$) effects. Comparisons among means were performed using the Scheffé test (Scheffé, 1953) for groups differing substantially in size and the Tukey test (Tukey, 1953) for those of similar size. These comparisons indicated that the highest levels in both graphs were significantly different ($p < .05$) from all others and that the second highest levels differed significantly from some of the lowest levels. Trend analyses showed that a cubic term fitted the curve within statistical error for the sample of 155 subjects, whereas a quintic term fitted the curve for the 95 participants in both research phases. ANOVAs comparing average sexual aggression within each level of this classification scheme (e.g., those scoring high on one set of four predictors vs. those scoring high on a different set of four predictors) supported the rationale of classifying subjects according to the number of predictors on which they scored relatively high: For both samples, no significant differences were found within each classification level. It should be noted, however, that the relatively small numbers in each cell reduced the likelihood of finding such differences.

Discussion

The data provided the following answers to the three questions posed earlier: First, in the simple correlation analyses all the predictors except psychoticism were significantly related to naturalistic aggression, and psychoticism showed a marginally significant relation. Second, the predictors did not, on the whole, provide "redundant information" in that a combination of them was superior to any individual ones for predicting levels of sexual aggressiveness. Third, the data were more consistent with the Interactive than with the Additive model of combining the predictors. Regression equations containing interactive effects accounted for a significantly greater percentage of the variance (45% for the 155 subjects and 75% for the 95 subjects) than equations containing additive effects only (30% and 45%, respectively). However, it may be that a modified version of the Interactive model that also incorporates additive effects would best account for the data. Multifactorial models in other areas of research (e.g., Faraone & Tsuang, 1985) may provide useful guides in the development of such a model.

Additional analyses were conducted classifying subjects according to the number of predictors on which they scored relatively high (i.e., above the median). A curve was found indicating that with an increasing number of predictors with high scores, greater levels of sexual aggression occurred. The data pattern appeared to show a synergistic process whereby the combined

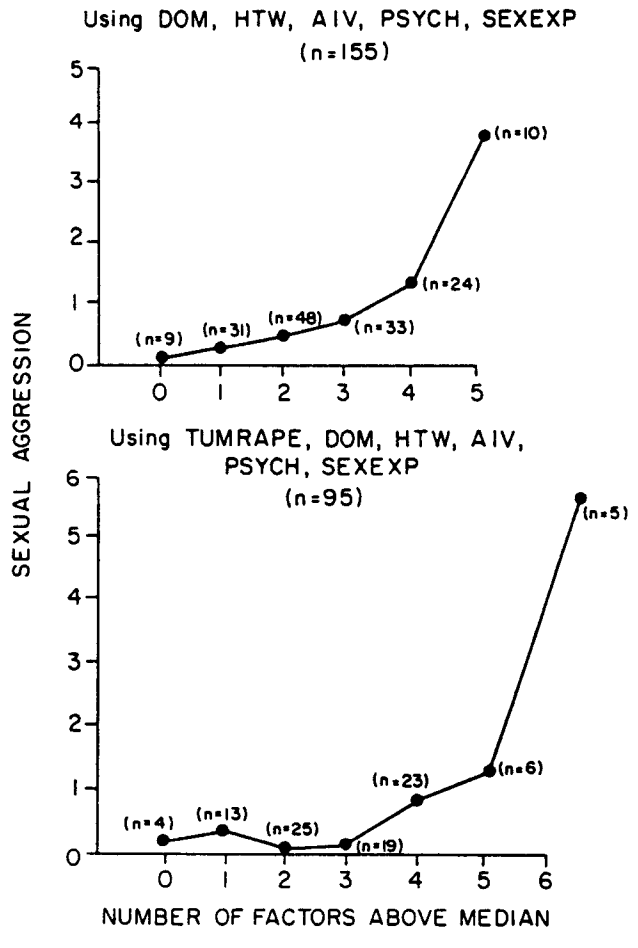

Figure 1. Mean levels of sexual aggression as a function of number of factors on which subjects scored above median.

action of several variables yielded considerably higher levels of sexual aggression than would be expected by the additive combination of them.

Malamuth and Check (1985b) very recently attempted a partial replication of the research reported here. They administered to 297 males the same measures used here, except for the sexual arousal indices and for psychoticism. The results replicated very successfully the present conclusions: The predictors related significantly to sexual aggression, a combination of predictors was superior to individual ones, and an equation including interactions was preferable to an additive one only. Further, classifying subjects according to the number of predictors on which they scored relatively high showed the same general relation reported here, although the slope of the line was somewhat less steep. This appeared to be due, at least in part, to a lower proportion of subjects in that study at the very high levels of sexual aggression as compared with the present or earlier studies.

Malamuth (1984b) recently assessed the ability of a number of the predictors used in the present research (i.e., tumescence rape index, self-reported arousal to rape index, dominance, AIV, and psychoticism) to predict laboratory aggression against female and against male targets. Laboratory aggression was measured in a procedure similar to that used by Malamuth (1983a). The results showed that except for the penile tumescence measure (which was in the expected direction but not statistically significant), all the predictors significantly related to aggression against females. The data for male targets were more ambiguous, suggesting no or possibly weak relations with the predictors. On the basis of this study and earlier work (Malamuth, 1983a; Malamuth & Check, 1982), it is apparent that the same predictors found here to relate to self-reported naturalistic sexual aggression also relate in similar ways to laboratory aggression against women.[5]

The present findings suggest a high degree of similarity between some factors contributing to stranger and to acquaintance rape. Although we did not specifically ask subjects whether they knew their victims, based on earlier studies using the same measure (see Koss & Leonard, 1984), it seems very likely that the vast majority of the sexually aggressive acts reported were in acquaintance situations. Yet, some of the same factors theorized and/or found to contribute to stranger rape (e.g., sexual arousal in response to aggression, dominance motivation, hostility toward women) related to sexual aggression among the subjects studied here.

The results suggest that the presence of any predictor alone is unlikely to result in high levels of sexual aggression. This conclusion may be particularly relevant to research focusing on sexual arousal in response to aggression. Although measures assessing such arousal (i.e., the tumescence rape index) have been used in the diagnosis and treatment of rapists (Quinsey, in press), there are considerable data showing that within the general population a substantial percentage of men show arousal patterns similar to those of known rapists (e.g., Malamuth, Check, & Briere, 1986). The present results are supportive of the view that sexual arousal in response to aggression is one of the factors that may create an inclination to aggress against women. They also indicate clearly that other factors must be present before such an arousal pattern will lead to aggressive behavior. The findings point to the types of variables that should be included in clinical and research assessments.

The data also provide important information pertaining to recent research on the effects of sexually aggressive mass media stimuli. In several studies (e.g., Linz, 1985; Malamuth & Check, 1981, 1985a) exposure to certain types of media stimuli changed men's attitudes about aggression against women, including rape. Some (e.g., Vance, 1985) have downplayed the social significance of such findings by asserting that attitudes of this type have not been shown to actually relate to aggressive behavior. The present data extend earlier laboratory findings (Malamuth, 1983a, 1984b; Malamuth & Check, 1982) in showing that the same scales used to measure the impact of media exposure on attitudes (e.g., the AIV scale) are useful predictors, in combination with other factors, of actual aggression in naturalistic and in laboratory settings. Although causal relations cannot be inferred on the basis of such correlational data alone, the findings are consistent with a theoretical model hypothesizing that media depictions contribute to changes in attitudes and that these may, under certain conditions, be one of the contributing factors affecting actual aggressive behavior (see Malamuth & Briere, in press).

An important goal for future research is to further develop and empirically test varied multifactorial models regarding the causes of sexual aggression. These models should attempt to define the causal links among the predictor variables in addition to their influences on sexual aggression. Structural equation modeling with latent variables (e.g., Bentler & Bonett, 1980; Kenny & Judd, 1984) may be particularly suited for this purpose. As well, such models should incorporate two conceptual elements suggested by the present data in combination with earlier work (e.g., Malamuth, 1984a). First, rather than adopting an "all or none" approach, sexual aggressiveness should be conceptualized along a continuum encompassing both differing degrees of inclinations to aggress and differing levels of actual aggressive behavior. Second, in attempting to understand the causes of relatively high levels of this continuum, emphasis should be placed on analyzing crucial configurations of multiple interacting factors (i.e., motivational, disinhibitory and opportunity) rather than on searching for a single or even the primary causal factor.

[5] Some subjects in the research measuring laboratory aggressiveness also participated in the present research. This enabled assessing the relation between laboratory aggression and a composite of six items from the measure of naturalistic sexual aggression that concern the use of force or aggression. (The other three items refer to psychological tactics such as "saying something you don't mean.") Reported naturalistic aggression correlated significantly with both laboratory aggression against males, $r(47) = .25$, $p < .04$, one-tailed, and against female targets, $r(38) = .31$, $p < .025$, one-tailed.

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