

A Brunswikian Evolutionary- Developmental Theory of Adolescent Sex Offending

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A Brunswikian Evolutionary-Developmental model was developed to relate the sex offending behavior of adolescents to other forms of social deviance, tracing a history of repeated frustration and failure in various competitive sexual strategies and escalation to more extreme means of obtaining sexual gratification. Four hypothetical constructs were proposed as stages in the development of sexual criminality: (1) Psycho-Social Deficiency (PSD); (2) Non-Criminal Sexuality (NCS); (3) Non-Sexual Criminality (NSC); and (4) Sexual Criminality (SC). Significant direct and indirect pathways led from PSD to SC through both NCS and NSC, each time facilitated by an interaction with PSD. Although the causal orders between stages remain equivocal, the current results are consistent with our theory and establish the heuristic value of our theoretical approach, providing empirical support for otherwise counterintuitive predictions. This interpretation also offers hope for focusing preventative intervention at one major root cause of this unfortunate cascade of consequences, Psycho-Social Deficiency. Copyright © 2000 John Wiley & Sons, Ltd.

Evolutionary theory provides us with two principal alternative hypotheses regarding the proximate causation of human sexual coercion. The first is that there exists a specific behavioral adaptation for sexual coercion. Thornhill and Thornhill (1992) have hypothesized that the use of rape and other coercive sexual behaviors have an evolutionary history of promoting the reproductive success of the per-

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petrators. Under this formulation, the entire suite of behavioral tactics involved in sexual coercion is preprogrammed by sexual selection into a single facultative psychological mechanism. Thus, if this hypothesis were true, we would expect to see the putatively unitary adaptation for sexual coercion express itself in a holistic, "all-or-nothing," manner. This does not mean that there cannot exist continuous gradations of sexual coerciveness as a dimensional trait, but that the entire suite of component behaviors should covary in unison. For example, one convincing sign that such an adaptation is in place is the presence of an associated physiological structure for rape (Thornhill & Alcock, 1983). Claspers, which are solely used for forced copulation, exist in several species of *Panorpa* scorpionflies.

There are often problems, however, in establishing any simple one-to-one correspondence between an observed pattern of behavior and its ultimate adaptive function. For example, evolutionary theory posits that genetic propagation is the ultimate selective pressure underlying sexual behavior. How, then, do we explain the so-called "pedophilia" (sexual coercion of underaged individuals) practiced by many adolescent sex offenders, given that it cannot be reproductively effective, even in principle? Such seemingly misdirected sexual effort could be considered an artifact of a general adaptation for sexual coercion, analogous in certain ways to the observed patterns of physical and sexual abuse of pups by elephant seals and southern sea lions (Campagna & Le Boeuf, 1988; Campagna, Le Boeuf, & Cappozzo, 1988) and to the corresponding patterns of child physical and sexual abuse by wife batterers (Figueredo & McCloskey, 1993).

The second hypothesis offered by evolutionary theory responds to the simplicity of the first, at least when applied to more complex organisms, and is the main focus of this article. It posits that sexually coercive behavior might be a side-effect or additive composite of other, more general, behavioral adaptations (Thornhill & Thornhill, 1992). For example, sexual violence could be merely an interactive product of separate sexual and violent tendencies (Figueredo, 1992). If this second hypothesis were true, we would expect to observe different combinations of the component behavioral traits, each functioning independently as a separate adaptation in its own domain. The concurrence of these separate adaptations into the constellation we call sexual coercion would therefore have to be explained as either a chance coincidence of independently assorted traits, or as a systematic confluence of some set of strategic circumstances that simultaneously favor the development and use of each behavioral component.

One way to test the validity of this hypothesis is to first deconstruct the comorbid complex of adolescent sex offending into its major components and then reconstruct the conditions under which these components would likely co-occur. For example, we could separately examine the proposed etiologies of conceptually distinct behavioral components, such as sexual deviance and antisociality, and consider what specific conditions might favor their concurrent development.

Rowe's (1990) work provides a starting point by using a synthesis of evolutionary psychology with behavioral genetics to derive both the sexual and criminal components of adolescent sexual offending. According to Rowe, genetic influences on antisociality can be best thought of as those genes that produce personality characteristics that dispose an individual to more easily acquire and be reinforced for antisocial behaviors. "A way of conceptualizing this genetic influence is to think of the genes [as] producing differences in nervous system functioning, which

in turn affects the ease with which behaviors are learned and the preference expressed for one behavior over another” (p. 123). While Rowe emphasizes the importance of genetic influences, he also recognizes the role of environmental factors. “This logic, however, does not mean that genetic differences at birth are the sole cause of behavioral differences. The final expression of these genetic differences may depend on the range of available environments during development, and they may be expressed more strongly in one environment than another” (p. 123). Inherited traits could provoke reactions from the environment in a process referred to as “a *reactive* genotype–environment correlation.” Rowe (1990) gives the example of an unattractive individual who receives negative social attention that in turn results in delinquent behavior.

The power of this perspective has been demonstrated by Rowe (Rowe, 1986; Rowe, Rodgers, & Meseck-Bushey, 1989). He has shown that the genetic link between the level of early sexual behavior and the level of delinquency in adolescence is so strong that early sexual behavior in one sibling can be used to predict the level of delinquency in the other! These findings suggest a possible causal relationship between delinquency and sexual development—i.e., that early sexual activity predisposes adolescents to delinquency.

More recently, Rowe, Vazsonyi, and Figueredo (1997) have confirmed that a heritable disposition called “mating effort” is a significant predictor of juvenile delinquency. In sociobiology, reproductive effort is roughly partitioned into two complementary components: mating effort (ME) and parental effort (PE). ME is that portion of the total reproductive effort that is invested in the initial acquisition of mates as sexual partners. ME may also include some degree of short-term guarding of mates from rival males. Such short-term mate guarding should not be interpreted to mean lifelong commitment; for example, in many species, the period of mate guarding is on the order of several days. PE, on the other hand, is that portion of the total reproductive effort that is invested in the rearing and defense of offspring. This often involves male provisioning of material resources for the offspring and the establishment of a long-term pair bond with the female. Because any individual must allocate limited resources between these two components of reproductive effort, there is expected to be an inverse relationship between high PE and high ME strategies. Furthermore, it was expected that higher PE was more likely to be consistent with prosocial reproductive strategies, while higher ME was more likely to be consistent with antisocial reproductive strategies. As predicted by this theory, those persons psychometrically identified as high ME individuals (by a new scale dubbed the MES) were found to be more sexually active at an early age, as well as at significantly higher risk for juvenile delinquency. This theory further posits that the higher average ME for human males, as compared to human females, is the fundamental reason for their universally higher rates of delinquency (cf. Daly & Wilson, 1988).

This ME theory of delinquency is consistent with that of Ellis (1989), who had previously argued that exposure to male sex hormones (androgens) at various stages of development contributes to an increased tendency toward what he termed *victimizing behavior*. Victimizing behavior was defined as “all acts that either injure another social group member or deny a member access to resources” (Ellis, 1987, p. 154). According to Ellis, victimizing behavior has evolved as a reproductive strategy for human males—it is useful when competing for access to

a limited number of resources, whether they be money, sex, or power. Victimized behavior in its more subtle form includes commercial or capitalistic competition, and in its more aggressive form includes crimes against persons and/or property. The boundary between acceptable competition and unacceptable crime is determined by societal laws and tolerance. Developmentally, victimizing behavior manifests itself during adolescence with varying forms of “juvenile delinquency”, which range from mild acts of rebellion, disrespect of authority, and increased high-risk behaviors, to acts of vandalism, theft, and other crimes. Furthermore, Ellis’ theory predicts that “difficulties in learning (due either to a low general aptitude or to specific learning disabilities) will be positively associated with involvement in criminality and negatively associated with success in profit-making commercial activities” (p. 628). According to Ellis, this theory does not deny the importance of other causal factors for criminal behavior, but, instead, provides some explanation as to why some people are more *disposed* to criminal (victimizing) behavior.

Ellis’ (1987, 1989) theories, like those of Rowe *et al.* (1997), interpret both specifically sexual criminality and generalized “nonsexual” criminality as different aspects of the same evolved male reproductive strategy (associated with high ME) and postulate a central influence of male sex hormones as critical in the development of the whole spectrum of victimizing behaviors. Furthermore, both theories recognize the possible roles of other predisposing factors, such as depressed mental abilities and sexual unattractiveness, as potentially reactive genotype–environment correlations contributing to both sexual and nonsexual delinquency.

An emergent construct, also derived from evolutionary theory, that is relevant to this proposed etiology of adolescent sex offending is that of the competitively disadvantaged male (CDM). The designation CDM was first used in a study examining the causes of domestic violence, spousal rape of adult women, and sexual abuse of children (Figueredo & McCloskey, 1993). In this work, CDMs were theorized to rely on coercion as their primary means of obtaining sex. CDMs were thought to be unable or unwilling to effectively use “normal” or more appropriate sexual strategies; hence, they are forced to acquire sex by coercing their partner through verbal threats, manipulation, or physical force. CDM characteristics may include (i) poor competency/skills in social or sexual situations, (ii) physical unattractiveness to women, and (iii) low socioeconomic status. CDMs may possess some or all of these characteristics, and as a result have a “relative disadvantage in the sexual marketplace” (Figueredo & McCloskey, 1993). This formulation suggests that those males who have psychological or social problems would be more inclined to utilize more aggressive (criminal) tactics in order to stay competitive in the sexual marketplace (cf. Figueredo, 1995). Indeed, Saunders, Awad, and White (1986) have suggested that some adolescent sex offenders may suffer from what they have dubbed a “courtship disorder.” If so, then what could be the principal root causes of this disorder?

Clearly, gross morphological factors such as purely physical unattractiveness (e.g., due to fluctuating asymmetry) are likely to play a role in both human and nonhuman mating systems (cf. Thornhill, 1992, 1993). But many seemingly unattractive males are able to find sexual partners because sexual “attractiveness” to human females often has more to do with other endowments and attributes, such as intellectual capacity, social status, and financial prospects (Buss, 1989, 1994). Indeed, there is a great deal of evidence that adolescent sex offenders often

have learning disabilities. Awad and Saunders (1989) assessed 29 adolescent child molesters (mean age was 14 years), and found 83% had “serious learning problems” (48% were diagnosed with a learning disability, and 65% failed a grade). There was also evidence of other factors that might be viewed as limiting the resources of adolescent sex offenders. For example, 62% of the adolescent child molesters were described as “socially isolated” with 45% demonstrating antisocial behaviors (stealing, truancy, physical aggressiveness), and 33% were diagnosed as suffering from emotional problems prior to committing the offense. Overall, 87% of the sample were believed to suffer from a diagnosable disorder using DSM-III criteria, with one-third of the sample having received previous outpatient psychiatric treatment. Similar results were obtained from a sample of 19 adolescent sex offenders who had committed “hands-off” offenses (Saunders & Awad, 1991).

In comparison to male delinquents matched on age, socioeconomic background and time of referral who were convicted of nonsexual offenses the child molesters were more likely to have had chronic, severe learning difficulties and to be socially isolated (Awad & Saunders, 1989, p. 198).

Awad and Saunders also discussed the link of “antisocial traits” as a contributing factor to adolescent sex offending: “In some cases antisocial traits were secondary to sexually deviant urges as motivating factors . . . in others, antisocial traits and sexually deviant impulses jointly contributed to the commission of the offense and in a few cases the sexual offense seemed to be an expression of an exploitative attitude towards others rather than of sexual deviance” (p. 200).

Several other studies appear to support this finding of poor psycho-social functioning as a causal influence on sex offending behavior (O’Brien & Bera, 1986; Fehrenbach, Smith, Monastersky, & Deisher, 1986). One such study compared juvenile sex offenders to a sample of violent delinquents. Fagan and Wexler (1988) found that juvenile sex offenders were more sexually isolated, had girlfriends less often, and rated sexual relations as “unimportant.” However, Davis and Leitenberg (1987) pointed out that many of these studies lack an adequate comparison or control group, consequently, it is “problematic” to establish a relationship between adolescent sex offending and social and psychological deficits.

More recently, Hunter and Figueredo (2000) used structural equations modeling to investigate the relationship between characterological and experiential factors in the prediction of patterns of sex crime perpetration in adolescent males. The characterological factors included various measures of personality and psychosocial adjustment. It was found that adolescent sex offenders evidenced deficits in self-sufficiency and had more pessimistic explanatory styles than nonsexually-offending controls. Self-sufficiency was defined as reflecting attitudes of self-confidence, independence, assertiveness, and self-satisfaction. With regard to pessimism, the sexually offending youths showed a greater tendency than controls to assign internal, stable, and global attributions for the occurrence of negative events in their lives. The results of this study were interpreted as supporting a conceptualization of juvenile sex offenders as youths who are lacking in social competencies and who are perhaps competitively disadvantaged in the social and sexual arenas relative to their peers by both early environmental challenges and

exacerbating constitutional deficits. This form of coercive sexuality may thus represent a conditional adaptive strategy involving elements of reactive heritability.

Thus, the beginnings of an integrative theory can be sketched out in which both genetic and environmental influences can be hypothesized to feature prominently in the etiology of adolescent sexual offending (cf. Kobayashi, Sales, Becker, & Figueredo, 1995). An evolved genetic predisposition to a high mating effort reproductive strategy can be coupled with either innate or acquired psycho-social disadvantages to produce a variety of different forms of sexually deviant and antisocial (delinquent or criminal) behaviors.

However, one potential problem for the application of this evolutionary developmental theory to the complexities of human sexual and criminal behavior would reside in the precise proximate mediation of these various adaptive strategies. Whereas behavioral ecologists have specified the functional requirements of a conditional strategy, the proximate mediation of such an adaptation has not been very well specified. One common metaphor is that of a “developmental switch.” This can be described as an ethological mechanism, analogous to imprinting, in which a specific environmental contingency directly triggers an innate releasing mechanism for the conditional strategy, which would presumably operate otherwise identically to a species-typical fixed action pattern in that particular individual. Historically, this has been the kind of “push–pull, click–click” mechanism favored by ethologists and behavioral ecologists to avoid the postulation of sophisticated mental faculties (cf. Tinbergen, 1950). It is quite possible that such mechanisms indeed exist exactly as proposed in many simpler species, such as insects (cf. Thornhill & Alcock, 1983). On the other hand, it is not consistent with the psychological evidence regarding the operating characteristics of more advanced learning processes to presume that this is the way a conditional strategy would be proximately implemented in many of the more complex vertebrate animals, such as humans. What needs to be determined is whether there are any established mechanisms of behavioral development that can plausibly serve to produce the functional equivalent of a conditional developmental strategy.

Unlike the mechanistic theories of the Pavlov (1927), Hull (1943), and Spence (1956) tradition, in which conditioning merely reinforces the associations between stimuli and responses by random trial and error, the more cognitive theories of Tolman (1925) and Brunswick (1952, 1955) imply that what an individual organism learns is instead the relative efficacies of various responses, representing alternative *means* to a desired end. Thus, a hierarchy of alternative (“vicarious and intersubstitutable”) responses is established in the behavioral repertory, based on the individual’s past experience with the relative *ecological validities* of these alternative means in producing any given distal achievement (cf. Petrinovich, 1979). We proposed that this is the most plausible known mechanism for implementing a conditional developmental strategy in humans.

Through the experience of its interaction with its immediate environment, an individual would thus form an assessment of the relative effectiveness of various adaptive strategies for which it is biologically prepared. Thus, the learning need not be totally *de novo*, as implied by the exclusively environmentalist perspectives of radical behaviorism, but based at least in part on previously evolved and genetically available behavioral programs of some sophistication and complexity (cf. Garcia & Ervin, 1968; Garcia, Hankins, & Rusiniak, 1974; Mayr, 1974;

Seligman, 1970; Seligman & Hager, 1972; Waddington, 1957). One evolved developmental program in our own species which is now generally believed to fall into this category is that of human language acquisition (Pinker, 1994).

Nevertheless, the role of the immediate environment is often critical in determining what behavioral strategies work best *for that particular individual*. This theory implies that there are other phenotypic features of the individual, beyond the behavioral strategy itself, which may also figure prominently in this interaction. Thus, the individual is not merely passively assessing the external environment in which it is developing, but is instead assessing *itself* within that environment. This predicts that individual differences related to the implementation of alternative strategies play a major role in their development.

In summary, these behavioral repertoires may be established either through evolved genetic preparedness or through environmental exposure to the coercive sexual behavior of social models, such as parents, or through some combination of both. Psycho-sexual development also entails a comprehensive assessment of the individual's sociosexual capabilities and opportunities. In humans, this may involve such physical characteristics as size, strength, health, and attractiveness, as well as such psychological characteristics as intelligence, self-efficacy, social skills, personality, and socioeconomic status and/or prospects (cf. Hunter & Figueredo, 2000). Thus, an individual will preferentially select the sexual strategy that is most consistent with optimal utilization of the physical and psycho-social assets with which it is naturally endowed.

Coercive sexual strategies will therefore be selected by individuals when the major noncoercive and prosocial avenues of sexual expression fail. After engaging in some degree of experimentation with these behaviors, especially during adolescence, a competitively disadvantaged individual can be expected to select between these alternative adaptive strategies depending on the relative success encountered in practicing each of them. It is possible that the degree of competitive disadvantage experienced therefore plays a role in the development of escalating levels of social and sexual deviance. If so, these alternative sociosexual strategies can be arranged hierarchically in the following series in descending order of preference: (1) deviant sexuality, which is paraphilia of a not necessarily criminal nature, as a partial release from the mainstream sexual competition through occupying an alternative sociosexual niche; (2) criminality, which is antisocial delinquency of a not overtly sexual nature, as an alternative means of economic acquisition for resource-based sexual competition; and, finally, (3) sexual criminality, which is the direct coercion of females or juveniles, as a last resort when all other options fail. Clinical folklore also tells us that this is precisely the status hierarchy generally to be found among inmates in correctional institutions, with child molesters ranking below rapists in the sex criminal category.

This Brunswikian Evolutionary–Developmental (BED) Theory addresses the ultimate motivation of sex offending behavior. The model suggests a causal sequence that has progressive stages leading to sex offending behavior. The results tell a story which is defined by repeated frustrations and failures to attain sexual gratification. Those adolescent sex offenders who suffer from psycho-social problems, and consequently might be considered to have a competitive disadvantage in the sexual marketplace, could develop deviant sexual interests. Their inability to use normal/appropriate strategies for acquiring intimate relations with a peer

might lead them to develop deviant/unusual sexual interests as a means of sexual expression. Our BED Theory would predict that when indirect means of sexual competition fail, more direct means become necessary (Thornhill & Thornhill, 1992). Such would be the case with the adolescent youth who was unable to remain sexually competitive, and turns to a more direct strategy including acting out criminally. The adolescent begins to engage in delinquent/victimizing behaviors (cf. Ellis, 1989), committing crimes as a way of securing resources and status in an effort to remain sexually competitive. The final stage involves the use of coercive sexual strategies to attain sexual objectives. The etiology of sex offending behavior can be seen as a cascade of failing sexual strategies starting from psycho-social deficiencies and leading to sexual deviance to social deviance and finally to sexual criminality.

The rest of this article uses the sex offending behavior of a clinical sample of 82 adolescents to test a causal representation of this evolutionary developmental model. This model incorporates the psycho-social, criminal, and sexual aspects of the sex offending syndrome. It is hypothesized that those characteristics relating to the individual's psycho-social deficits would be strong predictors of deviant sexual interests; these deviant sexual interests would, in turn, predict the adolescent's involvement in non-sexual criminal behavior; finally, non-sexual criminal behavior would be the best predictor of sexual offending behavior. In keeping with the theorized hierarchical ranking of deviant sociosexual strategies, it was also predicted that psycho-social deficits would moderate the transition between each stage and its subsequent stage in the hypothesized progression. We concede in advance, however, that these data are purely correlational and do not definitively prove that either our causal model or the integrative theory that it is derived from is correct, or even that it represents the only valid interpretation of these results. We merely wish to demonstrate that the data are at least consistent with the theory and to use the causal pathways estimated in our model to illustrate in some detail the mechanisms that we are proposing might be underlying the development of adolescent sexual offending behavior. More rigorous tests can and should be developed in the future, but we believe that this present exercise is a necessary first step in the exposition and elaboration of our integrative model.

METHODS

Participants

Participants were adolescent males (ages 13 to 18) who had been charged with or convicted of a sex crime. These adolescents had been referred to the Sexual Behavioral Clinic (SBC), an outpatient evaluation and treatment clinic for sexual offenders in New York City, for assessment and treatment from 1985 to 1990. In clinical interviews, all participants were diagnosed as nonpsychotic and able to give informed consent. Most referrals were from the criminal justice system. Offenses committed included sexual contact with minors at least five years younger than the offender, incest, and rape. The victims of these sex crimes included both males and females. The ethnic composition of the adolescent sex offenders was 60% were African-American, 25% were Hispanic-American, and 15% were Eur-

opean–American. This was reflective of ethnic composition of adolescents in the criminal justice system for the state of New York. Some participants were dropped due to missing data. A total of 82 adolescent sexual offenders were used in the final analyses.

Procedures

Informed consent was obtained from each participant and his parent(s) or guardian(s). Structured clinical interviews were conducted with adolescents and parent(s) or guardian(s). Each adolescent was asked to complete questionnaires dealing with demographic information, personality characteristics, sexual history, criminal history, psycho-social development, and psycho-sexual development. Psychometric assessments included the PCI (Parent Clinical Interview, parts a–d), ACI (Adolescent Clinical Interview, parts a–d), BDI (Beck Depression Inventory), DEMO (Adolescent Demographic/Assault Questionnaire), PAS (SBC Psychophysiological Assessment Summary, parts a–e). The plethysmograph evaluation (PAS) was completed only on those who consented (cf. Becker & Kaplan, 1988 for description of procedure). Each assessment instrument or questionnaire was reviewed by a team of experts who assigned the individual items or group of items from each instrument to one of four major categories. The categories were deficits in psycho-social functioning, non-criminal sexual deviance, non-sexual criminality, and sexual criminality. The items within each of these categories are detailed in Appendices A through D, all coded according to the different sources from which they were derived. While several other measures were also included in the assessment protocol, only those relating to the adolescents' psycho-social functioning, criminality, and sexuality were used in this analysis.

Statistical Analyses

The Measurement Model

Factor scores for each of the four categories were estimated as unit-weighted factor scales, which were the simple arithmetic means of the standardized (Z) scores of the indicators. Indicators were assigned to factor scales based on *a priori* theory. To check for internal consistency, “item–total” correlations were computed for each indicator with the composite factor scale and tested for statistical significance. This procedure generated a table of bivariate correlations that was conceptually equivalent to a factor structure, providing detailed information on the “factor loadings” of the individual items. Although these bivariate correlations varied somewhat between individual items, their pattern was generally supportive of the convergent validity of our constructs. Only those items which correlated reasonably highly with the factor (statistically significant at $p < .05$ and greater in magnitude than $r = .25$) and made theoretical sense in context were retained.

This initial scale construction was done because, although this was not a “small” sample in absolute terms, the number of indicator items was too numerous with respect to our sample size to support conventional factor analytic procedures for

the factor scales. In essence, this procedure is identical to those described for scale construction in classical texts (e.g., Wiggins, 1973). Numerous empirical studies, as well as Monte Carlo simulations, have shown that “unit weighted” factor scores, in which all significant indicators are weighted equally (i.e., 1.0), possess the following desirable characteristics: (1) they are typically correlated about .95 to “differentially weighted” factor scores, (2) they are more generalizable across independent samples, and (3) they are considerably easier to calculate (Gorsuch, 1983). The relative virtues of this method with “small” samples are discussed at greater length in Figueredo *et al.* (1995).

The Structural Model

A causal model involving four factors was constructed. The four hypothetical constructs, relating to the proposed causes of sexual criminality, were defined as follows: (1) *psycho-social deficiency (PSD)*, as detailed in Appendix A; (2) *non-criminal sexuality (NCS)*, as detailed in Appendix B; (3) *non-sexual criminality (NSC)*, as detailed in Appendix C; and (4) *sexual criminality (SC)*, as detailed in Appendix D. The psycho-social deficiency factor included measures of various forms of psychopathology and ratings of social skills and related mental abilities. This included such items as the Beck Depression Inventory and their parents’ ratings of the youths’ physical, mental, and emotional development. The non-criminal sexuality factor included measures of sexual variation that may be outside of the dominant sociocultural norms but are not necessarily criminal or antisocial in nature. For example, certain sexually deviant behaviors are “victimless” in that they do not directly impinge upon or violate the rights of others. These included such items as plethysmographic measures of sexual arousal to deviant and non-deviant stimuli and their parents’ ratings of the youths’ use of pornography, transvestitism, fetishism, and masochism. The non-sexual criminality factor included various measures of juvenile delinquency or antisocial behavior that are not directly sexual in nature, such as crimes against property or non-sexual aggression against persons. This included items such as their parents’ ratings of the youths’ commission of acts of vandalism, burglary, robbery, violent (non-sexual) assault, and as well as both their parents’ and their self-reports of arrests for nonsexual offenses and the criminal use of weapons. Finally, the sex criminality factor included measures of specifically sexual offenses. This included items such as their parents’ report of the youths’ commission of rape, child molestation, frottage, voyeurism, exhibitionism, and arrests for sexual offenses as well as the youths’ self-reports of sex offenses (including age, sex, and relationship of victim) committed and the amount of physical aggression used in their various acts.

A series of hierarchical regressions was used to model the hypothesized causal order among the outcome factors (Cohen & Cohen, 1983). This procedure can be summarized as follows: (1) the first factor is used to predict the second factor; (2) the second factor is then used to predict the third, followed by the first; and (3) the third factor is then used to predict the fourth, followed by the second, followed by the first. This was done to statistically control for any indirect effects between any two outcome factors that is causally mediated by one or more other intervening factors (cf. Gorsuch & Figueredo, 1991). Each effect size therefore represents a direct effect, or semipartial correlation (Cohen & Cohen, 1983), that

is statistically controlled for all those that are modeled as causally prior. Interactions between the factors were also included in the specified causal order, which is why standard structural equation modeling programs (e.g., Bentler, 1989) were not appropriate. Thus, in this study:

- (1) *non-criminal sexuality (NCS)* was predicted from *psycho-social deficiency (PSD)*;
- (2) *non-sexual criminality (NSC)* was predicted from *non-criminal sexuality (NCS)*, *psycho-social deficiency (PSD)*, and the interaction between them ($PSD \times NCS$);
- (3) *sexual criminality (SC)* was predicted from *non-sexual criminality (NSC)*, *non-criminal sexuality (NCS)*, *psycho-social deficiency (PSD)*, and their three two-way interactions ($SEX \times NSC$; $PSD \times NCS$; $PSD \times NSC$).

All hierarchical (sequential or “step-down”) multiple regression analyses were performed using UniMult (Gorsuch, 1991).

RESULTS

The results of the statistical analyses are summarized in Table 1. Effect sizes reported are semipartial correlations (Cohen & Cohen, 1983), with all hierarchically prior predictors statistically controlled. The causal diagram displayed in Figure 1 shows the multiple pathways to sexual criminality that were found to be statistically significant, including some interactive ones. Consistent with the hypothesized model, PSD was found to be a strong predictor of NCS ($sr = .67$). NCS was, in turn, the strongest predictor of NSC ($sr = .86$), an effect that was

Table 1. Hierarchical (i.e., sequential or step-down) multiple regression analyses

Variable	Effect size	Sum of squares	<i>df</i>	Mean square	<i>F</i> ratio	<i>p</i>
Dependent variable: <i>NCS</i> (non-criminal sexuality)						
<i>PSD</i>	$sr = .67$	35.87	1	35.87	63.6	<.0001
Error		45.13	80	.56		
Dependent variable: <i>NSC</i> (non-sexual criminality)						
<i>NCS</i>	$sr = .86$	59.61	1	59.61	477.90	<.0001
<i>PSD</i>	$sr = .32$	8.48	1	8.48	67.99	<.0001
$PSD \times NCS$	$sr = .20$	3.19	1	3.19	25.54	<.0001
Error		9.73	78	.12		
Dependent variable: <i>SC</i> (sexual criminality)						
<i>NSC</i>	$sr = .73$	43.41	1	43.41	117.74	<.0001
<i>NCS</i>	$sr = -.08$.48	1	.48	1.31	.3
<i>PSD</i>	$sr = .26$	5.46	1	5.46	14.80	<.001
$NCS \times NSC$	$sr = -.13$	1.35	1	1.35	3.65	.06
$PSD \times NSC$	$sr = .15$	1.94	1	1.94	5.26	.02
$PSD \times NCS$	$sr = -.09$.70	1	.70	1.90	.2
Error		27.66	75	.37		

Note: Tests have all prior independent variable(s) partialled out. Effect sizes (*sr*) are Pearson product-moment correlations (*r*) with prior independent and dependent variables partialled out.

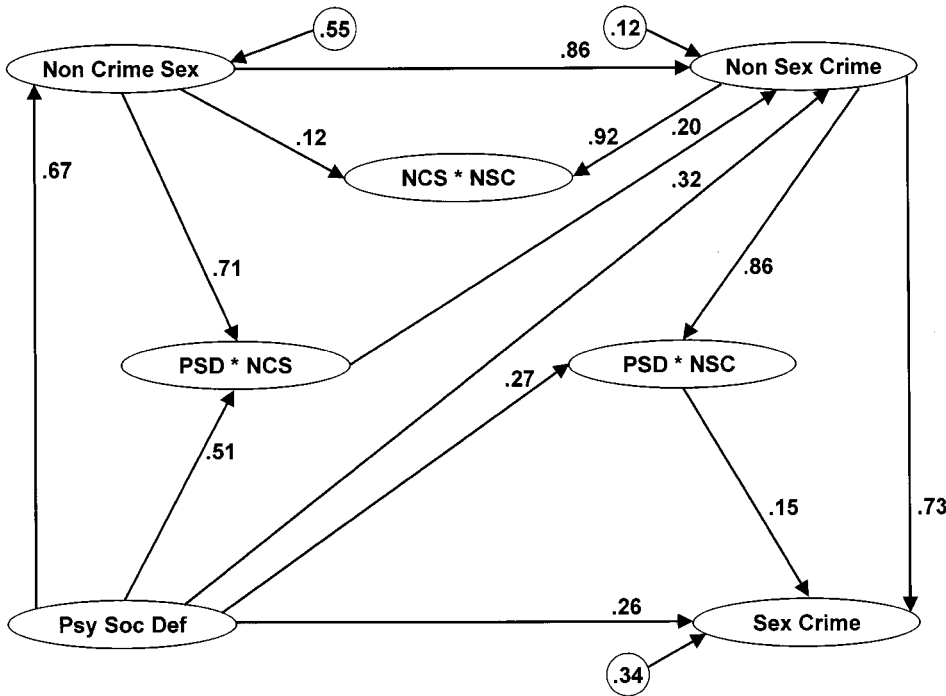


Figure 1. Causal diagram for multiple pathways in the etiology of adolescent sexual offending

further enhanced by the interaction with PSD ($sr = .20$). NSC was found to be the strongest predictor of SC ($sr = .73$), and was also enhanced by the interaction with PSD ($sr = .15$).

The model coefficients of determination (squared multiple correlations) were $R^2 = .45$ ($F(1,80) = 63.60$, $p < .0001$) for NCS, $R^2 = .88$ ($F(3,78) = 190.48$, $p < .0001$) for NSC, and $R^2 = .66$ ($F(6,76) = 24.11$, $p < .0001$) for SC. These represented the proportions of variance accounted for in each of the dependent variables by each of the three multiple regression models as a whole.

DISCUSSION

The significance, magnitudes, and directions of the multiple causal pathways reported are consistent with the BED Theory's hypothesized etiology of criminal sexual behavior—namely, that a lack of the requisite social skills and mental abilities might lead to frustration in the mainstream sexual marketplace and therefore to the selection of deviant avenues of sexual expression. The results show that psycho-social deficiency was a strong predictor of non-criminal sexuality. Non-criminal sexuality was, in turn, the strongest predictor of non-sexual crimi-

nality. This effect was further enhanced by an interaction with psycho-social deficiency, which may indicate that the frustration of deviant avenues of sexual expression by a lack of requisite abilities may facilitate turning to criminal instrumentalities.

Although these two categories superficially appear to have nothing in common, the BED Theory predicts that criminal behavior may be used as an alternative means of securing the resources and status that are instrumental in male sexual competition. Thus, although not directly sexual in physical instrumentality, non-sexual criminality can be seen as indirectly sexual in ultimate motivation. Finally non-sexual criminality was the strongest predictor of sexual criminality. This effect was also further enhanced by an interaction with psycho-social deficiency, which may indicate that failure at criminal instrumentalities (frustrated by a lack of requisite mental abilities) may facilitate turning to direct coercion as a means to achieve what are ultimately sexual objectives. This is also consistent with our BED Theory in that when the indirect means of sexual competition fail, direct coercion may become the last resort.

Importantly, our findings are also supported by prior research. Previous studies have also: (1) supported a link between non-sexual criminal behavior and sex offending (cf. Awad & Saunders, 1989; Saunders & Awad, 1991; Simon, Sales, Kaszniak, & Kahn, 1992); (2) found high incidences of learning disabilities, antisocial traits, and diagnosable psychological disorders in adolescent child molesters (Awad & Saunders, 1989; Kavoussi, Kaplan, & Becker, 1988); (3) reported an association between lower intelligence and greater responses to deviant stimuli in normal males (Barbaree & Marshall, 1989; Murphy, Haynes, Coleman, & Flanagan, 1985) and in male sexual offenders (Marshall, Barbaree, & Christophe, 1986; Marshall, Barbaree, & Eccles, 1991; Wormith, Bradford, Pawlak, Borzecki, & Zohar, 1988); and (4) implicated social deficits as a causal factor to sex offending (Becker & Abel, 1985; Fehrenbach *et al.*, 1986; Groth & Loreda, 1981; Groth, Longo, & McFadin, 1982). The results of our BED analysis also appear to be consistent with studies identifying sexual deviance as a contributing factor to sex offending (Awad & Saunders, 1989; Barbaree & Marshall, 1988; Bradford, Boulet, & Pawlak, 1992), but finding that non-criminal sexual deviance by itself does not constitute a sufficient cause for the development of sexual criminality. For example, a study by Templeman and Stinnett (1991) found a multiplicity of deviant sexual interests in the “normal” as well as the sex offender populations.

Finally, the present results are also consistent with the General Theory of Crime (Gottfredson & Hirschi, 1990) in that it shows a strong statistical association between sexual and nonsexual crimes. The General Theory of Crime (GTC) asserts that criminals are predominantly individuals who have low “self-control” and who take advantage of opportunities to commit crimes for immediate gratification and give little consideration of the consequences to themselves or their victims. Thus, their theory would predict that both sexual and nonsexual criminality is primarily attributable to the single causal factor of low impulse control. For example, Awad and Saunders (1989) describe a case of a 15-year-old sex offender who broke into a house with the intention to steal. While in the basement, he found a nine-year-old girl and attempted to rape her. Later, he returned to the house with the intention of killing the girl, but was arrested by the police. This youth had a history of thefts. In their 1991 study involving 19 adolescent sex

offenders, Saunders and Awad described another case involving a boy who began leaving obscene phone messages after having misdialed a telephone number that reached a woman's answering machine. In both cases these youth took advantage of an opportunity to commit a sexual crime.

However, the GTC does not address the ultimate sexual motivation of the criminal resource-acquisition strategy itself. Instead, the GTC would attribute all criminality directly to specific psycho-social deficiencies, such as poor impulse control. Although psycho-social deficiency did have statistically significant direct effects on all other subsequent outcome factors, these effects were found to be quite small by comparison with the principal pathways reported. Although the starting point of the model remains psycho-social deficiency, as would be predicted from the GTC, we believe that it is the evolutionary perspective that is most congruent with the broader implications of the existing data by tracing the ultimate origin of these sexual and criminal impulses and not just the relative difficulty presumably experienced by certain individuals in their control.

While this study provides interesting findings in support of the BED Theory, these results are preliminary, and should be interpreted with caution. Participants were youth from the inner city of New York who were referred by the criminal justice system. This sample consisted of mostly minority offenders who had been caught and had either admitted their guilt or been found guilty of a sex crime. Furthermore, most of the information gathered relied heavily on self-reports of the adolescents or their family members and other potentially biased data—both adolescents and parents may deny or distort information (cf. Awad & Saunders, 1989). Youth who commit sexual offenses may even be more likely to minimize reporting offense history than other youthful offenders (Fagan & Wexler, 1988). In addition, these data are cross-sectional, rather than longitudinal, and the actual causal order between outcome factors remains equivocal. Prospective research would be very helpful establishing the predictive validity of these constructs and the causal relations between them. Similarly, the model's causal stages have yet to be tested with adequate comparison groups of other adolescents—those who might be equivalent on the various risk factors (e.g., psycho-social problems, commission of other crimes), but are not sexual offenders. However, there exist practical difficulties in obtaining such a comparison group. For example, it is extremely difficult to obtain parental consent for many of these measurements (such as penile plethysmography under exposure to deviant sexual stimuli) in normal adolescents. What we did was to exploit the natural variability observed in both the severity and extent of offending in a sample of known sex offenders.

Moreover, while our evolutionary developmental model provides a valuable starting point for examining the complex issues related to the etiology of adolescent criminal sexual behavior, we can only show that the current results are consistent with BED Theory; we cannot yet *definitively* rule out alternative explanations. Nevertheless, the results are highly encouraging in that they testify to the heuristic value of our theoretical approach by providing empirical support for certain otherwise counterintuitive (or at least non-obvious) predictions. Our interpretation of the data tells a sad, albeit somewhat unsympathetic, tale of repeated frustration and failure in various competitive sexual strategies, leading to an escalation of more and more extreme means of obtaining sexual gratification. On the other hand, it also offers some hope for preventative intervention at the

point that is suggested as one of the major root causes of this unfortunate cascade of consequences, psycho-social deficiency.

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APPENDICES A–D: CODES KEY FOR ASSESSMENT INSTRUMENTS AND QUESTIONNAIRES

PCI Parent Clinical Interview (parts a–d)
ACI Adolescent Clinical Interview (parts a–d)
BDI Beck Depression Inventory
DEMO Adolescent Demographic/Assault Questionnaire
PAS SBC Psychophysiological Assessment Summary (parts a–e)

APPENDIX A: PSYCHO-SOCIAL DEFICIENCY (PSD)

PCla 57) Does your son have a history of emotional problems?

Compared with other boys, how fast:

PCla 60) Do you feel that your son has developed physically?
PCla 61) Do you feel that your son has developed mentally?
PCla 62) Do you feel that your son has developed emotionally?

Between the ages of 7 and 12, compared with other boys:

PClb 63) Could your son sit still without fidgeting?
PClb 64) Was he overactive during his sleep?
PClb 65) Was he always on the go?
PClb 66) Did he have trouble finishing things like homework?
PClb 67) Was he easily distracted?
PClb 68) Did he have more trouble than other children paying attention in school or home?
PClb 69) Did he have trouble playing games for more than a short while?
PClb 70) Did he have trouble waiting his turn in games?
PClb 71) Did he talk a lot in school when he wasn't supposed to?
PCLc 17) Has your son not done his homework?
PCLc 20) Has wrong or shameful does your son feel this is?
PCLc 33) Has your son lied to his parents?
PCLc 36) How wrong or shameful does your son feel this is?

How important are each of the following treatment goals to you now?

DEMO 25) Decreasing your deviant sexual arousal
DEMO 26) Increasing your arousal to your peers
DEMO 27) Gaining control over your sexual behavior
DEMO 28) Expressing your feelings to others; being more assertive
DEMO 29) Learning more about sex
DEMO 30) Learning to communicate better with my peers

- DEMO 31) Decreasing your risk of arrest/rearrest for sex crimes
- DEMO 32) Making certain your beliefs about sexual behavior are like others
- DEMO 33) Developing a lifetime plan for controlling your sexual behavior
- DEMO 34) Becoming more socially acceptable to other people
- DEMO 35) Improving my relationships with my family
- DEMO 36) Improving my relationships with my girl or boy friend
- ACla 38) Number of times you have been hospitalized for a psychiatric/psychological problem?
- ACla 41) Are you currently on any medications?
- ACIb 27) Therapist rating of social skills:
- ACIb 28) Therapist rating of assert skills:
- ACIb 29) Therapist rating of empathy skills:
- ACIb 30) Subject's rating of social skills:
- ACIb 31) Subject's rating of assert skills:
- ACIb 32) Subject's rating of empathy skills:
- ACIb 40) If you dropped out what was the last grade you completed?
- BDI—Beck Depression Inventory (total score)

APPENDIX B: NON-CRIMINAL SEXUALITY (NCS)

- PCLc 45) Has your son shown dirty pictures to or talked dirty to someone?
- PCLc 48) How wrong or shameful does your son feel this is?
- PCLc 61) Has your son used articles of clothing for sexual purposes?
- PCLc 64) How wrong or shameful does your son feel this is?
- PCLc 69) Has your son dressed as a woman for sexual purposes?
- PCLc 72) How wrong or shameful does your son feel this is?
- PCLc 73) Has your son got sexually turned on by hurting or being hurt by someone?
- PCLc 76) How wrong or shameful does your son feel this is?
- PCLd 28) If your son got sexually turned on by hurting or being hurt by someone, how harmful do you think each of these acts would be to the person that he did them to?
- ACIc 54) Total number of non-deviant sexual partners that were female?
- ACIc 59) Current frequency of masturbation to nondeviant sexual material involving females?
- ACIc 61) Current frequency of masturbation to nondeviant sexual material involving males?
- ACIc 63) What percentage of your sexual fantasies are nondeviant and about females?
- ACIc 66) What percentage of your sexual fantasies are nondeviant and about males?
- ACIc 69) Approximately how many nondeviant sexual fantasies do you have each day?
- ACIc 73) How does pornography affect your nondeviant sexual arousal?
- PASb 41) Penile plethysmograph—Female age 13–18 (percent of full erection)
- PASb 24) Penile plethysmograph—Male age 13–18 (percent of full erection)

APPENDIX C: NON-SEXUAL CRIMINALITY (NSC)

- PCla 49) How many times has your son been arrested for a non-sexual crime?
 PClb 53) Did he skip school more than 20 days a year for 2 years or more?
 PClb 54) Was he ever suspended or expelled from school?
 PClb 55) Did he run away from home and stay out overnight more than once?
 PClb 56) Did he lie a lot even when he didn't need to avoid punishment?
 PClb 57) Did he get drunk or use drugs more than twice?
 PClb 58) Did he steal things outside of the home on more than two occasions?
 PClb 59) If so, did he use force or a weapon?
 PClb 60) Did he deliberately damage things that were not his?
 PClb 61) Did he start fist fights on more than two occasions?
 PClb 62) Did he get into trouble at home or at school because he was always breaking the rules?
 PClc 13) Has your son stolen from a store?
 PClc 16) How wrong or shameful does your son feel this is?
 PClc 21) Has your son committed murder?
 PClc 24) How wrong or shameful does your son feel this is?
 PClc 25) Has your son committed robbery or burglary?
 PClc 28) How wrong or shameful does your son feel this is?
 PClc 41) Has your son beaten someone up?
 PClc 44) How wrong or shameful does your son feel this is?
 ACIDRUGS 43–51) Do you use alcohol, smoke grass, cocaine, sniff glue, heroin, uppers, downers, angel dust, hallucinogenics (LSD)?
 ACla 53) How many times have you been arrested for a non-sexual crime?
 ACla 64) Did you ever use a weapon during any of these offenses?
 PASc 41) Penile plethysmograph—Assault on a male (percent of full erection)
 PASd 75) Penile plethysmograph—Assault on a female (percent of full erection)

APPENDIX D: SEXUAL CRIMINALITY (SC)

- PCla 50) How many times has your son been arrested for a sexual crime?
 PClc 29) Has your son raped or forced himself on someone sexually?
 PClc 32) How wrong or shameful does your son feel this is?
 PClc 37) Has your son had a sexual experience with someone at least five years younger than him?
 PClc 40) How wrong or shameful does your son feel this is?
 PClc 49) Has your son shown his penis to someone?
 PClc 52) How wrong or shameful does your son feel this is?
 PClc 53) Has your son window peeped (on purpose)?
 PClc 56) How wrong or shameful does your son feel this is?
 PClc 65) Has your son rubbed someone's body in a subway/bus/crowd to get turned on sexually?
 PClc 68) How wrong or shameful does your son feel this is?
 PClc 77) Has your son made sexually obscene phone calls?
 PClc 80) How wrong or shameful does your son feel this is?
 PClc 26) If your son rubbed someone's body in a subway/bus/crowd to get turned

on sexually, how harmful do you think this would be to the person that he did this to?

PCld 29) If your son made obscene phone calls, how harmful do you think this would be to the person that he did this to?

PCld 30) When other people found out about the sexual behavior that recently got your son into trouble, did he feel anxious/nervous?

PCld 31) When other people found out about the sexual behavior that recently got your son into trouble, did he feel depressed?

PCld 32) When other people found out about the sexual behavior that recently got your son into trouble, did he feel guilty?

PCld 33) When other people found out about the sexual behavior that recently got your son into trouble, did he feel upset?

PCld 34) When other people found out about the sexual behavior that recently got your son into trouble, did he feel ashamed?

PCld 35) When other people found out about the sexual behavior that recently got your son into trouble, did he feel like killing himself?

PCld 36) When other people found out about the sexual behavior that recently got your son into trouble, did he feel happy?

PCld 37) When other people found out about the sexual behavior that recently got your son into trouble, did he feel like he would never do it again?

PCld 38) When other people found out about the sexual behavior that recently got your son into trouble, did he feel like it was wrong?

PASa 24) Penile plethysmograph—Voyeurism (percent of full erection)

PASa 41) Penile plethysmograph—Male under age 8 (percent of full erection)

PASa 58) Penile plethysmograph—Male age 9–12 with force (percent of full erection)

PASa 75) Penile plethysmograph—Female under age 8 (percent of full erection)

PASb 24) Penile plethysmograph—Female age 13–18 with force (percent of full erection)

PASb 58) Penile plethysmograph—Female age 9–12 with force (percent of full erection)

PASs 75) Penile plethysmograph—Frottage (percent of full erection)

PASc 24) Penile plethysmograph—Incest with female child (percent of full erection)

PASc 58) Penile plethysmograph—Male age 9–12 consensual (percent of full erection)

PASc 75) Penile plethysmograph—Exhibitionism (percent of full erection)

PASd 24) Penile plethysmograph—Female 9–12 consensual (percent of full erection)

PASd 41) Penile plethysmograph—Incest with male child (percent of full erection)

PASe 41) Penile plethysmograph—Male age 13–18 with force (percent of full erection)

PASe 58) Penile plethysmograph—Rape of adult female (percent of full erection)

Offense Characteristics (Composites of all the subjects' victims):

ACI 12) Age of victims

ACI 13) Sex of victims

- ACI 14) Relationship of victims (e.g., known, stranger, relative)
- ACI 19) Type of sexual act (e.g., vaginal, oral, fondling, etc.)
- ACI 22) Highest rating of aggression for acts (e.g., verbal, physical, etc.)
- ACI 24) Referral source: Number of acts (offenses) reported
- ACI 30) Referral source: Report of highest aggression rating for acts

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