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Sexual Harassment, Sexual Abuse, and the Serial Offender Personality: Derivations and Predictions from Evolutionary Psychology

Patrick Frank[1,*]

[1]*Scientific Staff Emeritus, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, United States*

Abstract:

Purpose: Interrogation of Evolutionary Psychology to bring the study of sexual harassment (SH) fully into science and to apply the causal connection of genes and personality to the social incidence of violent crime. The definition of SH within science is expected to bring focus and objective coherence to its study and adjudication.

Background: The notion of sexual harassment (SH) remains subjective and almost whimsical. Shultz has noted that "despite forty years of activism and legal reform … an adequate theoretical framework [of sexual harassment] to guide action remains as pressing as ever." Despite the need for objective specificity in study and law, SH in regard presently finds itself co-extensive with Art: no one can define it but everyone knows it when they see it. Nevertheless, sexually-based harrying remains an on-going social and criminal problem, as indicated by the currency of analyses, case-reports, and legal initiatives.

Objective: To bring the study of SH fully into science. The primary task is to deduce a monosemous and falsifiable description of SH from Evolutionary Psychology. Further, to query whether the distribution of gene-based personalities produces durable and statistically valid subsidiary fractions of a large population. Sub-populational cohorts are to be examined to determine whether they robustly manifest genetically grounded criminal personalities and, in aggregate, produce behavioral trends rising to social significance.

Methods: Evolutionary constructs of human mating behavior are queried to define SH. The HEXACO Personality Inventory and Barratt Impulsivity Scale are quantitatively applied to derive the sub-populational fractions prone to SH or violent crime.

Results: Sexual harassment is the abusive imposition of evolutionarily endogenous mating behaviors. HEXACO-PI predicts that 9% of males and 4% of females have harassment personalities. Upon including Barratt Impulsivity, 0.6% of males and 0.2% of females are prone to violent crime, including rape. U.S. felony statistics for 2009 or 2019 confirm that 0.53% of males and 0.08% of females, ages 18-64, committed violent crimes, while 0.4% of males perpetrated felony rape. These statistical fractions consistently emerge from the college-level to nationwide. Campus sexual offense is dominated by male serial offenders, averaging five victims each. The great majority of campus rape involves alcohol or drugs. Among academic staff, the 0.23% of males and 0.10% of females with abuse-prone personalities fully explain rates of campus sexual maltreatment.

Conclusion: The inevitability of personality-trait extremes determines the base-line of personality-driven societal incidence of violent crime and rape, limns the small cohorts of offenders, and provides an objective basis for safety awareness. However, epigenetics and neuronal plasticity together falsify the notion of genetic determination of personality or behavior. Individual choice remains open. It is hoped that the new understanding of SH as the abusive imposition of evolutionarily endogenous mating behaviors will bring objective equality to policy and jurisprudence, and a coherent clarity to its study.

Keywords: Evolutionary psychology, Sexual harassment, Violent sexual abuse, Serial offenders, HEXACO-PI, Barratt Impulsivity, Gene-personality.

*Address correspondence to this author at the Scientific Staff Emeritus, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, United States; Tel: 650-477-4565; E-mail: pfrank@slac.stanford.edu

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1. INTRODUCTION

The notion of sexual harassment (SH) remains subjective and almost whimsical [1-15]. Current scholarship, including the 2018 U.S. National Academies report, invariably presents inferential, intuitive, behavioral, and unstable definitions of SH that leave its meaning ambiguous [3, 16, 17]. Shultz has noted that "*despite forty years of activism and legal reform ... an adequate theoretical framework [of sexual harassment] to guide action remains as pressing as ever*" [18]. This problem -- the absence of scientific specificity from the study of SH -- is extensively documented [1-4, 8, 19]. Examples of the definitional volatility of SH are provided in Section 1.1 of the Supplementary Material. How is recognition and intervention possible if the target phenomenon is ambiguous [20]?

Complicating the problem further, SH survey instruments and the usual statistical correlations of responses cannot establish causality [3, 10, 21-25]. Thus, despite the need for objective specificity in study and law, SH in regard presently finds itself co-extensive with Art: no one can define it but everyone knows it when they see it. Nevertheless, sex-based harrying remains an on-going social and criminal problem as indicated by the currency of analyses, case-reports, and legal initiatives [2, 5, 7, 26-39].

The project described herein was undertaken to bring the study of SH fully into science. Doing so may cause a clarification cascade from research through policy and law to adjudication. The primary task is to deduce a monosemous and falsifiable description of SH from Evolutionary Psychology [40-42]. Succinctly, "*An understanding of the psychologies that evolution has strapped us with is essential to the management of the human behaviors that are produced by those psychologies*" [43]. A unique objective description from science is central to understanding [44, 45] and critical to the integrity of sexual harassment scholarship and legal study, and to juridical intervention. The present work develops this recognition. Section 1.2 of the Supplementary Material presents the foundational approach from science.

Evolutionary Psychology hypothesizes causal associations between gene-frequency, epigenetics, and human personality [46-51]. The thesis proposed here is that the present ambiguity of meaning in SH research is resolved in Evolutionary Psychology and the correlates of genes, brain structure, and personality [3, 43, 52-58].

Taking notice of this correlation should not be understood to suggest genetic determination of behavior [59, 60]. Epigenetic alteration of DNA expression in response to experience obviates any notion of behavioral genetic determinism [61-64]. Further, neuronal plasticity permits the individual nervous system to fundamentally readjust in response to experience or injury [65-68]. Both learning and behavior can be modified across life. These biological processes, in influencing human personality, provide latitude for self-modification by means of experience and education. That is, the rigidity of genetic or biological determinism is removed. Indeed, the existence of epigenetics and neuronal plasticity falsify a strict genetic determinism. One notes that genetic determinism fails at least to the extent that an individual engages in self-modification [59, 69, 70]. Although personality motivates behavior and frames choices, our decisions, choices, and behavior are not fixed. They remain open and our own. These conditionals should be kept in mind through what follows.

The ethical meaning of a biogenic influence on behavior is under active discussion [70-72]. However, exploration herein is beyond the scope of this work. Nevertheless, the biological reality of epigenetics and neuronal plasticity obviates doubts of willful agency or the moral responsibility of the individual [69]. Ethical jurisprudence remains viable.

Nonetheless, the physical reality of genetically influenced personalities will produce durable and statistically valid subsidiary fractional distributions of a large population. If members of a sub-populational cohort robustly manifest genetically-grounded criminal personalities, then those personalities in aggregate will produce behavioral trends rising to social significance [73-77]. Thus, the perfusing context of Evolutionary Biology provides physically causal explanations [78-82].

Previous work has falsified the standard methodological survey instrument of the SH study, thus clearing the ground for a reconceptualized approach [3]. The present work carries the project forward into a positive derivation of SH from Evolutionary Psychology. Summarizing the thesis: evolutionary genetics ensures the existence of durable distributions of personality traits. Coherent population-wide personality traits are predicted to produce analogous behaviors that necessarily aggregate to social significance.

This prediction is tested using several sets of real-world crime statistics. The gene-brain-personality thesis developed here focuses on sexual harassment (SH) and violent offenses.

The organization of this paper is as follows. Section 2 provides sources and methods. Section 3 briefly reviews the heritability of personality and its measurement. The fractional occurrence of the abusive personality within a population is then quantitatively predicted from HEXACO personality metrics. Section 4 deploys Evolutionary Psychology to derive the previously unrecognized structure of SH. The complementary sexual harrying of females by males and of males by females is described. Illustrations of the exploitation of female power in the sexual harassment of males are provided, rectifying its prior neglect in study. Section 5 uses the HEXACO personality inventory and Barrett BIS-11 Impulsivity metrics to quantify the populational incidence of violence-prone individuals. Rape is shown to be dominated by serial abusers, from nation-wide through to the college campus. A widespread but unrecognized abuse of statistical inference is then described, which has plagued the entire field of SH studies. Discussion Section 6 further develops the generally relevant delineation of SH from Evolutionary Psychology and offers an illuminating historical incident to demonstrate, in light of the foregoing, how the standard treatment of SH encrypts the true locus of physical danger.

In the interest of logical flow, many elements of discursive evidence have been removed to the Supplementary Material. A subject-oriented Table of Contents is provided. Appropriate guides to the Supplementary Material are included in the text.

2. SOURCES AND METHODS

The United States 2019 census data for male-female fractional populational was obtained from the World Populational Review [83]. U.S. Census of age and sex composition for 2009 and 2019 were obtained from the U.S. Census Bureau [84, 85]. Populational distributions of academic staff were obtained from the National Center for Education Statistics [86]. Census data for felony defendants of the year 2009 was obtained from the U.S. Bureau of Justice statistical tables [87]. The 1994-2010 or 2019 census of female victims of sexual violence was obtained from the U.S. Bureau of Justice Statistics [88, 89]. The estimates of violent crime unreported to the police for the years 2009 or 2019 were obtained from the U.S. Bureau of Justice Statistics [90, 91]. Statistics of sexual offenses by academic staff were obtained from the Academic Sexual Misconduct Database [92].

The means and standard deviations of HEXACO factors were obtained from Table **1** of another study [93], consisting of student self-reports and observer reports, and online survey self-reports. The factor means and standard deviations of the three data sets were weighted by cohort N and combined into a single set of factor statistics. Factor means were calculated as $\mu_T = \Sigma_i[(n_i \times \mu_i)/N]$, where n_i is the cohort participant size, μ_i is the cohort HEXACO mean, and N is the sum total of all cohort participants. Likewise, standard deviations were calculated as $\sigma_T = \sqrt{\Sigma_i[(n_i \times \sigma_i^2)/N]}$, where n_i is the cohort size and σ_i is the cohort factor standard deviation and N is the sum total of cohort participants. The derived factor means and standard deviations were calculated for the total male and female cohorts. The factor populational distributions were calculated using the formula for a Gaussian (G): $G = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$, where μ and σ are the factor mean and standard deviation, respectively and x is the range of trait intensity; typically given a 5σ width. This statistical model assumes that factor intensities are distributed randomly in a population. The genetic inheritance of each individual HEXACO personality factor was assumed to be independent of the others.

Crime victimization rates are collected by the U.S. Census Bureau on behalf of the U.S. Bureau of Justice Statistics. Telephone surveys were conducted with a representative sample of the U.S. population. The 2009 statistics are representative of an annual average of 140,000 persons aged 12 or older in 79,000 households. The 2019 statistics included 155,076 household interviews with 249,008 persons. Methodological details and statistics of standard errors are provided in the official reports [88, 94, 95].

The 2019 estimates of campus sexual offense and misconduct nationally (N = 181,752) and for Stanford University (N = 16,296) were obtained from the Report on the AAU Campus Climate Survey on Sexual Assault and Misconduct [96, 97]. Methodological details are provided in the reports. The 2019 student demographics for Stanford University were obtained from the Fall 2020 Stanford Facts undergraduate student profile [98].

Statistical analyses were carried out using the Kaleidagraph data analysis package (Synergy software). Statistical means were calculated as the fractionally weighted sum of the N-values, *i.e.*, $\Sigma_i[n_i/(n_1+...+n_n)]$, and mean standard deviations were calculated as the similarly weighted root-mean-square.

3. EVOLUTIONARY PSYCHOLOGY AND THE HARASSMENT PERSONALITY

3.1. Context

Throughout what follows, 'physical theory' is meant in its most general form, namely a logically coherent, culturally invariant (objective), monosemous hypothesis that entrains the deductive prediction of unique physical observables. To clarify further, an explanatory structure is proposed that allows the deduction of causal correlations so specific as to constitute a mortal test. This is in strict methodological contrast to inferentially assigned definitions and subjective survey responses [99-101]. The foundational approach and its rationale are elaborated more deeply in Sections 1.1 and 1.2 of the Supplementary Material.

The analysis starts with the 1980 Equal Employment Opportunity Commission (EEOC) definition of sexual harassment, namely, "*Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment,*

(2) submission to or rejection of such conduct by an individual is used as the basis for employment decisions affecting such individual, or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment," see p. 196, Note 77*ff* in Cooper [102].

It is here recognized that the EEOC definition is one of legal art, not of science. The legal definition itself might be improved if amended with the notion of repetition or insistence.

3.2. *Who Abuses?* This Section will bring the EEOC Definition of SH into a Scientific Context

"*unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature [that] has the purpose or effect of unreasonably interfering with an individual's work performance …*"

Empirical Psychology has found notable success in an analytical explanation of behavior through the development of the related Big-5 and HEXACO lexical inventories of personality traits [55, 103-116]. Each personality factor of the lexical model consists of multiple subsidiary facets (traits). These categories of personality find a causal link in gene-personality correlates and Evolutionary Biology [46, 50, 51, 117-131]. Specific examples continue to accrue. For example, gene-based functional extremes of serotonin neural biochemistry correlate with impulsivity, violence and criminal behavior [132, 133]. Likewise, gene variation causing shifts of monoamine metabolism in the amygdala can produce violent and antisocial behavior [53, 134]. Similarly, genetic polymorphisms in the oxytocin receptor affect social expression [135, 136]. The general finding is that genetics and intrauterine environment impact personality, while family environment (socialization) has a significantly lesser effect [50, 114]. Females of mixed-sex twin pairs show a slight but real masculinization relative to females unexposed to male developmental hormones. Reviews of this still-emerging field are available [54-56, 113, 131, 137, 138],

The predictive validity of lexical inventories of personality themselves derives from the natural selection of social perception within culture over human evolutionary time [74, 139-143]. Thus, selective advantage should accrue to individuals able to perceive personality and respond defensively to dark triad behavior, or positively to agreeableness [144], and to communicate that perception to others [145-149]. A more critically selective survival strategy might be found in possessing the complementary ability to identify and communicate with cultural group members likely to enter a defensive coalitional alliance to counter dark triad individuals [143, 150-157]. It is here suggested that selective pressures to recognize personality, operating on anatomically modern *Homo sapiens* over the many tens of evolutionary millennia produced languages accurately descriptive of personality [158-160].

In this light, the lexical personality inventory allows general prediction of traits and the existence and extent of the impulse toward sexual harassment and violent crime, including violent sexual abuse. These predictions can be tested against criminal history. The Likelihood to Sexually Harass (LSH) scale identifies a subset of personalities manifesting a proclivity to discomfit or abuse others in a sexual manner [149, 161-163]. The LSH scale, in turn, is grounded in the trait structure of the Big-5 and HEXACO personality inventories [164-166]. A causal connection from genes to personality introduces a downstream causal connection between population genetics and patterns of behavior at the societal level [167-170].

Continuing analysis requires a digression into female-male personality differences. Fig. (**1**) shows Big-5 single-item personality scores for males and females [171]. Although there is a significant area of overlap (~0.7 unit area), males and females are generally distinguishable by personality. Cross-cultural analyses have shown consistent personality differences between the sexes, with females scoring higher means in nurturance but males in assertiveness [172-175]. However, the sex-based difference in assertiveness is small and nearly non-existent in children [176]. Corroborating this, a 2001 American Association of University Women study found that among adolescents, 57% of boys and 50% of girls admitted to harassing their peers, as discussed by Ménard [177]. Studies of interpersonal violence have found gender parity in incidence [178], also discussed by Ménard [179].

The six-factor HEXACO instrument was derived subsequent to the Big-5 personality inventory and appears to have somewhat greater explanatory power [104, 107, 108, 180, 181]. The Big-5 factors do not map exactly into the HEXACO set. The six-factor HEXACO Model includes Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O), with Honesty-Humility (H-H) the unique addition [182-184]. Honesty-Humility tracks the personality elements of sincerity, fairness, greed-avoidance, and modesty. Intercorrelations among the HEXACO traits are relatively small, with an average absolute correlation r = 0.11±0.08 [108]. Two recent large studies of the HEXACO-revised inventory yielded a mean corrected absolute factor intercorrelation r = 0.14±0.09 [185, 186]. Correlation 'r' is the cosine of the angle between data vectors in the state phase space [187]. The mean phase-space factor separation angle of the HEXACO-PI-R, (82±5)°, indicates that the six HEXACO personality traits are nearly orthogonal and thus almost free of ambivalence [3, 185, 187]. The largest HEXACO factor intercorrelations are Honesty-Humility and Agreeableness (r = 0.42; 65°) and Honest-Humility and Conscientiousness (r = 0.25; 76°), with the degree value indicating their phase-space vector separation angles [188]. The corresponding absolute average Big-5 intercorrelation r = 0.23±0.15 (NEO-PI-R corrected) suggests an average (77±9)° phase-space angle separating the factors [189]. The largest Big-5 two-factor absolute correlations are between Extraversion and Openness (r = 0.49; 61°) and between Neuroticism and Conscientiousness (r = 0.44; 64°). The Big-5 angles

indicate relatively greater projections of multiple personality facets onto each of the orthogonal phase-space axes. A preferred explanatory regime is thus centered on the HEXACO set of personality factors [187, 190, 191]. Gene frequency mapping of HEXACO personality factors indicates 50-60% heritability, with the remainder of personality formed by extra-familial experiences [50, 191].

3.3. The Harassment Personality

Turning now to sexual offense, low scores of HEXACO Agreeableness (A) and Honesty-Humility (H-H) together predict the likelihood to sexually harass (LSH) [161] among both males and females [164, 179, 180, 192]. This correspondence implies those prone to sexual abuse tend to have personalities low in modesty, straightforwardness, warmth, and kindness and relatively high in rudeness and harshness [104, 182]. A low score in Honesty-Humility is also characteristic of personalities prone to criminal activity [182]. Many studies have shown those guilty of sexual violence also have wider criminal histories, including domestic violence [193-197].

Assertiveness associates most strongly with Conscientiousness and Extraversion, and only weakly or very weakly with Honesty-Humility or Agreeableness. Thus, greater Assertiveness does not contribute to a male propensity for sexual offense.

Established personality trait distributions allow estimation of the population fractions of males and females who are likely to abuse sexually. Fig. (**2**) shows the distributions of Honesty-Humility and Agreeableness personality traits contributing to this estimate.

Lee and associates used the HEXACO Personality Inventory to evaluate the correlation of traits with the LSH scale in a group of 150 young males recruited from the University of Western Australia and its surroundings [164]. Personalities were distinguished into high (N = 25), medium (N = 70), and low (N = 55) LSH trait intensities. Assuming this group to be representative allows an estimate of the population fraction of males prone to sexual harassment. However, the mean HEXACO score of the male test group was not identical to the male population HEXACO mean (N = 206) [108]. Therefore, for this estimate, the means and standard deviations of the HEXACO SH test group were re-scaled to the population-wide means and standard deviations (Eq. **1**). This normalization allowed estimation of the HEXACO value of a high-LSH fraction, H_{LSH}, within the larger population. Thus,

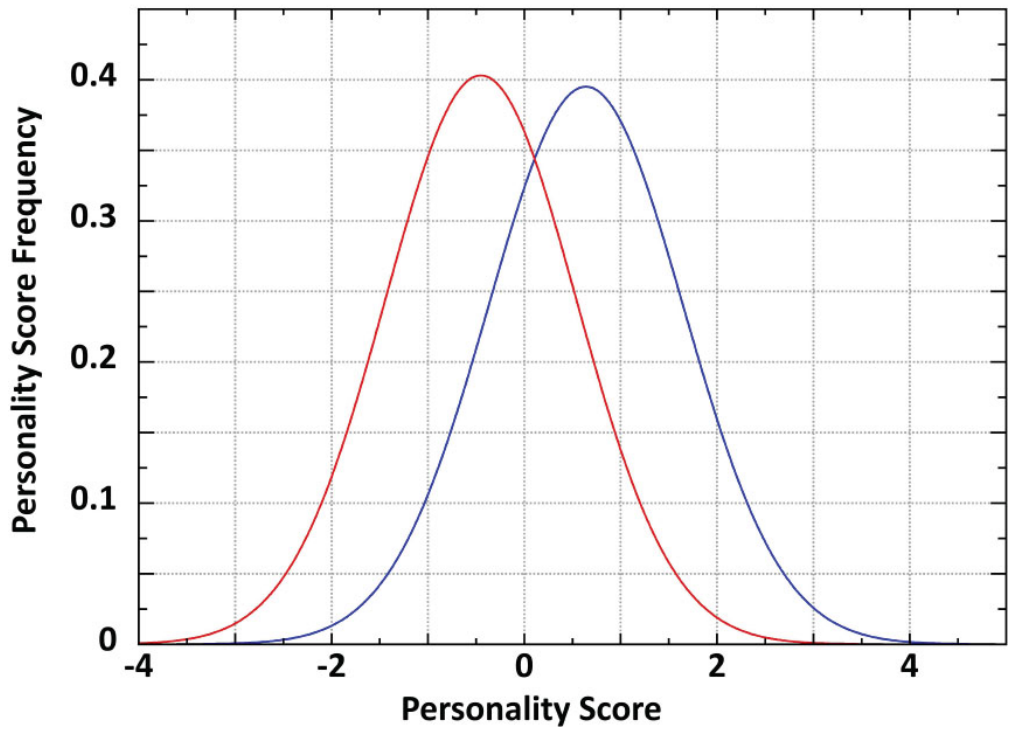

Fig. (1). Idealized Gaussians showing overall Big-5 personality scores for: (red), females (μ = -0.45; σ = ±0.99), and; (blue), males (μ = 0.64 σ = ±1.01). Fig. (**1**) in Verweij and associates [171]. The sample comprised 9,520 participants, including 2,245 twin pairs. Identical twin pairs: 695 female, 374 male; genetically disparate pairs: 392 female, 248 male, and 536 opposite-sex pairs. Additionally, 5,030 single twins were included to estimate mean and variance effects. Participants were aged between 27 and 54 (μ = 40.8, σ ±7.8).

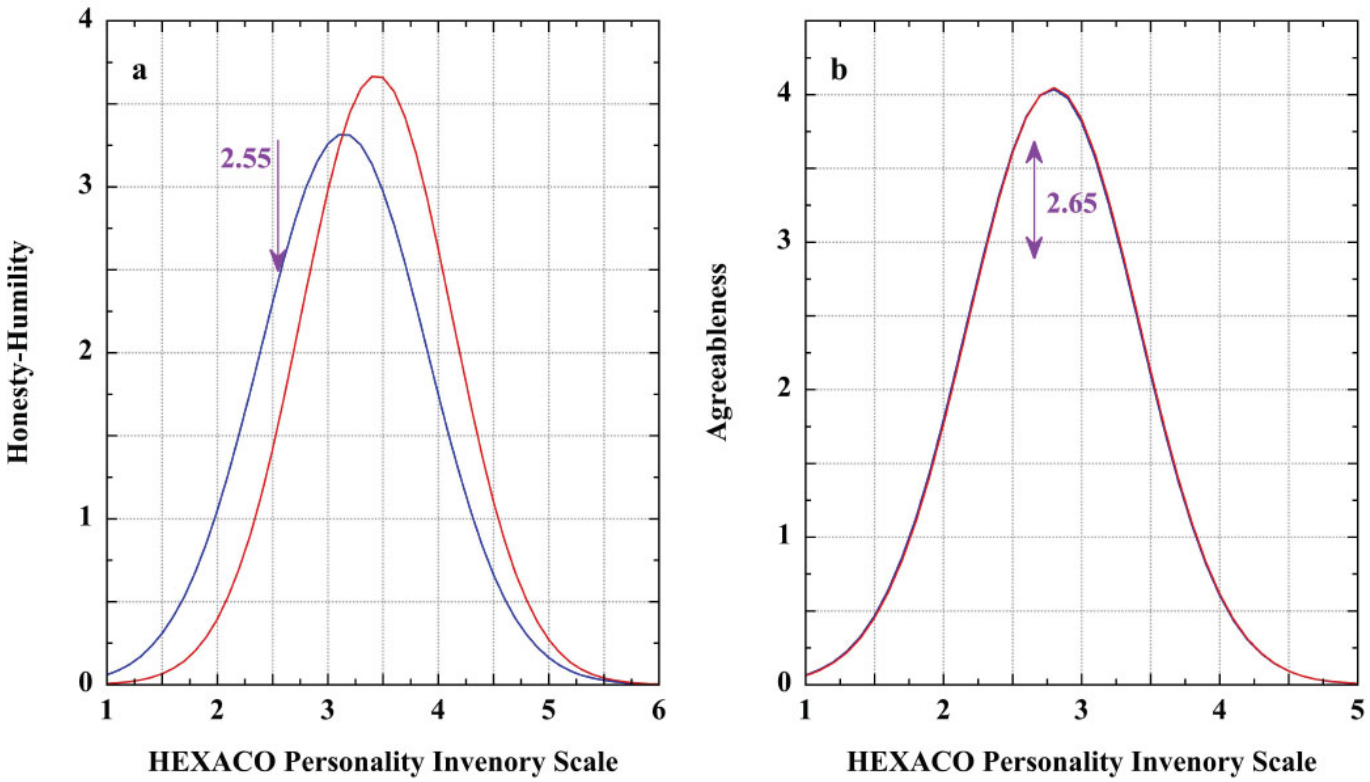

Fig. (2). Idealized Gaussians showing the population-average distribution of Honesty-Humility (panel a) and Agreeableness (panel b) among (red line) females and (blue line) males. Arrows point to the bounds below, which are high LSH scores (Table **1**). The HEXACO means and standard deviations are: H-H, 3.14±0.76 (male), 3.44±0.68 (female) and A, 2.79±0.62 (male), 2.80±0.62 (female). The means are the N-weighted average of the populational cohorts and the standard deviations are the N-weighted root-mean-squares, all from Table **1** of another study [93].

$$\Delta H_{LSH} = [(\mu_{LSH} - \mu_R)/\sigma_{LSH}] \times \sigma_R, \qquad (1)$$

where ΔH_{LSH} is the shift in the male population HEXACO trait mean, where the onset of the high-LSH trait occurs, μ_{LSH} is the HEXACO mean for the high-LSH respondent cohort (N = 25), μ_R is the HEXACO mean of the complete LSH study group (N = 150), σ_{LSH} is the standard deviation of the HEXACO trait for the high-LSH cohort and σ_R is the standard deviation of the male population-wide LSH HEXACO trait (N = 206 [108];). Equation 1 was applied to the Agreeableness and Honesty-Humility population-wide HEXACO means to find the shift in the trait-values that correspond to the high-LSH personality. Table **1** shows the stepwise method and results.

Assessing these traits [93, 108], low Honesty-Humility implies a tendency toward manipulation, deceit, displays of status or wealth, and feelings of entitlement. Low-Agreeableness personalities tend toward being unforgiving, harsh in judgment, argumentative, and quick to anger.

Table 1. Population-level high LSH scores[a].

Trait	High LSH sub-Group (μ_H)	LSH Reference Group[b] $\mu_R \pm \sigma_R$	(μ_{LSH} - μ_R)	Ref.
Agr.[c]	3.45	3.59 ± 0.61	-0.14	e
H-H[d]	2.83	3.23 ± 0.56	-0.40	e
-	Pop Avg (male μ±σ)	ΔH_{LSH}	μ (Pop-wide High LSH)	
Agr.[c]	2.79 ± 0.62	-0.14	2.65	f
H-H[d]	3.15 ± 0.76	-0.59	2.55	f

Note: a. round-off error is present in some values. b. Means are the population-weighted averages of Low- (N=55), Medium- (N=70), and High-LSH (N=25) cohorts. c. Agreeableness. d. Honesty-Humility. e [164]; Table III. f [93]; Table **1**, N-weighted average; standard deviations are the N-weighted root-sum-squares.

It is assumed here that the absolute HEXACO values indicating personalities prone to SH are identical for both males and females. That is, in each gender, the same-valued bounds of HEXACO personality traits produce the equivalent propensity to abuse. It is further assumed here that the inheritance of HEXACO personality traits is genetically and evolutionarily independent and has uncorrelated heritability [198].

Integration of the two personality-trait Gaussians in Fig. (**2**) over the regions determined to produce a likelihood to SH yields the fractions of male and female populations within each sector. The product of these personality trait fractions yields the fraction of males or females in the total population that is prone to SH under the assumptions given above.

The result, shown in Table **2**, indicates that about 9% of males and 4% of females have conjoint personality traits that yield a high likelihood that yield a high likelihood to sexually harass. These fractions do not imply a population disposed to harass at the level of criminal violence, *e.g.*, to engage in violent abuse or rape. Rather, they represent the populational fractions with personalities prone to sex-based harrying. However, impulses can be brought under conscious control [199-201]. Thus, an important qualifier is that personality does not determine individual behavior. The derived fractions are population-level statistical averages of propensity. They do not predict individual behavior but rather will find use in accounting for the social incidence of non-violent sexual offenses. The social significance of these population fractions is addressed next.

Table 2. Estimated population fraction likely to sexually abuse.

HEXACO Trait	Male	Female
Agreeableness	0.41	0.41
Honesty-Humility	0.22	0.097
Fraction of High LSH	0.090	0.040

4. SEXUAL ATTRACTION AND SEXUAL HARASSMENT

4.1. The Grounds of Courtship

The evolutionary origin of human mating behaviors is well-established [202-205]. The behavior that initiates courtship and flirting, involves a set of non-verbal and verbal signaling that is transcultural and the result of an evolutionary gradient [205-210]. In a modern social milieu, male mating behavior begins with notice, approach, and conversational engagement [211-214]. In contrast, female mating behavior begins with attraction, non-verbal signaling, and conscious display [215-217]. Males attend to female behavioral cues as indications of sexual interest. The literature on this mutuality is unambiguous [208, 218, 227].

Among males, normal courtship behavior bifurcates with the intention to negotiate either a short-term sexual liaison or a long-term commitment [228]. When sex talk becomes aggressive, or touch or embrace is aggressive and imposed, these otherwise benign courtship tactics transform into abusive behavior. Liaising then becomes coercion and males thereby sexually harass their mark, most typically females [8, 228, 229]. Such events are predicted to occur most often at the hands of the 9% of males with personalities low in both H-H and A.

What about females? The estimate in Section *3.3* is that 4% of women are low in HEXACO H-H and in A, and thus have a personality prone to sexual harrying. In analogy with males, one should look for sexual harassment by females in the abusive imposition of their courtship behavior. Attention now turns to their contemporary mating behaviors.

4.2. Female Sexual Display and Sexual Response

Displays based upon red coloring are particularly attractive to men and are heavily employed in female choices of clothes, lipstick, and facial make-up when they are interested in gaining male attention [218-220, 224, 225, 227]. Reddened cheeks and lips mimic the flush of sexual arousal, a signal of interest to which males are particularly attuned [220, 224, 226].

A detailed study of young women (N = 351) entering five separate discotheques found that these women deliberately chose clothes that were tight and revealing, with the conscious intention of attracting males [223, 230]. That is, the women were well aware that their displays drew male attention. Individual women employed multiple sexualized modalities to increase the strength of the one signal; that signal being sexual interest. Males sensitive to such display will have been favored by evolutionary selection.

Thus, females interested in attracting males take full conscious advantage of the male trait of response to female sexualized displays of behavior, glance, skin, dress, and form. One might describe such displays as alluring rather than as attractive because they are meant to draw males into a close approach, there to initiate negotiation toward a sexual encounter. Eliot and associates have reported similar findings [218-220]. Female display and male response apparently have deep evolutionary roots [218, 219]. None of this behavior is inappropriate in a social setting. The detailed specification of the evidence supporting these descriptions of female and male mating behavior are provided in Supplementary Material. Section 2.1, *Females, males and their mating strategies* and Section 2.2, *Who initiates courtship?*

4.3. Female Sexual Harassers?

The literature on the sexual harrying of females by males is very large [8, 19, 231-236]. In contrast, the literature reporting the sexual harrying of males by females is very small. Barbara Gutek's path-breaking book included the idea [237], but very little has followed [238-243]. In many cases, sexual harassment of males by females is mentioned as almost an afterthought. A constant throughout the scholarly literature is that sexual harassment of males by females involves the same behaviors as that of females by males. Often, when sexual harrying of males is addressed, the focus is the maltreatment of males by other males [244].

The Evolutionary Psychology of personality that informs Fig. (**1**) supports a prediction that female abusive behavior will be distinguishable from that of the male. In this event, the Sexual Experiences Questionnaire (SEQ) and all other survey instruments that focus on male-typic

sexualized behaviors miss the harassment behaviors characteristic of females [9, 245-247]. The reason for the focus on male harassment behavior can perhaps be found by paraphrasing a view from Catherine MacKinnon, namely that sexual abuse is typified in male behavior because the standard used to judge men is that of women ([102], p. 192, par. 2).

4.4. Female Power

It is in the evolutionarily endogenous female power of display that one should look for the sex-based harassment behavior peculiar to women. Evolutionary Psychology establishes the female evolutionary power to induce the reflexive sexual response in males [248, 249]. That is, females can sexually arouse males by way of behaviors or displays exploiting the peculiar power that women have over male reflexive response. Through consciously sexualized displays of skin and form, females can signal sexual interest, which is alluring to men, and thereby induce male reflexive arousal. Female sexualized harrying involves a deliberate abuse of that power in a professional or sexually neutral setting. Male arousal is inappropriate in such venues and may be embarrassingly visible. Subjected males must suppress and bear in silence their reflexive arousal and interest. The result is male social discomfort.

4.5. Sexual Harassment by Females

This category of harassment has been neglected. Female sexual harassment of males is the deliberate display of skin, form, or glance that knowingly conveys a false signal of sexual availability and interest. By this means, the evolutionarily innate and automatic sexual response of males is induced. Harassment occurs with the deployment of the false sexualized signal in a serious or malapropos venue where sexual displays violate civil deportment and are intrusive, contextually unjustifiable, and most effective in causing the social discomfit of males. That is, harassment displays occur in a venue where reflexive male sexualized attention is discouraged or even forbidden. In this event, the male response must be consciously suppressed and borne in silence. These behaviors can be described as harassing rather than attractive because they are constructed to induce in males a reflexive sexual arousal and an impulse to engage, both of which are circumstantially frustrated and necessarily suppressed.

In extreme cases of SH an inaptly responding male may be ostentatiously rebuffed, or disparaged, or may be subjected to contempt. Under EEOC workplace guidelines, these displays constitute, "*physical conduct of a sexual nature [that] has the purpose or effect of unreasonably interfering with an individual's work performance*." In a discussion of the forensics of possible bias among clinical psychiatrists in sexual harassment cases, Gold noted that "*Sexual harassment is distinct from other acceptable behaviors that occur in a workplace because it lacks the elements of choice and mutuality inherent in a normal relationship. In addition, it is a type of coercion that relies on the power of the perpetrator to affect a victim's economic status and does not necessarily involve physical force*" [250]. This description presents all the factors entering the abuse of female sexual powers in a sexually neutral setting aimed at male colleagues. The following sections illustrate sexual harassment by females.

4.6. Sexual Harassment by a Female?

In 2018 February, Ms. Aurore Bergé, a 31-year-old elected MP of the French government, received critical attention after her "*short, low-cut dress*" provided a sexualized display during an appearance on French television to discuss education and public service reforms [251]. An illustration of this display is presented in Supplementary Material Fig. (**S1**). Ms. Bergé was defiant when criticized, labeling her critics as "*sexist*." When earlier choosing her clothing, it seems unlikely that Ms. Bergé was unaware of the display she would produce, or of the impact that display would have upon any male viewer.

Ms. Bergé evidently decided to present a display guaranteed to induce frustrated sexual arousal in nearby males under circumstances that called for professional deportment. If consciously making an inappropriately alluring display, Ms. Bergé will have deliberately abused her power over male reflexive sexual response. Her defiance in the face of criticism seems consistent with the HEXACO personality traits of low Agreeableness and low Honesty-Humility, including low modesty, that would attend such behavior had it been consciously chosen.

It is here proposed that Ms. Bergé's display illustrates the common mode of sexual harassment that is peculiar to females. Such display is advanced to be a primary method of sexual harassment, of which the 4% of females with personalities low in Honesty-Humility and Agreeableness are prone.

Daily and repetitive workplace exposure to sexualized displays that require male targets to maintain self-control and self-suppression may well negatively affect their work productivity or efficiency or, in Gold's words, "*result in significant stress and stress-related symptoms or disorders*."

4.7. Innocent Sexual Harassment

The previous section described the deliberate sex-based harrying of males, carried out by females who contrive evolutionarily grounded sexualized displays in serious venues, with the intention of causing males to experience a discomfiting and frustrated arousal. These females are expected to be low in both HEXACO Agreeableness and Honesty-Humility. In this section, a much more common and much less mindful form of sexualized harrying of males is discussed, which is here distinguished with the term 'innocent sexual harassment' (ISH).

Innocent sexual harassment of males follows from a culturally normative female choice to wear display-oriented clothing -- appropriate to a social gathering -- to serious or professional venues. *Innocent* refers to a lack of conscious intent to provoke male reflexive arousal through

abuse of the female power of sexualized display. Rather, what ends as mistreatment might be motivated by the female desire to appear attractive within a cultural milieu that unwisely permits unsuitable female sexualized displays as casually normative.

Fig. (**S2**) of the Supplementary Material illustrates innocent female sexualized signaling, which falsely indicates sexual interest. The depicted three young women received an academic award [252]. The graphic has been anonymized in deference to the parties involved.

Of the three females appearing in Fig. (**S2**), the attire of two produces a sexualized display. Any discreet male present would necessarily retain conscious control of his glance to avoid looking at displays comported to draw his focused attention. Repressive self-control would be his only defense against automatic arousal, against an embarrassing response, and against discomfiting the females within a serious venue by transmitting his interest in their sexualized displays.

This sort of innocent sexualized stressing of males by females is extremely widespread, as discussed by clinical psychologist Ms. Bettina Arndt in a video on the topic [253]. Ms. Arendt's video includes some dishabille content but is presented evidentially and thoughtfully. She notes that reports of ogling as campus sexual harassment are often the stares of males deemed unattractive by the females who have drawn their attention through sexualized displays. Further discussion bearing on ISH is presented in Section 2.4 of the Supplementary Material.

The motivation to dress for display can be complex in that, for example, competition with other females can influence clothing choices [215, 254]. Nothing of this socio-sexual complexity is explored here. The focus is on observables. Any casual normativity consisting of female sexualized displays will not disengage the signal-and-response mechanism that evolutionary forces have ingrained into females and males.

This, then, is innocent sexual harassment of males by females. It is the display of evolutionarily endogenous, but false signals of sexualized interest that have been foolishly (Ms. Arndt says "*shamefully*") characterized as normative and transmitted in both socially casual and inappropriate venues where reserved deportment is the expected standard. The maltreatment is levied against any males present who are required to not respond, nor to approach, nor to show any of the reflexive arousal or interest with which the human evolutionary gradient has inhered them.

The language of the EEOC, namely, "*unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature [that] has the purpose or effect of unreasonably interfering with an individual's work performance …*" captures both derived forms of sexual harassment: that of females by males and that of males by females. Each form of harassment is an abuse of the sexual power evolutionary gradients have inhered into males or females.

These considerations lead to the deductive description of sexual harassment within the aegis of Evolutionary Psychology, here iterated for the first time: the abusive imposition of evolutionarily endogenous mating behaviors.

Sexual harassment *by* males is deliberated, inappropriate, mal-contextual and imposed sexual advance. Sexual harassment *by* females is deliberated, inappropriate, mal-contextual and imposed sexual display.

5. THE CRIMINALITY CONNECTION

5.1. Who Rapes?

The conjoint explanatory power of Evolutionary Psychology and the HEXACO personality inventory is now applied to the question of sexual crime. The focus first turns to the evolutionary psychology that governs the incidence of rape. A convincing literature exists showing that males convicted of rape or violent sexual assault have prior criminal records [193, 196, 255-258]. Adolescents who engage in sexual violence also display anti-social and criminal behavior [195, 259-261]. The same literature establishes that males who commit sexual violence are typically serial offenders with a diverse history of crime [255, 258, 262, 263].

The questions addressed here are: who is likely to rape and how many such people are there in a general population?

5.2. The Psychological Metrics of Sexual Violence

Individuals disposed to sexual harassment are those with personalities scoring low in HEXACO Honesty-Humility and low in Agreeableness [161, 163, 164, 264]. Psychometric inventories of violent criminals equate a disposition to violence with personalities not only scoring low in Honesty-Humility and Agreeableness but also high in Impulsivity [147, 265-268]. Impulsivity is measured using the BIS-11 Barratt Impulsivity scale [267, 269]. Fig. (**3**) shows the distribution of Impulsivity for males and females within a statistically valid population [265].

Although the mean Impulsivity for males is slightly higher than for females, they are nearly indistinguishable within the limits of normal variation (males 63.3±9.5; females 62.4±10.5) [265, 269]. Individuals who score 72 on the BIS-11 scale exhibit above-average impulsive and aggressive behavior. However, as noted above, behavioral choices are our own, and impulsivity alone need not translate into criminality or the perpetration of sexual violence [129]. Thus, some individuals with high-risk personalities need not commit crimes, while others with low-risk personalities may well commit crimes. This disparity of outcome is briefly discussed in Section 3.1 of the Supplementary Material.

The Impulsivity characteristic of aggressive male criminals is about 1.58 standard deviations above the normal mean [267], shown by the dashed arrow in Fig. (**3**). Integration of the Gaussians yielded an estimate that about 5.8% of males and 5.7% of females will have this high level of Impulsivity.

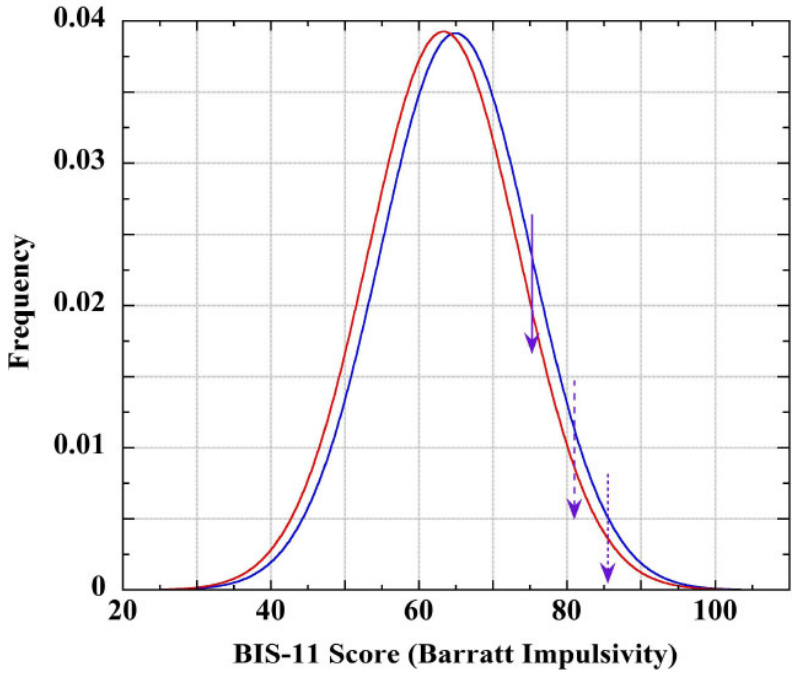

Fig. (3). The BIS-11 Impulsivity scores for (red line) females and (blue line) males. The arrows point to: (full line), 1 standard deviation (σ); (dashed line), 1.58 σ and (dotted line), 2 σ above the mean on the scale for males.

5.2.1. The Social Significance of Personality

However, a disposition to sexual violence must combine the aggressive Impulsivity of criminals with low Agreeableness and low Honesty-Humility, indicating a personality that is callous, self-entitled and self-centered (Table **2**). For males or females, the likelihood of engaging in felony crime, including sexual violence, is the population that inheres all three personality traits. It is assumed again that each trait is inherited and expressed independently of the others. In this framework, the fraction of males or females likely to commit felony crimes or sexual violence is defined by the product of the population fractions of the three personality traits most strongly governing the proclivity (Table **2**). For males, this is 0.41×0.22×0.058 = 0.52% prone to commit a felony-level crime or criminal violence, including sexual violence. Among females, this is 0.41×0.097×0.057 = 0.23%. These are small populational fractions. Nevertheless, males are predicted to inherently be 2.3 times more likely than females to commit a felony or violent crime. However, the female propensity to felonious criminality, including sexual violence, is predicted to be not zero. These predictions can be tested in light of real-world examples. Noted again is that propensity in personality is not determinism in behavior.

5.2.2. The Populational Fraction of Violent Criminals in the U.S

The United States Bureau of Justice Statistics (BJS) regularly publishes a survey of crime in the 75 most populous counties during the month of May, the most recent covering the year 2009 [87]. In May 2009, these counties recorded 13,938 arrests for violent felonies. Assuming May is a typical arrest month, and assuming no defendant is arrested more than once per year, then the total population of violent felony arrests in 2009 can be estimated as 12×13,938 = 167,300, of whom about 86% were male [87]. In 2010, the total population in these 75 counties was 121.83 million [83]. About 49% of the US population is male and about 63% are of age 18 to 64 [84]. This yields about 37.57 million adult males in these 75 counties in 2009 within the age group responsible for 86% of violent crime. Of these males, an estimated $(1.67\times10^{5}/37.57\times10^{6})\times100$ = 0.44% were arrested on suspicion of a violent felony in 2009.

The same analysis for females yields 0.06% arrested for violent felonies. These known arrest fractions are comparable in magnitude to, though slightly smaller than, the 0.5% and 0.2% fractions prone to felony crime, respectively, predicted from the population of HEXACO low A, low H-H, and high Impulsivity personalities (Section *5.3.1*). The somewhat lesser fractions may indicate that not all those disposed to violence go on to commit violence or that not all offenders were caught.

Those convicted of felony violence are known violent offenders. However, arrests are not convictions and convictions are not total conviction-level offenses. The total fraction of violent offenders in a population includes the unknown fraction -- those who were not caught. Following Bouchard and Lessier, the uncaught fraction

can be appraised using the Zelterman estimator, Eq. (**2**) [270-272].

$$N_Z = N/(1 - e^{-(2n_2/n_1)}), \quad \textbf{(2)}$$

where N_Z is the number of undetected violent offenders who committed convictable violent crimes, N is the number of known (convicted) offenders, n_1 is the number of convicted offenders with a single offense, and n_2 is the number of offenders with two convictions. The Zelterman estimator is truncated at reconviction, making it insensitive to covariates [270, 271]. The results of this analysis are presented in Table **3**.

Table 3. Number of Detected and undetected violent offenders in the 75 most populous us counties during May 2009[a].

-	Male	Female
Zelterman N_Z	11271	1839
95% CI[b]	10554-12202	1579-2241
N convictions	4889	796
n_1	3129	509
n_2	636	103
n_{3+}	1124	184
Total offenders (N_Z+N)	16160	2635
Population Fraction	(0.52±0.04)%	(0.08±0.01)%
Capture & Conviction	30%	

Note: a. The data are derived from Tables **4**, **10**, and **21** [87]. b. 95% CIs were calculated as $1.96 \times \pm\sqrt{n_1(n_1+n_2)/n_1^3}$ added to the Zelterman exponent [270].

The total population of offenders is the convicted known plus those undetected. During May 2009, in these 75 counties, there were 13,938 male plus female felony defendants charged with violent crime, while 5685 were convicted. Of these, 64% had no prior convictions, while 13% had one [87]. From the Zelterman estimator (eqn. 2), about 13,110 violent offenders were not caught (Table **3**). The total population of May 2009 offenders is then 13,110+5,685 = 18,795, *i.e.*, the convicted plus the undetected violent offenders.

From Table **3** and under the same assumptions as above, the total population of violent male offenders in 2009 was 12×18,795×0.86 = 193,964, or 0.52% of the 18-64 age group male population. The homologous calculation yields 31,576 female violent offenders during 2009, equivalent to 0.08% of the age 18-64 female population. The fraction of males is identical to the predictions from personality metrics (Section 5.3.1), while about 35% of felony-prone females were violent offenders. Further implied is that within the 2009 total population, high impulsivity was exhibited by about 8.6% of males and about 4% of females who are prone to sexually harass, relative to about 5.3% and 4.8% predicted from personality metrics alone, respectively.

5.2.3. Personality and Rape, 2009 & 2019

The BJS National Crime Victimization Survey (NCVS) conducts a national survey to estimate the incidence of unreported crimes. The total crime is the reported plus unreported incidents. In 2019, the rate of rape reported to the police in the U.S. was 0.43/1000 residents, which amounts to 141,143 reported rapes in a population of 328 million [89]. However, the NCVS estimated that 66.1% of rapes went unreported in 2019. The corrected total of violent rapes in the US in 2019 is then 416,351, when the age 18-64 demographic included 100.22 million males [85]. The corrected incidence rate of rape is then $416{,}351/(100.22\times10^6) = 0.0042$ per male (reported plus unreported). That is, assuming every incident of rape in 2019 involved a unique male perpetrator (no serial rapes), then the fraction of the male population as perpetrators of rape is 0.42%. This fraction is again consistent with the prediction from personality metrics and is identical to the 0.4% fraction of rape perpetrators found in Quebec [271]. For an extended discussion of the Bouchard and Lussier study of sexual violence in Quebec, see Section 3.2 in the Supplementary Material.

By comparison, ten years earlier, in 2009, the U.S. reported 89,241 rapes and about 165,859 sexual assaults [95, 273]. The NCVS estimated that 77% of rapes went unreported in 2009, implying a corrected 2009 total of 388,004 reported plus unreported rapes in the U.S [90]. The 2009 U.S. male population of age 18-64 was 94,341,111, estimated by linear interpolation of the 2000-2010 census populations [84]. Once again, assuming unique male offenders, then [(388,004/94,341,111)×100] = 0.41% of the age 18-64 male population perpetrated violent rape in 2009. That is, the 2009 and 2019 incidence rates of rape per male are identical (A further corroborative example for 2009 is presented in Supplementary Material Section 3.3, *Incidence of rape in the 75 most populous U.S. Counties*). These several independent corroborations indicate the durability expected if the 0.4% fraction of violent sexual male offenders arises from a time-stable distribution of personalities, as predicted from Evolutionary Psychology.

Thus, in both 2009 and 2019, an estimated 0.4% of all U.S. males were involved in rape, while 99.6% of males were not. If sexual violence is confined to the personality-derived 0.5% of low A, low H-H, and high Impulsivity males, then an upper limit of about 80% of these males (18-64) were active rapists in both 2009 and 2019.

5.2.4. Campus Serial Abusers

Koss and associates presented a foundational study of sexual harrying and violent sexual abuse on U.S. college campuses (N = 32), which surveyed victimized female students (N = 3187) and male student abusers (N = 2972) [274, 275]. The student cohort was taken to be a statistically valid national sample. The study methodology is provided in Supplementary Material Section 4.1, *The Koss et al., 1985 campus rape study*.

A Web of Knowledge 1985/1987 Koss and associates search carried out on 5 May 2023 produced 1622 total citations, with 438 citations following 2015, 36 citations in 2022, and 7 in the first 4 months of 2023, indicating the study remains actively relevant [276]. The widespread

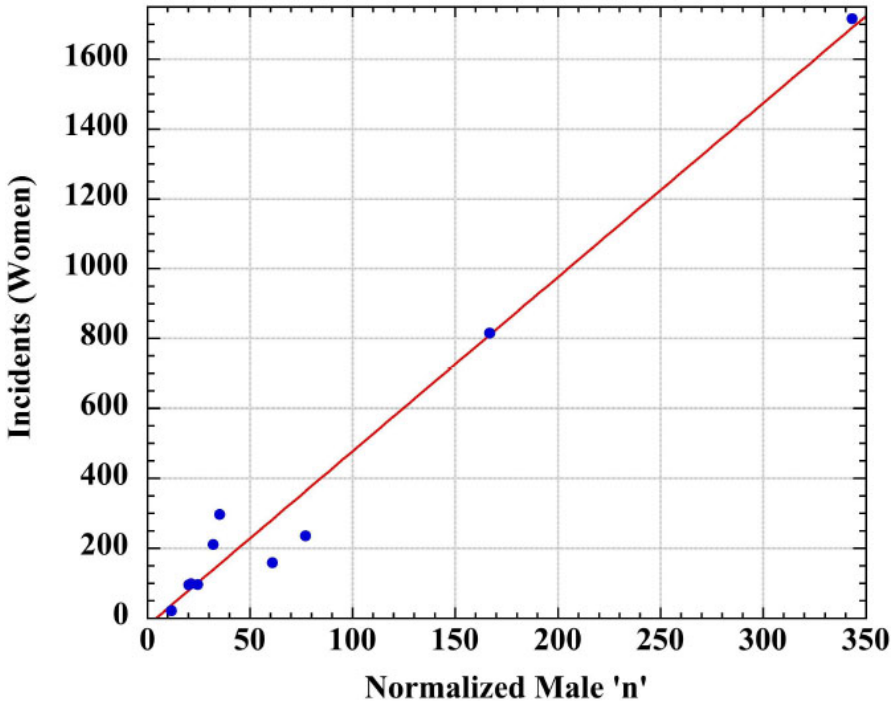

Fig. (4). Sexual offense survey data of 32 institutions of higher learning nation-wide in the U.S. from Table 5 of Koss and associates [274]. Points are incidence of sexual harrying or violent sexual abuse suffered by undergraduate females (N = 3187) plotted against the population of male perpetrators normalized to the same N (see text). The line is a linear least squares fit, y = 4.98x-20.78; r^2 = 0.97. Point 0,0 was included in the fit. The ten points range from violent rape (low frequency) to inappropriate sexual contact (highest frequency).

notion that 20-25% of college females suffer rape appeared first in the work of Koss *et al*. [276-279], which in turn, however, arose from a misreading of the literature (*cf*. *The legendary incidence of campus rape* in Supplementary Material Section 5.2) [278-280].

In their Table 5, Koss and associates presented the survey result, "*One-Year Incidence Frequencies of Sexual Experiences*" for female victims (N = 3187) and male perpetrators (N = 2972). The statistically valid incidence rates can be used to estimate the average perpetration rate per male. For this estimate, each male incident category n-value was renormalized so as to sum to the total female N. Thus, $n_{renorm} = n_{male} \times (N_{female}/N_{male})$. These renormalized male populations from Koss Table 5 correspond to an estimated number of offenses committed by a virtual set of N = 3187 undergraduate males identical in size to the complete female cohort. One can then plot the number of abuses *versus* the number of perpetrators, as in Fig. (**4**).

The relation between female victimizations and male victimizers is highly linear, and the slope of the fit, 4.98 (95% CI 4.4-5.5), estimates that each male perpetrator victimized about five undergraduate females. This rate of victimization per serial abuser is constant, from abusive touching through rape itself. Notably, Lisak and Miller independently reported a very similar 5.8 campus rapes per male serial offender [196]. The incidence rate per offended female ranged from a low of 1.6 for intercourse by threat or force to a high of 2.4 for sexual contact by verbal coercion.

From these data, the populational fraction of campus male rape perpetrators can be estimated. For this estimate, Koss and associates [274] categories "*intercourse by threat or force*" and "*oral or anal penetration by threat or force*." indicated the number of rapes. The populational fraction of male perpetrators, F_p, is then, (Fig. **3**).

$$F_p = [n_{rapes}/(rapes/male)/N_{males}] \times 100 = [90/5/3187] \times 100 = 0.56\ \% \quad (3)$$

This fraction of rape perpetrators is again completely consistent with the derived predictions from personality and Evolutionary Psychology. However, 0.56% is about half the fraction of campus undergraduate males who admitted to forcible rape (*cf*. Supplementary Material Section 4.1 *The Koss, et al., 1985 campus rape study*). The dichotomy is ascribed to the impact of insobriety (*cf*. Section 6.1 below). Adding the categories "*sexual contact by threat or force*" and "*attempted intercourse by force*" yields 1.4% of the male student population.

Thus, the data of Koss and associates present clear evidence that the perpetration of all forms of personality-driven sexual abuse, ranging from inappropriate touching to violent rape, is resident in a small population of male serial abusers. Foubert and associates independently

corroborated this finding. Across 49 Midwestern colleges, they found that 87% of alcohol-involved rapes were committed by male student serial perpetrators (N= 12,624), who averaged five victims each [281]. Serial abuse is exactly the result predicted by the HEXACO personality trait distributions (Section *3.3*), indicating a sub-population prone to sexual harassment and sexual abuse up to and including rape. Although the evidence of serial abusers was present in the 1987 data of Koss and associates, it went unnoticed for 35 years [274].

5.2.5. The Circumstances of Campus Rape

The 2019 AAU Campus Climate Survey on Sexual Assault and Misconduct reported (Table **5**) that 4.7% of female undergraduates (N=68,616) had been forcibly penetrated during the 2019 school year and 12.8% had been victimized in this way at some time during their matriculation [96]. The corresponding fractions of undergraduate male victims (N=39,605) were 1.2% and 2.9%, respectively. Among these (Cantor *et al*., Table 19), 78% of the female victims of forcible penetration were using alcohol, as were 65% of the perpetrators (99% male), and at least 12% and 9.5%, respectively, were using alternative drugs. Among male victims, 80% were using alcohol as were 63% of their perpetrators (39% male, 66% female), while 13% and 19%, respectively, were using alternative drugs.

Thus, 90% of female victims and 74% of perpetrators were under the influence of alcohol or drugs at the time of the rape. From this, the fraction of rapes in which both parties were of diminished capacity from alcohol or drugs is (0.90×0.74)×100 = 66%. Then of the 12.8% of females who had been forcibly penetrated at some point in their matriculation, 0.66×12.8 = 8.5% had suffered rape with both parties likely intoxicated and of diminished capacity. Over their time of matriculation, then, 12.8-8.5 = 4.3% of females were raped during which either the female victim or her male perpetrator, or both, were sober.

Campus sexual assaults involving diminished capacity due to alcohol or other drugs confound extraction of the influence of personality on sexual harassment and violent sexual abuse from these statistics. Nevertheless, the populational fraction of violent male perpetrators (0.5%) and the serial perpetration rate of college males taken from Fig. (**4**) above allow an estimate that 5×0.52% = 2.6% of campus females were raped by males whose personalities are low in HEXACO traits of both Agreeableness and Honesty-Humility and with high Impulsivity [282].

The populational frequency distributions of HEXACO personality traits and the campus statistics on sexual assault thus allow predictions of the rate of conscious intentional sex-directed harrying or violent sexual abuse. The focus here is necessarily on those with a personality-driven, sober and clear intent who, under the goad of impulse, undertake to sexually harry or violently assault another person.

5.2.6. A University Illustration

The demographics of Stanford University provide a sample of convenience to illustrate the working out of the personality fractions in a localized academic context. In the 2018-2019 academic year, Stanford University included 7,083 undergraduates equally divided between males and females [98]. Students are chosen primarily for academic excellence. Academic achievement follows IQ and Conscientiousness, with other personality traits only poorly correlated with university admission [148, 283-286]. It follows that the range of other HEXACO traits, especially those playing into SH and Impulsivity, should approximate the population average (*cf*. Supplementary Material Section 5.1, *Comparative HEXACO traits of university students* and Table **S1** *HEXACO Traits for Selected Cohorts*) [148, 264, 287, 288].

Personality analysis predicts that within Stanford University, about 318 male undergraduates (9%) and 142 female undergraduates (4%) will have low H-H plus low-A personalities (*i.e*., likely to offend by SH). More cautiously, about 18 male undergraduates (0.5%) and 7 female undergraduates (0.2%) may have personalities prone to violence. An important caveat, discussed above and repeated and emphasized here, is that propensity does not determine individual choices or behavior (*cf*. Supplementary Material Section 3.1 *Impulsivity*) (Table **S2**).

The Stanford University portion of the 2019 AAU Survey reported that 2.9% of undergraduate females (N = 3626) had been victimized by forcible penetration during the 2019 class year and that 9.6% had been so victimized at some point during their matriculation (Table 3.1 in [97]). The one-year incidence rate of 2.9% rape victims reported by Koss and associates implies a comparable 11.6% victimization rate across a 4-year matriculation in 1987 (assuming no repeats) [274]. Of the Stanford groupings, 50% of the female victims and 46% of the perpetrators were using alcohol, as were 52% of the male victims and 61% of their perpetrators (see [97] Table 3.11). A further 3% of female victims had been using drugs. Such diminished capacity excludes behavioral explanations within the traits of a sober personality. However, as an exercise, the 18 Stanford male undergraduates predicted to be violence-prone may serially average about 5 rapes each (Fig. **4**). This totals 90 rapes, equivalent to 2.5% of the Stanford female undergraduate population, which scales to a four-year victimization rate of (10±2)% (99.7% CI), assuming no repeat victims. These fractions are very comparable to the 2.9% and 11.6%, respectively, reported by Koss and associates 34 years earlier. Thus, Evolutionary Psychology and personality distribution appear to explain the majority incidence of campus violent sexual assault within the context of violence-prone serial perpetrators. When extended to university faculty, the analysis from Evolutionary Psychology can explain the entire incidence of SH and sexual violence involving staff (Supplementary Material Section 6, *The predicted incidence of university faculty SH or rape from Evolutionary Psychology*, derives the predicted incidence fraction) [289].

6. SUMMARY RESULT & DISCUSSION

6.1. Summary Result

Evolutionary Psychology has provided a fully scientific and predictive theory of sexual harassment based on the genetic determinants of personality. Section 3.2 above summarizes the gene-personality connection. The lexical personality inventories have an evolutionary grounding and explanatory efficacy. In Section *3.3*, HEXACO traits were used to delineate the personality of those likely to sexually harass. The means and standard deviations of traits allow a statistical appraisal of their occurrence within a population. Calculating the statistical fraction of the population likely to possess a harassment personality was then straight-forward.

This chain of logic connecting genes and personality is grounded in Evolutionary Biology and an established quantitative Evolutionary Psychology. It, therefore, provides a physical basis for the causal connection between the incidence of harassment personalities and the incidence of sexual abuse.

This quantitative hypothesis was tested against the frequency of crime, as published by the U.S. Bureau of Justice Statistics. The near identity of the prediction and the empirical results establishes, the validity of the connection.

Necessary to keep in mind, however, is that personality with a propensity to harassment or violent criminality does not determine behavior. Deliberative self-modification can produce epigenetic gene modification and changes in neuronal connectivity [290]. The possibility of rehabilitation is then a biological reality, and a more civil personality can result from personal effort. However, successful societal intervention requires effective and rationally constructed tools to achieve this result [290-293].

In some cases, the demographics of arrest or conviction are smaller than the sub-populational fractions predicted to have personalities prone to abuse or violence. Such data may indicate learned choices against the violent criminal impulse, possible evidence of self-modification endogenous to epigenetics and neuronal plasticity. This qualifier, discussed in the Introduction Section, is critically important and ethically should be kept in view. Table **4** summarizes the statistical fractions of criminal behavior discussed above.

In some cases, the fraction of perpetrators departs somewhat from the HEXACO plus Impulsivity prediction. These disparities may result from personal self-modification or from cultural influences on personality. In either event, a departure is expected.

6.1.1. Sexual Harassment

Sexual harassment is the impositional abuse of evolutionarily endogenous mating behaviors. A durable baseline of SH is predicted to be determined by the populational incidence of personalities low in HEXACO H-H and A. Likewise, the baseline incidence of violent sexual assault is predicted to follow the populational incidence of personalities of low HEXACO H-H and A, and with very high Barrett Impulsivity. Materially higher societal incidence rates may indicate regions where a local culture fosters sociopathology.

Table 4. Summary of predicted and found populational fractions perpetrating crime.

Source	Males (%)	Females (%)	Comment
This work	0.52	0.23	Predicted HEXACO + Barratt Impulsivity
Koss, 1987, this work	0.56	---	Rape, predicted
Koss, 1987	1.3	3.6	Rape, ~66% both parties intoxicated
Koss, 1987	2.1	9.3	Attempted rape, ~74% male intoxication
Bouchard, 2015	0.4	---	Rape, sexual assault (Zelterman estimate)
U.S. 2009, this work	0.44	0.06	Felony arrest
U.S. 2009, this work	0.52	0.08	Felony violence (Zelterman estimate)
U.S. 2009, this work	0.41	---	Rape conviction
U.S. 2019, this work	0.42	---	Rape conviction

Each sex has power over the reflexive response of the other. This definition of SH is readily extended to the conduct of other sexualities. Mutually consensual evolutionary mating behavior involves negotiation. Impositional abuse abjures negotiation and consent. In neutral venues, impositional abuse of the sexual power conferred by evolution causes discomfit and stress and possibly fear, in the targeted individual. This description from science should clarify and render objective the study and adjudication of SH. Certain sexual offenses, such as violent sexual assault, depart from the abuse of evolutionary mating behaviors. This distinction implies that violent reproductive strategies, even when the product of a subsidiary evolutionary gradient, are not classifiable as mating behaviors [143, 150, 294]. Violent sexual assaults are categorically distinct from sexual harassment. They should be classified separately in scholarly study, in policy, and law.

This deduction permits a new and constructive approach to the study of sexual harassment as a phenomenon. HEXACO personality traits map onto gene frequency, while the nearly orthogonal HEXACO factors imply a discrete meaning to each trait. The elements of personality both predict the populational fractions prone to sexual harassment and sexual violence and explain the rates of societal incidence.

Supplementary Material Section 7, *Toward clarification and adjudication of SH,* provides a description of how Evolutionary Psychology limns actionable SH. Supplementary Material Section 8.1, *Abuse by Statistical Implication,* describes the abuse of statistical generalization that plagues the entire field of SH studies,

with reference to several illustrative studies [233, 277, 295]. Generalized statistics of victimhood provide no indication that serial perpetrators from a sub-populational cohort are responsible for the great majority of offenses.

Supplementary Material Section 8.2 briefly assesses the 2018 National Academy Report, *Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine,* which also falls under the verdict of abuse by statistical generalization [3].

This study has expanded the modes of sexual harassment to include those committed by females against males. Until this work, sexual harassment of males by females has been mischaracterized as involving the same behaviors as harassment of females by males. However, deductions from Evolutionary Psychology falsify this equivalence. Females harass by an inappropriate exertion of their own unique evolutionary power of display. Doing so evokes a reflexive and discommoding sexual response in males.

This evolutionarily derived and legally definable mode of sexual harassment by females is completely absent from recognition or discussion in prior scholarly literature. It is entirely un-sampled in any SH survey instrument [234, 246, 296-300], including all forms of the "gold standard" Sexual Experiences Questionnaire (SEQ) recently used to imply systemic sexual harassment in academic STEM fields [3, 16]. Academic researchers have apparently been utterly blind to the mode by which females sexually harass males, Ms. Bettina Arndt being the outstanding exception.

Following from the analysis in Sections 4 and 5 above, it should be clear that a city of any size will include a sub-population of people with personalities high in propensity to commit SH. Among those will be a smaller group with the added trait of very high Impulsivity, a significant fraction of whom (~80%) will be readily disposed to sexual violence. The elements of behavioral choice, as previously noted, are at play here. The social significance of these personality statistics is illustrated next.

6.1.2. If you Insist on Sleeping Exposed in the Forest, a Lion will eventually find you

That was the subtext message of Constable Michael Sanguinetti when, in 2011, he spoke on personal safety to a group of female students at Osgoode Hall Law School, York University, Toronto.

His actual choice of words was indelicate and impolite, and lacking in finesse. He said, "*I've been told I'm not supposed to say this – however, women should avoid dressing like sluts in order not to be victimised*" [301].

Constable Sanguinetti's choice of words was unfortunate, but it is worth considering his message. As an experienced patrol officer, Constable Sanguinetti certainly possessed street wisdom. As with all law-enforcement personnel, Constable Sanguinetti will have had much more exposure to criminally impulsive people than any member of the general population. He will have had direct knowledge of the criminal personality. He will have become well aware of their propensity to opportunistic criminal violence and of their ever-present danger to others.

Knowledge of this danger provides the rationale for his warning, ill-worded though it was. Young women whose public display or deportment signals sexual interest, innocently or not, will necessarily include among those signaled, the at-large population of low H-H, low A, high Impulsivity males. This is a matter of pure statistical certainty. These males, among the 0.5% population of high-criminality, highly impulsive personalities, will be at least as receptive to those signals as any male but very, very much more likely to indulge in a violent response, whether immediately or as an opportunity later provides.

The analogy is apt that city streets are as a forest with a few predatory lions hidden among the denizens. To enter while unarmed with awareness of that danger is to suffer an enhanced risk of being their prey. This was Constable Sanguinetti's message however badly worded. To protest against the criminal personalities who abuse signal-and-response [302] is to protest against the indifferent workings of an iron statistic.

However, the misinterpretation of Constable Sanguinetti's warning as 'blaming the victim' has been propagated into the academic literature by some whose professional training should have led them to see more deeply [303, 304]. For example, Constable Sanguinetti's poorly worded but statistically and professionally valid warning has been called "*objectifying, patriarchal and moralising*", while he himself was said to be expressing his "*deeply sexist social and cultural values*" or to be asserting that "*women control the conditions leading to sexual assault*" [304, 305].

These rephrasings of intent are not correct. Such ideological judgments completely lose track of Constable Sanguinetti's point, which is that a habit of risk-taking enters the statistical landscape of disaster probabilities. Evolutionary Psychology makes clear that although a sexualized signal is received by all men, only the very small population of Low H-H, low-A, high I males may be moved to assault. Women who present a sexualized display while on city streets are not agents of their own possible assault. They do, however, enter a geography of greater danger. A warning based upon the statistical outcome of an evolutionary extreme of personality has no moralizing or sexist content. Dismissing this valid warning by way of a tendentious Feminist politics is a disservice to women. Indeed, doing so foolishly diverts safety awareness into grievance politics [306] to the point of fueling female endangerment.

7. LIMITATIONS OF THIS STUDY

This study uses HEXACO indices to predict personality-based rates of crime. Discordant observations ceteris paribus will falsify the gene-personality-crime hypothesis. Modification of the HEXACO inventory may impact the fractions of the population predicted to be prone to SH or criminal violence. These fractions are also subject to the validity and substantive orthogonality of the HEXACO personality index. For example, the 0.42

correlation between HEXACO C and A implies an unresolved personality factor. A general disproof of the HEXACO index would obviate this study. The validity of the derived criminal fractions, in turn, requires the validity of the Barrett BIS-11 Impulsivity scale. Similarly, the semi-dependence of personality on gene frequency and the evolutionary independence of the specifying genes are accepted but may be later disproved or modified. The empirical fractions of criminal behavior derived here that heretofore support the HEXACO-PI-crime hypothesis are subject to the integrity of the crime statistics provided by the U.S. Department of Justice.

CONCLUSION

Final Words

The HEXACO personality inventory combined with BIS-11 impulsivity predicts that about 0.52% of males are prone to violence, including sexual violence, a fraction validated by the real-world data described in Section *5ff*. Data on the incidence of rape clearly indicate dominance by repeat offenders.

In the same fashion, the data of Koss and associates and those of the 2019 AAU Campus Climate Survey on Sexual Assault and Misconduct support the view that the locus of campus sexual violence against women is primarily the responsibility of a sub-population of violence-disposed male serial abusers. These derive from the fraction of (mostly) males predicted to occupy the low H-H, low-A, high-Impulsivity regions of the seven-dimensional HEXACO-Impulsivity personality phase space. The finding of a discrete sub-population of perpetrators falsifies the view of a widespread male tendency toward rape, which has been encouraged by the use of generalizing statistics of victimology. The quantitative finding that the incidence of both sexual harassment and violent sexual assault, including rape, are based on serial abusers composing small sub-fractions of the population obviates notions of rape culture [307-310].

Nevertheless, the totality of campus data makes clear that university and college presidents and provosts sincerely interested in reducing the incidence of campus rape or lesser sexual assault will strictly ban the use of alcohol and/or drugs on campus. In light of these very clear data, expressions of concern in the absence of an active ban will signal a deficit in administrative integrity.

Finally, the new science-based gender-independent characterization of SH deduced herein from Evolutionary Psychology necessitates a proximate re-evaluation of sexual harassment in scholarship, policy, and law. The rigor of Evolutionary Psychology should help clarify the identification, the incidence, the study, and the adjudication of sexual harassment. It is hoped that the new delineation of SH as the abusive imposition of evolutionarily endogenous mating behaviors will bring an objective quality to policy and jurisprudence, and a coherent clarity to its study.

AUTHORS' CONTRIBUTION

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

LIST OF ABBREVIATIONS

SEQ	=	Sexual Experiences Questionnaire
NCVS	=	National Crime Victimization Survey
ISH	=	Innocent Sexual Harassment
SH	=	Sexual Harassment
EEOC	=	Equal Employment Opportunity Commission
LSH	=	Likelihood to Sexually Harass

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical declaration.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIAL

The authors confirm that the data supporting the findings of this research are available within the article.

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CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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SUPPLEMENTARY MATERIAL

Supplementary material is available on the publisher's website along with the published article.

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