Handedness, criminality, and sexual offending

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Abstract

A very large database was used to investigate whether men with a history of criminality and/or sexual offending have a higher incidence of nonright-handedness (NRH) relative to a control sample of nonoffender men. The sample (N > 8000) comprised interviews by investigators at the Kinsey Institute for Sex and Reproduction in Indiana. The general offender group and a subsample of sex offenders (e.g. pedophiles) had a significantly higher rate of NRH relative to the control (nonoffender) men. In addition, evidence was found that the general criminality/NRH relationship might result from increased educational difficulties that some nonright-handers experience. In contrast, education was unrelated to the handedness/pedophilia relationship, suggesting that there may be a different mechanism underlying the handedness/pedophile relationship than the handedness/(general) criminality relationship. Finally, as a cautionary note, it is stressed that the effects are small and that NRH should not be used as a marker of criminality. Crown copyright © 2001 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Nonright-handedness; Criminality; Pedophilia; Sex offenders; Kinsey

1. Introduction

Nonright-handedness (NRH) is not per se pathological (e.g. [5]), but most cerebral lateralization researchers argue that elevated NRH in clinical groups can result from developmental/central nervous system (CNS) disorders (e.g. [2,8,29,32]; but see [1,25]).

Evidence, therefore, that people with a history of criminality have elevated NRH may give support for the theory that these behaviors result, in part, from developmental/CNS abnormalities. The evidence supporting such a relationship is mixed. Reviewing early studies, Porac and Coren [27] noted an association between NRH and criminality. Three recent studies also support such a relationship [11,14,19], but some recent studies have been contradictory [12,20,33], with at least two finding evidence of less NRH in men with a criminal history [20,26]. More data on a large sample may help clarify this association. Moreover, few studies have addressed how other variables, such as education, may relate to a putative handedness/criminality relationship. For example, might NRH be related to criminality in part because those with NRH are more likely to have educational difficulties, which, in turn, creates impaired societal functioning (e.g. 'acting out'), or do NRH and educational difficulties have independent effects on criminality?

One antisocial group that is a good candidate for increased NRH resulting from developmental/CNS abnormalities is sex offenders because many sex offenders may have developmental/CNS abnormalities (see [24]). Perhaps the strongest evidence for such abnormalities has been found in pedophiles, offenders with erotic preferences for pre-pubescents. This evidence includes the finding that pedophiles show hypersecretion of luteinizing hormone under gonadotropin-releasing hormone stimulation [3,15]. Using CT scans, pedophiles have also been found to have less dense right frontal areas of the brain [21] and the smallest left frontal and temporal areas of the brain and the greatest asymmetry [31] relative to other men. Neuropsychological testing has confirmed that elevated left-hemispheric impairment may occur in pedophiles (e.g. [22]). Interestingly, such left hemisphere damage, if it proves reliable, suggests elevated NRH should be found in pedophiles because left hemisphere damage has been linked to elevated NRH (e.g. [29]).

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I am not aware of research examining if sex offenders (e.g., pedophiles) have elevated NRH. However, one very large sample with information on handedness, criminality, and sex offending comes from the Kinsey Institute [17,23]. With data available on over 8000 men, including 1400 sex offenders [16], this sample provides a rare opportunity to conduct powerful tests of the relations among handedness, criminality, and sexual offending. These tests are the focus of the present study. If, for example, men with a history of criminality and/or sexual offending have increased NRH relative to controls, then this finding may provide additional evidence that CNS abnormalities affect criminality and/or atypical sexual preferences.

2. Method

2.1. Subjects

From 1938 to 1963, 17502 case histories were recorded by the Kinsey Institute for Sex, Gender and Reproduction, using the interview schedule devised by its founder A.C. Kinsey [17]. The Kinsey files contain 2498 white men with a history of criminality. These men had been arrested and/or convicted of at least one misdemeanour or felony. Type of (nonsexual) offence was not coded in the original files. Of these men, 1410 had a conviction for a sexual offence, most of whom (1283) were classified into one or more of 14 basic sex offender categories (e.g., offender against girls under 12), as described in *The sex offenders* (Gebhard et al. [16, pp. 37–38]). Finally, I included the original sample of (nonoffending) white men who comprise 6050 cases. Only whites were included because the retrievable 14 categories of sex offenders comprise whites only [16]. Women were excluded because the Kinsey researchers did not ask them about handedness.

Based on information from the 14 retrievable sex offender categories, two sex offender groups were created. Sex offenders against children (‘pedophiles’) were those who had one or more sexual offence (non-incest) against girls or boys under 12 (n = 304). Incest offenders were excluded from the ‘pedophiles’ because these men can have phalometric profiles resembling men with adult-oriented sex preferences and not pedophiles (e.g. [13]). Other sex offenders (nonpedophiles) had one or more sexual offence but no offences against unrelated children under 12. Note that the information on offence-history indicates that a man had at least one offence in a given category; the actual number could not be recovered. Thus, ‘pedophiles’ might have had only one or many offences against children.

2.2. Procedures and materials

The raw data are stored in computer files at the Kinsey Institute, where they were analysed according to my instructions. Demographics included education ( # of years/grades completed), year of birth, age, and parental income (SES), which refers to the wealth of the proband’s parents when he was 14–17 years old (1 = extreme poverty; 8 = extreme wealth).

Kinsey’s interviewers asked one question on ‘overall’ handedness (i.e. ‘Are you right or left handed?’ see [17]). Four responses were recorded: ‘right-handed’, ‘left-handed’, ‘ambidextrous’, and ‘right-handed, retrained from left-handed’. Note that using only one item likely results in a conservative estimate of adexterity. Also, ‘ambidextrous’ is likely inaccurate for most people (i.e. equally able to use both hands), and some (e.g. [30]) now use other terms (e.g. ‘ambiguous/mixed’). To provide an estimate of NRH, ‘left-handed’, ‘ambidextrous’, and ‘right-handed, retrained from left-handed’, were collapsed into ‘nonright’ for some analyses. Despite the relatively simple classification system, Kinsey’s handedness rates are similar to adult norms (approx. 90% right-handed; [6]), and this question should correlate very highly with the total score and main first factor of multi-item handedness scales (e.g. [7,28]).

3. Results

Men with a criminal history (both sex and nonsex offenders) were 85.8% right-handed (valid n = 2086), whereas controls were 88.5% right-handed (valid n = 4706), a significant difference using a 2 (i.e. nonright by right-handed) by 2 (i.e. offenders by controls) contingency table ($\chi^2(1, N = 6792) = 10.38, P = 0.001$). Similar results occurred comparing right-handers to ambiguous/mixed (i.e. ‘ambidextrous’) handers (offenders = 4.7%; controls = 3.5%) and right-handers to left-handers (offenders = 9.6%; controls = 7.9%, $\chi^2(1, N = 6220) = 5.38, P = 0.02$ and $\chi^2(1, N = 6528) = 5.98, P = 0.01$, respectively). However, the offenders and controls also differed on all demographics, with the offenders being lower in parental income, year of birth, and education and higher in age (all Ps < 0.001). Thus, to evaluate whether the handedness difference resulted from a possible (confounding) effect from one or more of these variables (see [18]), I conducted logistic regressions, with group (offender vs. nonoffender) as the criterion, and handedness and the demographics entered as predictors. Handedness remained significant controlling for parental income, year of birth, and age (all Ps < 0.003), but was no longer significant once education was controlled ($P > 0.2$; see Table 1).
Note that the same pattern of results (i.e. a handedness difference, but not after controlling for education) occurred comparing the nonsex-offender group (valid n = 813, 84.6% right-handed) with the controls and comparing the sex offender group (valid n = 1273, 86.5% right-handed) with the controls.

The pedophiles (valid n = 286) were 84.3% right-handed. This rate of right-handedness differed significantly from the controls. (χ² (1, N = 4992) = 4.78, P = 0.03). Additional analyses indicated that the elevated NRH in pedophiles (relative to controls) may result from elevated mixed/ambiguous handedness (and not left-handedness per se). For example, 6.6% of pedophiles were mixed/ambiguous versus 3.5% for controls (χ² (1, N = 4594) = 7.5, P = 0.006), whereas there was no difference between pedophiles and controls comparing right-handers to left-handers (i.e. pedophiles = 9.1% vs. controls 7.9%, χ² (1, N = 4806) = 0.8, P > 0.3). Note, however, that the offender groups — pedophiles, nonpedophilic sex offenders, and nonsex offenders — did not differ significantly in NRH, including in rates of mixed/ambiguous handedness. This result may not be surprising given (nonpedophilic) offender groups may also be slightly higher in mixed/ambiguous handedness (relative to the controls) and a reduction in power occurs when making comparisons among the offender groups (approx. n = 1000) relative to the comparisons using the sample of controls (approx. n = 4500). Finally, the pedophiles and controls also differed on all the demographics (all Ps < 0.001), but, in contrast to the prior analyses, logistic regressions revealed that handedness (right vs. nonright) was relatively unaffected by controlling for all variables including education (all Ps = 0.054 or less; see Table 2).

Table 1

Logistic regressions of offender category (i.e. controls vs. all offenders) in the Kinsey sample of men

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>S.E</th>
<th>Wald</th>
<th>P</th>
<th>eB</th>
</tr>
</thead>
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<tr>
<td><strong>Four Predictor Equation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handedness</td>
<td>0.27</td>
<td>0.092</td>
<td>8.56</td>
<td>0.003</td>
<td>1.31</td>
</tr>
<tr>
<td>SES</td>
<td>−0.55</td>
<td>0.022</td>
<td>612.56</td>
<td>0.000</td>
<td>0.57</td>
</tr>
<tr>
<td>Age</td>
<td>0.18</td>
<td>0.008</td>
<td>487.95</td>
<td>0.000</td>
<td>1.19</td>
</tr>
<tr>
<td>Year of birth</td>
<td>0.16</td>
<td>0.008</td>
<td>422.17</td>
<td>0.000</td>
<td>1.17</td>
</tr>
<tr>
<td><strong>Five Predictor Equation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handedness</td>
<td>0.17</td>
<td>0.129</td>
<td>1.64</td>
<td>0.201</td>
<td>1.18</td>
</tr>
<tr>
<td>SES</td>
<td>−0.17</td>
<td>0.032</td>
<td>27.47</td>
<td>0.000</td>
<td>0.85</td>
</tr>
<tr>
<td>Age</td>
<td>0.21</td>
<td>0.011</td>
<td>368.14</td>
<td>0.000</td>
<td>1.23</td>
</tr>
<tr>
<td>Year of birth</td>
<td>0.18</td>
<td>0.010</td>
<td>289.69</td>
<td>0.000</td>
<td>1.20</td>
</tr>
<tr>
<td>Education</td>
<td>−0.58</td>
<td>0.016</td>
<td>1328.44</td>
<td>0.000</td>
<td>0.56</td>
</tr>
</tbody>
</table>

*Note: B represents the change in the logarithmic odds of criminal offending for a one unit increase in the corresponding predictor; standard error for each B; Wald statistic is the statistical quantity used to determine the significance level (P) of each predictor variable; eB is the multiplicative change in the odds of criminal offending for a one unit increase in the corresponding predictor; Controls = 0 and Offenders = 1; Handedness is 0 = right and 1 = nonright; SES ranges from 1 = extreme poverty to 8 = extreme wealth; and Education = grade 1 or less and 20 = Ph.D or MD.

4. Discussion

Results indicated that men with a history of criminality and/or sexual offending (e.g. pedophiles) have elevated NRH. Although the effects were small, it should be noted that a 5% difference means about a 30% change in NRH (e.g. 15.7% in pedophiles vs. 11.5% in controls). In addition, large differences in handedness rates are not expected, given power analyses suggesting that finding a handedness difference between groups may be low even with large samples (e.g. [9]). This is in part because handedness is, of course, imperfectly correlated with (and, thus, only a relatively crude marker of) the real difference between the groups (e.g. CNS impairment). Given such small differences and the
needed power to detect such effects, however, perhaps it is not surprising that the extant data are equivocal.

Interestingly, the handedness effects for the criminal and general sex offenders’ samples were no longer significant once education was controlled. This suggests that increased NRH may underlie both criminality and educational difficulties, or that the criminal/handedness relationship is mediated by educational difficulties. In particular, some NRH (or the CNS abnormalities it may represent) may cause educational difficulties, which ultimately affects criminality (e.g. by ‘acting out’). Whether some men with NRH have increased educational difficulties because of neurological/cognitive deficits, differential processing of (negative) emotions, or whether teachers have (traditionally) merely perceived and treated nonright-handers differently (and unfairly) is unknown (see [10] for a review). The latter explanation would support Feehan et al. [12], who argued that recent data may not show a handedness/criminality relation because NRH has become more accepted by society, including by educators (but see [11]).

In contrast, education is not related to the handedness/pedophilia relationship. Pedophiles had elevated NRH relative to controls with or without controlling for education. This result suggests that, even though pedophiles have a rate of NRH comparable to other general cognitive and educational difficulties. Instead, these data may indicate that elevated NRH in pedophiles reflects CNS abnormalities that, in part, directly affects their sexual preference systems (see [24] for a review of CNS abnormalities in pedophiles).

It is of note that elevated NRH for pedophiles may be largely due to elevated mixed/ambiguous handedness (and not just left-handedness per se). Interestingly, mixed/ambiguous handedness has been linked more reliably to certain CNS/developmental disorders (e.g. autism) than left-handedness (e.g. [4]), and, thus, this reinforces the idea that pedophiles may have CNS abnormalities (that may directly affect their sexual preference systems). Finally, as a cautionary note, it should be stressed that ambiguous/mixed handedness (or NRH generally) should not be used as a marker of pedophilia (or other offending): the vast majority of men with NRH are, of course, not pedophiles (or other offenders), and it is clear that the large majority of such offenders are in fact right-handed.

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References