

BRIEF REPORTS

An Implicit Test of the Associations Between Children and Sex in Pedophiles

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Pedophiles are motivated to disguise their thoughts and feelings about their sexual beliefs and attraction toward children. New developments using implicit measures of associations have been successful in accessing socially stigmatic beliefs, even in cases in which the participant is resistant to this disclosure. Using an implicit measure, the authors show that pedophiles have an association between children and sex, whereas nonpedophilic offenders have an association between adults and sex. The task can therefore identify a core cognitive abnormality that may underpin some pedophilic deviant sexual behavior.

Keywords: implicit measures, pedophiles

Although it can be said that on some level pedophiles must be sexually attracted to children in order to sexually offend, there are limited assessment tools available to measure this. Phallometry is one method that can be used to assess sexual arousal toward children but this is invasive, expensive, it can be faked (Harris, Rice, Chaplin, & Quinsey, 1998), and it requires the presentation of sexually explicit materials. Clinicians, police, and social ser-

vices are therefore forced to rely on self-report evaluations (e.g., interviews or questionnaires) of offenders' sexual attraction to children and of their beliefs about children and sexuality. This is far from ideal given the strong motivation of pedophilic offenders to disguise both their impulse to offend and their sexual attraction toward children.

Faced with similar problems when attempting to measure socially stigmatic beliefs (such as racism and homophobia) psychologists have developed tasks that aim to measure beliefs through indirect or implicit means (Fazio, Jackson, Dunton, & Williams, 1995; Fazio & Olson, 2003). One of these, the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) appears to have great success in indexing socially stigmatic associations that participants have sought to disguise (Banse, Seise, & Zerbes, 2001; de Jong, Pasman, Kindt, & van den Hout, 2001; Greenwald et al., 1998; Marsh, Johnson, & Scott-Sheldon, 2001; Swanson, Rudman, & Greenwald, 2001; Teachman & Brownell, 2001; Teachman, Gregg, & Woody, 2001). The IAT appears to have great potential in the domain of forensic and clinical research, and perhaps one day in forensic and clinical assessment, as it appears somewhat resistant to faking (Banse et al., 2001), it can index clinical change (Teachman & Woody, 2003), and it is predictive of actual behavior (McConnel & Leibold, 2001). We therefore aimed to determine whether, and how well, a version of the IAT designed to measure associations between sex and children could distinguish a group of pedophilic offenders from offenders with no history of pedophilia. We term this the *child-sex association—IAT* (CSA-IAT) for short-hand, but note that such a test involves a comparison of child-sex associations with adult-sex associations.

Editor's Note. Donald C. Fowles served as the action editor for this article.—TBB

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We thank the staff and prisoners of Her Majesty's Prison, Grendon for their cooperation in the research process. We also thank the Virtual Institute for the Study of Severe Personality Disorder (VISPED) and the Wales Office for Research and Development (WORD) for financial support.

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Method

Participants

All experimental protocols and data collection methods were given ethical permission by both Grendon Research and Advisory Committee and the Ethical Committee of the School of Psychology, Cardiff University. All participants provided written informed consent to participate in the experimental procedures and the clinical interviews and for the researchers to have full access to their prison records. Our sample (all male; $N = 78$) was recruited from consecutive admissions to a medium secure prison. Of the 78 participants, 18 had committed pedophilic offenses (age: $M = 44.1$, $SD = 13.1$), whereas the other 60 had a large variety of serious offenses (including violence and sexual assaults against adults; age: $M = 32.8$, $SD = 7.1$) but whom had never been convicted of any sexual offenses against children.

Stimuli and Materials

Whenever possible we followed the general methodology of the IAT as described elsewhere (Greenwald et al., 1998). The control task examined associations between flowers and insects and the affective dimension of pleasant and unpleasant. Again our shorthand for this is the flower-pleasant association—IAT (FPA—IAT).

Each IAT consisted of five stages. In the Stage 1, the attribute words (see the Appendix) were presented and participants were asked to classify them as belonging to each category (e.g., sex vs. not sex) as quickly as possible by pressing the left button for sex words and the right button for not-sex words. In Stage 2, participants then classified the target words as adult or child (see the Appendix). For half of the participants the left button was assigned for adult words (termed *Group 1*), whereas for the other half the left button was assigned for child words (termed *Group 2*). In Stage 3, the target words and attribute words were interleaved within a block of trials. For Group 1, the left button was assigned for both adult and sex words and the right button was assigned for child and not-sex words. We termed this combination the *congruent condition* in the belief that most people would have these associations. For Group 2, the left button was assigned for sex words and child words, and the right button for not-sex words and adult words. We term this combination the *incongruent condition*. In Stage 4, the target words were once again presented alone, but with the button assignments reversed. In Stage 5, Group 1 performed the incongruent condition, whereas Group 2 performed the congruent condition.

For each of these tasks, 32 words were used. For the FPA—IAT, we used 8 flower words, 8 insect words, 8 pleasant words, and 8 unpleasant words. The pleasant and unpleasant words were selected from norms reported by Bellezza, Greenwald, and Banaji (1986). This version of the task has been used extensively as a control condition by previous researchers (see, e.g., Greenwald et al., 1998), although the version used here was abbreviated for clinical purposes. For the CSA—IAT, we used 8 sex words and 8 not-sex words, 8 child words, and 8 adult words—see the Appendix for a full list of words. In the absence of any norms to aid compilation of these words the ones used were exemplars that we would be familiar to a prison population and would be unambiguously classified as belonging to the appropriate category. We ran pilot evaluations to ensure that offenders unanimously rated various words to the appropriate category. The sex-not-sex words were presented in lowercase letters, whereas the other words were presented in capital letters, as per standard IAT methodology (Greenwald et al., 1998).

All experiments were administered on an Apple Mac computer. Responses were taken via a specially built button box, consisting of two distinct response buttons that were relayed to the computer via the keyboard by using separate hands for each button. The computer recorded all reaction times (RTs). Words were presented in the center of the screen, with each letter being approximately 6 mm high (width varied slightly from letter to letter). Thus from the viewing distance of 57 cm each letter

subtended a visual angle of 0.6°. All letters were black (0.3 cd/m²) and were presented on a light background (100 cd/m²).

Design

For each IAT Task, we used a $2 \times 2 \times 2$ design: IAT Condition (congruent vs. incongruent) \times Order (congruent performed first vs. incongruent performed first) \times Group (pedophile vs. other-offender control). Participants were assigned to the order groups on a consecutive basis. The dependent variables were RT and errors of word classification. After each participant's IQ was ascertained through the use of the National Adult Reading Test—Revised (NART-R; Nelson, 1982), the experimental tasks were performed in a set order. First, all participants completed the FPA—IAT. They then completed a “violence—IAT” (Gray, MacCulloch, Smith, Morris, & Snowden, 2003b) and then the CSA—IAT. Although it is not relevant to this study, participants then completed a “rape—IAT” and finally an “arson—IAT.” Not all participants completed all tests as a result of time limitations, but this order was always followed.

Procedure

All tasks consisted of the five stages outlined in the overview. Stage 1 consisted of 32 trials in which each of the 16 attribute words was presented twice in a pseudorandom order, such that all words were presented once before any word was repeated. Stage 2 was identical to Stage 1 for the appropriate target words. Stage 3 consisted of 64 trials in which the 16 attribute and 16 target words were each presented twice in a similar pseudorandom order. Stage 4 was identical to Stage 2, except for the reversal of the response buttons. Stage 5 was identical to Stage 3, except the response button for the target dimension remained reversed. In addition to the trials mentioned above, each stage also had a short practice phase prior to commencement of the trials proper. For Stages 1, 2, and 4 the practice trials consisted of 8 of the attribute or target words chosen at random. For Stages 3 and 5, 16 practice trials were presented (consisting of 8 of the target and 8 of the attribute words chosen at random).

Each word was presented on the screen, and the participant was required to respond as quickly as possible via a button press. Each trial commenced with the presentation of a fixation cross for 70 ms and then the presentation of the test word until the participant responded. The participant's response caused the screen to blank, and the next trial commenced 70 ms later. No error correction was used.

Results

For statistical analysis, the raw RTs and errors were transformed to produce a D score via the scoring technique recommended by Greenwald, Nosek, and Banaji (2003). This D score uses the practice trials, includes a penalty for incorrect trials, and expresses the IAT effect (the difference in performance between the incongruent and congruent trials) in terms of the variance of the latency measures.

Initially the D scores were subjected to a two-way analysis of variance with the variables group (pedophile vs. other-offender) and order (congruent first vs. congruent second) for each of the IAT tasks. However, there were no main effects or interactions involving the order variable, so this was dropped from all further analyses.

Figure 1 shows the D scores for the two groups in the CSA—IAT. It should be noted that the group with convictions for a pedophilic offense showed a positive relationship between children and sex (i.e., they responded faster when the child and sex words shared a response button than they did when the adult and sex words shared a response button), whereas the control participants showed a

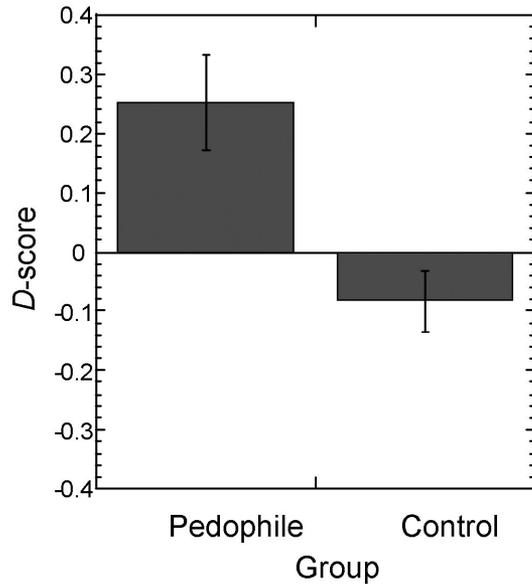


Figure 1. D score is plotted as a function of group (control vs. pedophile) for the child–sex—Implicit Association Test (CSA–IAT). Error bars represent ± 1 standard error of the mean (SEM).

negative relationship (i.e., they responded slower when the child and sex words shared a response button than they did when the adult and sex words shared a response button). A t test showed that the D scores for the groups differed significantly, $t(76) = 3.31$, $p < .01$, $d = 0.84$. The effect size is considered large by conventional terminology (Cohen, 1988).

For the control task (FPA–IAT) both groups produced strong positive D scores (pedophile group: 0.69 ± 0.073 ; control group: 0.60 ± 0.047), indicating the expected positive relationship between flowers and pleasant. The groups did not differ statistically, $t(76) = -0.92$, ns , $d = -0.24$. This pattern of results did not alter when the mean RTs were used instead of D scores or when age and IQ were added as covariates.

Although the above analysis demonstrated that the child–sex IAT was able to produce statistically significant differences at a group level, there is considerable scatter and overlap in the individual IAT scores between the groups. We therefore examined how well the task can classify people at an individual level. In theory, any particular IAT score could be used as a criterion cut-off score, and the test's hit rate (its ability to correctly identify a pedophile) and its false-alarm rate (its ability to exclude nonpedophiles) would vary with this cut-off point. A plot of hits (or sensitivity) versus false alarms ($1 - \text{specificity}$) for all possible criteria (see Figure 2) is known as a receiver operating characteristic curve (Green & Swets, 1966) and this way of expressing the data has become popular in such fields as risk assessment (e.g., Gray et al., 2003a), as it is relatively immune to changes in base-rates and thus allows the comparison of different measurement tools.

To quantify performance, the area under the curve (AUC) can be calculated. If the tool has no predictive validity, the hits should only rise at the same rate as the false alarms and the AUC will be 0.5 (see diagonal line on Figure 2). If our tool could perfectly

detect all the pedophiles without misidentifying any other offenders, the AUC would be 1.0. The D score from the CSA–IAT produced an AUC of 0.73 ($SE = 0.062$), which differed significantly from 0.50 ($p < .01$), showing that the IAT score does have some predictive validity. A similar analysis with the FPA–IAT D score from the control task produced an AUC of 0.48 ($SE = 0.076$, ns).

Discussion

As predicted, the CSA–IAT revealed an association between children and sex in a group of pedophilic offenders. It is important to note that the group differences were specific to the CSA–IAT, with no differences between the groups on the control–IAT. This indicates that nonspecific differences between the groups (e.g., intelligence, motivation, impulsivity) do not explain the differences on the IAT task.

The CSA–IAT showed moderate sensitivity and specificity in identifying pedophiles with an AUC of 0.73. This is not as high as the 0.86 reported for a phallometric test for pedophilia by Blanchard, Klassen, Dickey, Kuban, and Blak (2001). However, this discrepancy might be accounted for by the difference in samples rather than task specificity. Our other-offender control sample consisted of a combination of serious violent and sexual offenders (against adult women and/or men), and a proportion of these participants may also show pedophilic tendencies. Therefore some of our false alarms may in fact reflect the correct detection of pedophilic tendencies. In contrast, Blanchard et al. (2001) included only pedophilic offenders with multiple known victims, as compared with a control group that had committed sex offenses against adult women (teleiophiles). Clearly, it would be of interest to investigate the IAT further by using a wider sample alongside measurements of phallometry and other measures of sexual interest (Abel, Huffman, Warberg, & Holland, 1998).

While our results appear to show a greater association between children and sex in a group with pedophilic offenses, great caution

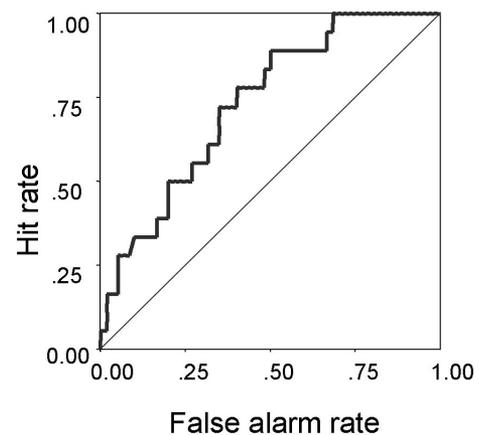


Figure 2. Receiver operating characteristics (rocs) for the CSA–IAT in predicting group membership. The hit rate (the proportion of pedophiles correctly assigned) is plotted against the false-alarm rate (the proportion of nonpedophiles incorrectly assigned) as the cut-off scores for assigning group membership are varied. The diagonal line represents chance performance.

should be taken in interpretation and in generalizing this finding. First, associations between children and sex may be present for many reasons other than those related to pedophilic interests. For example, one might also imagine an association between children and sex in victims or witnesses of child abuse. Further, one might also expect that people attempting to conceive a baby may also associate the concept of children with sex. There may also be large gender differences on such a task (we deliberately confined our study to incarcerated men so as to avoid these issues of gender, etc.). Second, although it is generally accepted that IAT effects are driven by associations, the exact nature of the generation of the IAT results is still debated (Fazio & Olson, 2003). Third, our particular CSA-IAT was a "first attempt" at the use of implicit measures in this manner. Important issues, such as its reliability (e.g., test-retest) and validity (does it predict future behavior?), must be addressed, and one would hope that refinements and improvements in methodology might bring about a more sensitive instrument. Fourth, we have treated our pedophilic population as homogeneous, yet the literature tells us that pedophiles are a very heterogeneous population (e.g., Greenberg, Bradford, & Curry, 1995; Marshall, Barbaree, & Christophe, 1986). Much larger sample sizes, and perhaps more specialized IATs, are required to examine subgroups. Fifth, although associations between children and sex (as indexed by the IAT) might be a causal factor in offending, it most certainly is not the only relevant factor in the genesis of sexual offending behavior (Hall & Hirschman, 1992; Ward, 2001; Ward & Siegert, 2002). Finally, although differences occurred at the group level, and the tool shows some predictive validity for group membership, it is clear from an inspection of Figure 2 that this is a very imprecise tool. If we were to take a *D* score of 0 as a threshold for classification, then we would have correctly identified 78% of the pedophiles (or missed 22%) but at the high price of mislabeling 42% of control participants as pedophiles. Hence, whereas we hope that further refinements might produce a useful tool in the domain of therapy and management, the tool as it stands cannot be used to screen for pedophilic tendencies.

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Appendix

*Child-Sex Association—Implicit Association Test**Sex Words*

breasts
climax
cock
lust
lick
pussy
snog
thrust

Non-Sex Words

eat
elbow
eye
hand
run
smile
talk
toe

Adult Words

BEARD
GROWN-UP
MATURE
RESPONSIBLE
STRONG
WISE
WORK

Child Words

INFANT
INNOCENT
KID
SCHOOL
SWEETS
TOY
VULNERABLE

*Flower—Pleasant Association-Implicit Association Test**Pleasant Words*

BEAUTIFUL
GOOD
HEALTH
HONEST
LAUGH
JOKE
LUCKY
HAPPY

Unpleasant Words

ACCIDENT
CANCER
DISASTER
POLLUTION
POVERTY
SICKNESS
UGLY
VOMIT

Flowers

BUTTERCUP
SNOWDROP
TULIP
ORCHID
DAISY
ROSE
DAFFODIL
CROCUS

Insects

ANT
COCKROACH
FLEA
GREENFLY
MOSQUITO
TERMITE
WASP
LOCUST

Received March 31, 2003

Revision received October 17, 2004

Accepted November 15, 2004 ■