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INDIRECT ASSESSMENT OF COGNITIONS OF CHILD SEXUAL ABUSERS WITH THE IMPLICIT ASSOCIATION TEST

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The Implicit Association Test (IAT) is adapted to measure cognitions regarding self and children in 27 male child molesters and 29 male nonsexual offenders. As expected, child molesters view children as more sexually attractive than do nonsexual offenders. Among the child molesters, viewing children as more sexually attractive is associated with greater risk of sexual recidivism as measured by the Static-99. Viewing children as more powerful is associated with greater risk of sexual recidivism as measured by the Rapid Risk Assessment for Sexual Offense Recidivism. Although not all hypotheses are supported, this study demonstrates that the IAT has much promise as a tool with which to study cognitions associated with sexual abuse of children.

Keywords: child sexual abusers; sex offenders; Implicit Association Test; cognition; Static-99; Rapid Risk Assessment for Sexual Offense Recidivism

In current sex offender treatment programs, much effort is directed at remedying child molesters' problematic cognitions concerning themselves, their victims, and other adults (Marshall, Anderson, & Fernandez, 1999). Although many theoreticians have posited that these cognitions play a central role in the etiology and maintenance of child sexual abuse (Finkelhor, 1984; Hall & Hirschman, 1992; Marshall & Barbaree, 1990), knowledge in the area remains incomplete because, in part, of reliance on self-report measures, which are generally restricted to consciously accessible thoughts and susceptible to presentation bias. In the current study, the primary goal was to test for the existence of differences between the cognitions of child molesters and nonsexual offenders using an implicit measure called the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). A series of IATs were designed to measure the domains of evaluation, social power, and sexual attractiveness in self and in children (relative to adults).

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THEORIES OF CHILD SEXUAL ABUSE

Three well-known multifactor explanations of child sexual abuse developed in the past 20 years have implicated cognitive representations of self, children, and adults in the etiology and maintenance of child sexual abuse (Finkelhor, 1984; Finkelhor & Araji, 1986; Hall & Hirschman, 1992; Marshall & Barbaree, 1990). Taken together, these three influential theories suggest that certain cognitive representations concerning evaluation (positive vs. negative), social power, and sexual attractiveness may be involved in the etiology and maintenance of child sexual abuse among male offenders. More specifically, men who sexually abuse children would be expected to (a) view self as negative, socially weak, and sexually unattractive and (b) view children (relative to adults) as positive, socially weak, and sexually attractive. With regard to maintenance, these cognitions would be expected to be most pronounced in child molesters who persist with their offending, compared to those who desist.

The largest source of data relevant to the cognitions listed above comes from self-report measures. Unfortunately, this body of research has yielded, with few exceptions, small effect sizes (Cohen, 1992) in conflicting directions and has not been particularly useful for evaluating theory-based hypotheses regarding cognitions putatively associated with the etiology and maintenance of child sexual abuse (e.g., Fisher, Beech, & Browne, 1999; Hanson & Morton-Bourgon, 2004, 2005; Horley & Quinsey, 1994; Overholser & Beck, 1986; Segal & Marshall, 1985; Thornton, Beech, & Marshall, 2004; Ward, McCormack, & Hudson, 1997). Despite the strengths of many self-report measures (Westen & Weinberger, 2004), they likely do not permit adequate tests of theoreticians' hypotheses regarding the etiology and maintenance of child sexual abuse (c.f., Mihailides, Devilly, & Ward, 2004).

WEAKNESSES OF SELF-REPORT MEASURES OF COGNITIONS

Although there are self-report measures designed to assess cognitions regarding self, children, and other adults, the validity of such measures with offenders has been called into question by many researchers (e.g., Andrews & Bonta, 2003; Beech, 1998; Horley, 2000; Marshall et al., 1999; Ward, Hudson, Johnston, & Marshall, 1997). These measures require respondents to access their cognitions through introspection and to report them accurately. However, some cognitive contents of interest, such as the aforementioned cognitions, may not be consciously accessible or, if they are accessible, may not be accurately articulated or reported honestly (Fazio & Olson, 2003; Ward, Hudson et al., 1997). There is evidence, for example, that offenders can and do purposefully modify their self-report responses (Gendreau, Irvine, & Knight, 1973; Kroner & Weekes, 1996; Walters, 1988). Anecdotally, clinicians working with sexual offenders report that problematic cognitions are clearly present but that valid tools with which to assess them are often lacking (Marshall et al., 1999).

INFERENCES FROM PENILE PLETHYSMOGRAPHY (PPG) RESEARCH

In addition to self-report methods, researchers have used more indirect techniques, such as PPG, that may reflect cognitions regarding sexual attractiveness (Ward & Siegert, 2002). PPG involves the physiological measurement of penile tumescence (erection) during the presentation of various stimuli. The procedures, issues, and controversies concerning the use of PPG to assess the sexual interests of sex offenders have received much attention in the literature (e.g., Lalumière & Harris, 1998; Marshall & Fernandez, 2000; Pithers & Laws, 1995). The PPG findings appear consistent in suggesting that child molesters find children more sexually

attractive than do nonmolesters (Barsetti, Earls, Lalumière, & Bélanger, 1998; Baxter, Marshall, Barbaree, Davidson, & Malcolm, 1984; Looman & Marshall, 2001; Marshall, Barbaree, & Christophe, 1986; Quinsey & Chaplin, 1988) and that recidivists view children as more attractive than do nonrecidivists (Hanson & Morton-Bourgon, 2004, 2005).

IAT

Concern over the reliance on self-report measures in the assessment of child molesters' cognitions has led some researchers to call for the application of more indirect measures that assess cognitions using response latencies or reaction times (e.g., Hanson & Morton-Bourgon, 2004; Ward, Hudson et al., 1997). A promising and relatively simple response latency measure is the IAT (Greenwald et al., 1998). In the IAT, the strength of association between a concept in memory (e.g., child) and an attribute (e.g., sexual attractiveness) is inferred from response latencies on different categorization tasks. A simple illustration of the IAT procedure from Greenwald et al. is presented in Figure 1. On the first computer screen shown in Figure 1A, the stimulus word is MOSQUITO. The task is to indicate whether MOSQUITO belongs in the FLOWER or INSECT category by pressing, respectively, "d" with the left hand or "k" with the right hand on the computer keyboard. In this case, "k" would be pressed to indicate that MOSQUITO belongs in the INSECT category. Each categorization of a stimulus word constitutes one trial. The reaction time, or response latency, for each trial is recorded. In the second trial shown in Figure 1A, the task is to indicate whether peace belongs in the pleasant or unpleasant category. The participant indicates peace belongs in the pleasant category by pressing "d."

The rationale behind the IAT centers on the degree to which the configuration of the categories is congruent with the configuration of one's associations in memory. The configuration of categories in Figure 1a would likely be congruent with the configuration of associations within most participants' memories (Greenwald et al., 1998). More specifically, just as FLOWER and pleasant are associated with the same response key, they would also likely be associated in most people's memories; that is, most people think flowers are pleasant. Similarly, INSECT and unpleasant are associated with the same key and would also be expected to be associated with each other in memory for many people; most people think insects are generally unpleasant. To the extent that this is the case, fast response latencies would be expected for the trials in Figure 1A. In other words, these categorization tasks would be easy because the categories that share the same response key are also linked in memory.

In contrast, the categorization tasks in Figure 1B would be expected to be more difficult because the configuration of the categories would not be congruent with most people's implicit cognitions. Although FLOWER and unpleasant are now indicated by the same response key, it is unlikely that FLOWER and unpleasant are strongly associated for most people. Similarly, INSECT and pleasant share the same response key, but most people probably do not think of insects as particularly pleasant. Thus, pairing FLOWER and unpleasant and pairing INSECT and pleasant would likely be at odds with the pairings stored in most people's memories. Accordingly, slower response latencies would be expected in the trials in Figure 1B than in Figure 1A.

Greenwald et al. (1998) presented this IAT to participants and found, as expected, that response latencies were indeed faster on trials similar to those in Figure 1A than on trials like those presented in Figure 1B. Greenwald et al. (1998) inferred that this pattern of response
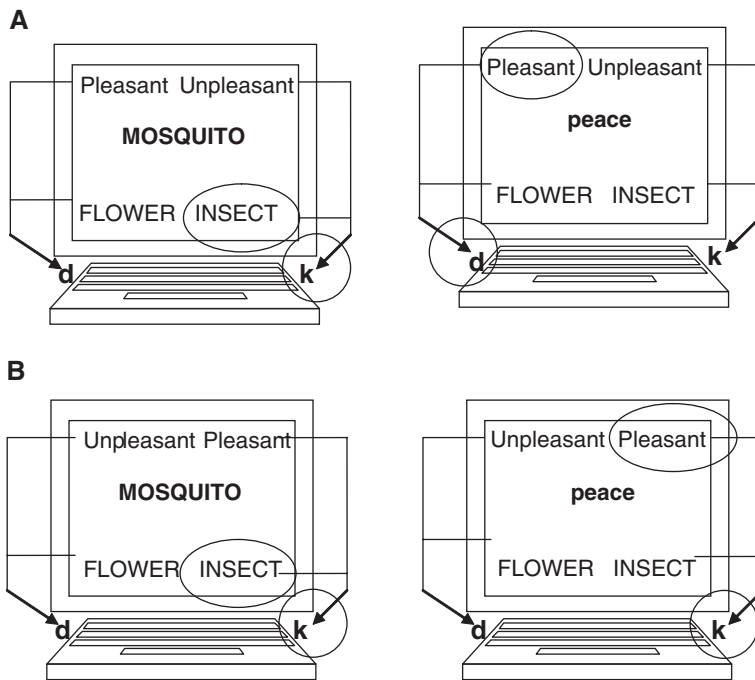
A

B

Figure 1:   **Example of Two Blocks of Categorization Trials in an Implicit Association Test (IAT) Designed to Assess the Pleasantness of Flowers Relative to Insects**.

latencies indicated that participants more strongly associated flower with pleasant and insect with unpleasant than they did flower with unpleasant and insect with pleasant. In other words, they considered flowers to be more pleasant than insects. A difference score was computed by subtracting average response latency in one block of trials from that in the other block of trials. This difference score is called an IAT effect. Thus, Greenwald et al. (1998) had created a relatively simple measure that appears to indirectly assess cognitions.

Greenwald et al. (1998) then adapted the IAT to assess a number of other constructs. For example, to assess implicit self-esteem, the categories of flower and insect were replaced with me and not me (Greenwald & Farnham, 2000). The flower and insect stimulus words were replaced with me stimulus words (e.g., mine) and not me stimulus words (e.g., their). A participant who views himself or herself in a fairly positive light would be expected to categorize words more quickly when the categories that share the same response key are congruent with his or her associations in memory (i.e., me with pleasant or not me with unpleasant). In contrast, slower response latencies would be expected when the configuration of the categories is incompatible with the associations in memory (i.e., me with unpleasant or not me with pleasant).

Some researchers have recently begun to apply the IAT procedure to studying the cognitions of sex offenders. Gray, Brown, MacCulloch, Smith, and Snowden (2005) created a version of the IAT to assess the degree to which children, relative to adults, were associated with

sex. They administered it to 18 men who had committed sexual offences against children and 60 men who had never been convicted of sexual offences against children but who had committed other serious offences, such as violence and sexual assault of adults. The IAT categories were child versus adult and sex versus not sex. Examples of their stimulus words for each of the categories were beard for adult, infant for child, breasts for sex, and elbow for not sex. Gray et al. found that the child molesters' response latencies were slower on the trials in which adult and sex shared the same response key than on the trials in which child and sex shared the same response key, whereas the nonmolesters showed the opposite pattern. The magnitude of the difference between the child molesters and nonmolesters was large ($d = .84$), with child molesters showing a stronger association between children and sex than did the offenders who had not been convicted of sexually abusing children.

Mihailides et al. (2004) also adapted the IAT to examine cognitions in child molesters. They compared 25 child molesters, 25 nonsex offenders, 25 male university students, and 25 female university students. Mihailides et al. examined the degree to which children were viewed as sexual beings. They found a medium-sized effect, with child molesters viewing children as more sexual than did nonsex offenders ($r = .31$). Although only two published studies were available, the evidence is consistent in suggesting that the IAT may be a useful indirect measure of cognitions associated with child sexual abuse.

PRESENT STUDY

The main purpose of the present correlational study was to examine differences that may exist between child molesters and nonsexual offenders in their views of self, children, and other adults along evaluative, power, and sexual attractiveness dimensions using the IAT. In addition, the association between the IAT effects and risk of sexual recidivism, as measured by the Static-99 (Hanson & Thornton, 2000) and the Rapid Risk Assessment for Sexual Offense Recidivism (RRASOR; Hanson, 1997), was examined. Although the Static-99 contains all the RRASOR items and is more strongly associated with sexual recidivism (Hanson & Thornton, 2000), both were included because they may differ in focus. Specifically, the RRASOR may be a more focused measure of sexual deviance, whereas the Static-99 appears to address antisocial orientation as well as sexual deviance (Roberts, Doren, & Thornton, 2002).

HYPOTHESES

Hypotheses were derived from the theories and PPG research reviewed above. The primary hypotheses involve differences between child molesters and nonsex offenders on the IATs. It was expected that, compared to nonsex offenders, child molesters would view themselves as less positive, less powerful, and less sexually attractive. It was also predicted that, compared to nonsex offenders, child molesters would view children as more positive, less powerful, and more sexually attractive. The secondary hypotheses concern correlations between the IAT effects and risk of sexual recidivism. It was hypothesized that greater risk would be associated with a view of self as less pleasant, less powerful, and less sexually attractive. In addition, greater risk was expected to be associated with a view of children as more pleasant, less powerful, and more sexually attractive.

METHOD

PARTICIPANTS

Participants were 27 child molesters and 29 nonsexual offenders. All participants were adult male inmates in federal penitentiaries in the Canadian province of Ontario. Offenders were classified as child molesters if they (a) were currently incarcerated for a sexual offence or a sexually motivated crime (e.g., convicted of murder but files indicate sexual assault of victim) and (b) had at least one index (i.e., current) or prior conviction for a sexual offence or a sexually motivated crime against an extrafamilial victim less than 14 years of age. Offenders were classified as nonsexual offenders if they (a) had no prior or index charges or convictions for a sexual offence or a sexually motivated crime and (b) denied ever committing or being charged with a sexual offence. In addition, inmates were only eligible to participate if they could read well enough to complete basic self-report questionnaires without assistance. Participation was voluntary, and informed consent was given by all participants. Certification of ethical approval from the Social Sciences and Humanities Research Ethics Board of the University of Ottawa and permission from the Correctional Service Canada (CSC) to conduct the present research were granted.

The initial pool of consenting participants consisted of 35 child molesters and 40 nonsexual offenders; some of these 75 offenders, however, were excluded. In total, data from 8 of the participants in the child molester group were excluded. One of the child molesters could not read well enough to complete the tasks, and his participation was discontinued. Four were excluded from the child molester group because it was discovered, only after reviewing their files, that they did not meet the inclusion criteria. The remaining three were excluded because of apparent difficulty comprehending or executing the required tasks. With regard to the nonsexual offenders, data from 11 participants in this group were excluded. Five of them did not return for the second testing session, and an additional 4 did not meet the inclusion criteria. The remaining two were excluded because of apparent difficulty comprehending or executing the required tasks.

Offence information was gathered from a review of files in CSC's automated database, the Offender Management System (OMS). Among the child molesters, 6 (22.2%) had exclusively victimized girls, 13 (48.1%) had exclusively victimized boys, and 8 (29.6%) had victimized both girls and boys. The child molesters had an average of 1.74 (*SD* = 2.63) prior sexual offence convictions and 7.56 (*SD* = 11.09) index sexual offence convictions. In terms of treatment exposure, file review indicated that 8 (29.6%) of the child molesters had completed a high, moderate, or low intensity sexual offender treatment program while under the supervision of CSC. Additional descriptive information about the participants is presented in Table 1. The operational definitions of some of the variables in Table 1 are described below.

MEASURES

IAT. The IAT is a relatively new method of assessing cognitions. The IAT has been used to measure a variety of constructs, such as self-esteem (Greenwald & Farnham, 2000), gender self-concept (Rudman, Greenwald, & McGhee, 2001), racial stereotypes (McConnell & Leibold, 2001), and shyness (Asendorpf, Banse, & Mücke, 2002). There is evidence that the

TABLE 1: Description of Participants

Variable	Nonsex Offenders		Child Molesters				
	n	M (SD) or %	n	M (SD) or %	df	F or χ^2	r
Age	29	37.93 (10.96)	27	47.52 (14.46)	1, 54	7.89**	.36
Education (years)	29	10.38 (1.57)	27	9.78 (2.72)	1, 54	1.05	−.14
Non-Aboriginal vs. Aboriginal	28	78.6%	27	100%	1	6.49*	−.34
Prior sexual convictions	29	0	27	1.74 (2.63)			
Index sexual convictions	29	0	27	7.56 (11.09)			
Prior violent convictions	29	2.66 (3.21)	27	0.96 (1.37)			
Index violent convictions	29	2.52 (3.61)	27	0.78 (1.05)			
Heterosexual vs. homo/bisexual	28	96.4%	26	57.7%	1	11.70**	.47

Note. Correlation coefficients (*r*) were reported as effect size estimates indicating the magnitude of the difference between groups.
*p < .05. **p < .01.

IAT possesses adequate psychometric properties. In nonoffender samples, the IAT has yielded good internal consistency (α = .89, .82, and .84 in Asendorpf et al., 2002; α = .88 in Bosson, Swann, & Pennebaker, 2000; α = .78 in Cunningham, Preacher, & Banaji, 2001) and moderate test-retest reliability (r = .69; Bosson et al., 2000). In addition, the IAT appears relatively uncontaminated by social desirability or other deliberate attempts at dissimulation (Asendorpf et al., 2002; Greenwald et al., 2002; Greenwald & Farnham, 2000). As noted above, researchers have also been able to distinguish child molesters from nonmolesters with the IAT (Gray et al., 2005; Mihailides et al., 2004).

In the present study, the IATs were designed to measure the domains of evaluation (pleasant vs. unpleasant), social power (powerful vs. weak), and sexual attractiveness (sexy vs. not sexy) in self (me vs. not me) and in children relative to adults (child vs. adult). This made for a total of six computer-administered IATs, which were named the pleasant self IAT, powerful self IAT, sexy self IAT, pleasant child IAT, powerful child IAT, and sexy child IAT. Each IAT consisted of one of the two target concepts (i.e., me vs. not me or child vs. adult) combined with one of the three attributes (i.e., pleasantness, power, or sexual attractiveness). The target concept stimulus words are provided in the appendix; selection of the target concept stimulus words was rationally and empirically guided based on previous research (Asendorpf et al., 2002; Greenwald et al., 1998; Greenwald & Farnham, 2000; Haines, 1999; Rudman, Greenwald et al., 2002).

The attribute stimulus words were selected based on pretesting. Nine sexual offenders beginning a sexual offender treatment program at a medium-security federal penitentiary in Ontario anonymously rated 164 words on pleasantness, power, and sexual attractiveness. This initial word list was derived from stimuli employed in IATs by other researchers (Asendorpf et al., 2002; Greenwald et al., 1998; Greenwald & Farnham, 2000; Haines, 1999; Rudman, Greenwald et al., 2001) and words used in self-report measures administered to child molesters (Horley & Quinsey, 1994). Additional sexual attractiveness attribute words from IAT stimuli used by D. E. McGhee were provided by A. G. Greenwald (personal communication, October 20 and 23, 2002). Finally, some words were generated by the first author.

In pretesting, participants rated each word on three 5-point Likert-type scales ranging from *pleasant* to *unpleasant*, *powerful* to *weak*, and *sexy* to *not sexy*. From the initial pool of words, 36 stimulus words were retained: 6 words each for the pleasant, unpleasant, powerful, weak, sexy, and not sexy categories. Focusing first on the pleasantness domain, an attempt was made to obtain relatively unambiguous pleasantness stimulus words that were not confounded with power or sexual attractiveness. Specifically, the 12 pleasantness words were selected as follows: (a) two words with the most pleasant, most powerful, and most sexy average ratings; (b) two with the most pleasant, neutral powerful, and neutral sexy average ratings; (c) two with the most pleasant, least powerful, and least sexy average ratings; (d) two with the least pleasant, most powerful, and most sexy average ratings; (e) two with the least pleasant, neutral powerful, and neutral sexy average ratings; and (f) two with the least pleasant, least powerful, and least sexy average ratings. The 12 power and 12 sexual attractiveness stimulus words were selected in the same fashion as above. The attribute stimulus words are presented in the appendix.

The IAT procedure used followed that of Greenwald et al. (1998). As mentioned above, the IAT involves categorizing stimulus words. Participants were instructed to use the left forefinger ("d" key on the computer keyboard) and the right forefinger ("k" key) to indicate the appropriate category for each stimulus word. Stimulus words were presented in the
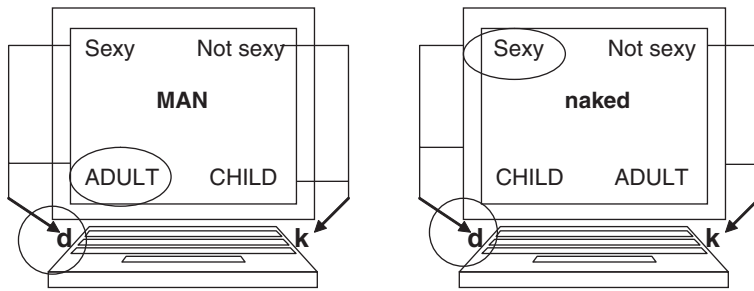
Figure 2:   Example of Trials in the Sexy Child IAT

Figure 3:   Illustration of the Sexy Child IAT Procedure Using Stimuli Designed to Measure Participants' Perceptions of Sexual Attractiveness in Children Relative to Adults

Note. A circle beside a stimulus word indicates the category to which it belongs (e.g., MATURE belongs in the ADULT category) and which index finger (left or right) should be used to make the response. The open circles indicate target-concept stimulus words for which the correct response is either ADULT or CHILD. The dark circles indicate attribute stimulus words, for which the correct response is either not sexy or sexy. In the actual sexy child IAT, all the stimulus words from the corresponding word lists in the appendix were presented.

center of the computer screen, randomly from each category within each block of trials. To increase the distinctiveness between target concepts and attributes, target concept categories and stimulus words were presented in upper case letters (e.g., ME), whereas attribute categories and stimulus words were presented in lower case letters (e.g., sexy). Participants initiated the beginning of each block of trials. An example of the IAT procedures used in the present study is presented in Figure 2.

Participants completed seven blocks of trials for each of the six IATs. (One trial consisted of the presentation of one stimulus word and the correct categorization of that word.) Each IAT was presented following the five-step sequence illustrated in Figure 3. Step 1 consisted of 20 practice trials in which participants categorized the target concept stimulus

words (e.g., CHILD vs. ADULT). Step 2 was a block of 20 practice trials in which participants categorized the attribute stimulus words (e.g., sexy vs. not sexy). The practice trials were designed to allow the participant to become accustomed to the task and learn the correct category for each stimulus word. Therefore, response latencies from the practice trials did not contribute to the IAT dependent variable. On Steps 3 and 5, a block of 20 practice trials was followed by a block of 40 trials, from which the response latencies for the first two trials were excluded because they are typically exceptionally slow (Greenwald et al., 1998). Thus, only the 38 trials in Step 3 and 38 trials in Step 5 provided data for the IAT dependent variables. In Step 3, stimulus words representing both the target concepts and the attributes were presented, and participants categorized them accordingly (e.g., CHILD or not sexy vs. ADULT or sexy). Step 4 was another block of 20 practice trials in which the target concept categories were reversed. This prepared the participants for Step 5, which was identical to Step 3 except that the categories were paired differently (see Figure 3). For example, whereas in Step 3 sexy and CHILD share the same response key, in Step 5 sexy and ADULT share the same response key.

Prior to each block, instructions that described the categories involved in the categorization task and the corresponding response keys ("d" or "k") were presented on the computer screen. The appropriate category names were displayed continuously in their respective corners of the screen throughout each block. After each correct response, the next stimulus word was presented. A correct response was one that corresponded to the categorization identified in the appendix. For example, if the stimulus word was *boy*, the correct response was pressing the key that indicated CHILD, whereas the incorrect response was pressing the key that indicated ADULT. If the response was incorrect, a red "X" was displayed below the stimulus word and remained on the screen until the correct response was provided. A subsequent stimulus word was presented 150 milliseconds (ms) after a correct response. Correct response latency and the accuracy of the first response of each trial were recorded.

The RRASOR. The RRASOR (Hanson, 1997) is an actuarial measure designed to assess risk of sexual recidivism. It consists of four items: (a) prior sexual offences, (b) young age at release, (c) victim gender, and (d) relationship to victim. These four items were selected from a larger pool of variables through multivariate statistical procedures. RRASOR scores can range from 0 to 6. In their meta-analysis, Hanson and Morton-Bourgon (2004) found a medium association with sexual recidivism (*M d* = .59) and a small association with violent (including sexual) recidivism (*M d* = .34).

Static-99. The Static-99 (Hanson & Thornton, 2000) is a 10-item actuarial instrument designed to assess risk of sexual recidivism. This measure was created by combining the RRASOR and the Structured Anchored Clinical Judgement–Min (SACJ-Min; Grubin, 1998). In addition to the four RRASOR items, the Static-99 consists of (a) ever lived with lover for at least 2 years, (b) any nonsexually violent index offense convictions, (c) any prior nonsexual violent convictions, (d) prior sentencing dates, (e) noncontact sex offense convictions, and (f) any stranger victims. Static-99 scores can range from 0 to 12. The Static-99 has demonstrated superior accuracy compared to its components, the RRASOR and the SACJ-Min, in predicting sexual and violent (including sexual) recidivism (Hanson & Thornton, 2000). Hanson and Morton-Bourgon (2004) found a medium association with sexual recidivism (*M d* = .63) and violent (including sexual) recidivism (*M d* = .59).

Balanced Inventory of Desirable Responding (BIDR). The BIDR (Paulhus, 1984) is a 40-item self-report measure designed to assess the tendency to respond to self-report scales in a socially desirable manner. Each item is rated on a 7-point Likert-type scale ranging from *not true* (1) to *very true* (7). Half of the items are reverse scored, with ratings of 1 or 2 scored as 1 and ratings of 3 to 7 scored as 0. The remaining items are positively scored, with ratings of 6 or 7 scored as 1 and ratings of 1 to 5 scored as 0. The scores are summed. The BIDR consists of two subscales: Impression Management (IM; 20 items) and Self-Deceptive Enhancement (SDE; 20 items). Higher IM scores indicate greater response bias because of a deliberate attempt to present oneself in a favorable light. Higher SDE scores reflect greater response bias because of self-deceptive overconfidence. In the present study, IM's relation with the IATs was examined. The BIDR-IM scale was selected for use in the current study because it is a commonly used and recommended measure of biased responding in forensic risk assessment (Kroner & Weekes, 1996; Lanyon, 2001).

In various factor analytic studies, the IM subscale items have generally emerged to form one independent factor in both offender samples (Kroner & Weekes, 1996) and nonoffender samples (Paulhus & Reid, 1991). Adequate internal consistency was reported by Kroner and Weekes (1996) for the IM scale (they modified the scale slightly such that it consisted of 17 items from the original 20 items of the IM scale); Cronbach's alpha was .84 with a large sample of incarcerated male offenders ($N = 539$). In addition, significantly lower IM scores were reported for offenders completing the measures as part of an intake assessment compared to offenders completing it as part of a prerelease assessment (when one would presumably be more motivated to make a good impression; Kroner & Weekes, 1996). In the present study, the BIDR-IM displayed good internal consistency. Cronbach's coefficient alpha for the BIDR-IM was .89 with the nonsexual offenders and .88 with the child molesters.

MATERIALS AND APPARATUS

The IATs were administered via an IBM laptop computer on a 13-inch color monitor using the Generic IAT computer program available on A.G. Greenwald's Web page (http://faculty.washington.edu/agg/iat_materials.htm) and the Inquisit 1.33 computer program for Windows (Millisecond Software, 2002). Data analyses were performed with Version 10.0 of the Statistical Package for the Social Sciences for Windows.

PROCEDURE

Eligible inmates were approached by the first author and asked to participate in the study. On the first day of testing, participants completed three of the IATs and on the second day of testing, they completed the remaining three IATs, the social desirability measure, questions about their sexual orientation (heterosexual, homosexual, or bisexual) and, for only the non-sex offenders, questions about whether they had ever committed or been charged with a sexual offence. Once participants had completed the IATs and questionnaires, their file information was reviewed using OMS. The following information was recorded for all participants: birth date, race, education (years), and number of prior and current sexual and nonsexually violent convictions. For the child molesters, gender of victims in the index and past sexual offences was recorded. Classification of offences as sexual or nonsexually violent was guided by the revised Static-99 coding rules (Harris, Phenix, Hanson, & Thornton, 2003, pp. 27-42). The Static-99 and RRASOR were taken from offenders' intake assessments when

available. For seven of the child molesters, however, it was necessary to score these measures from file information in OMS. Scoring followed the Static-99 coding rules (Harris et al., 2003).

DATA TREATMENT

Some participants' IAT data were excluded because of extreme error rates, extreme response latencies, or administrative errors. IAT data were excluded for those participants with error rates greater than 30%; such high error rates are typically excluded because they suggest the possibility of response artifacts that threaten validity, such as random responding (Greenwald et al., 1998). Data were also excluded for those participants with mean response latencies greater than 2,500 ms. Exceptionally slow mean response latencies (i.e., 2,500 ms or slower) may be due to biased responding, inattention, or some other response artifact (Greenwald et al., 1998).

As is typical of response latency measures, the raw data are often skewed and violate a number of assumptions for parametric statistics, such as ANOVA (Greenwald et al., 1998). Researchers commonly transform IAT data by taking the natural log (ln) of the raw response latencies (Greenwald et al., 1998). In the current study, this procedure was followed, and it is these transformed data on which all analyses were performed.

RESULTS

DATA SCREENING

For all analyses, data were screened for violations of assumptions. When violations were present, corrections were made by a variety of strategies, such as applying transformations and reducing or deleting outlying cases. The modified data met the assumptions of the tests conducted. With the exception of the IAT response latencies, in cases where data were modified, analyses were performed on both the modified and unmodified data; if the results were comparable in terms of statistical significance and effect size, only the results from the unmodified data were reported. If, however, the results differed, the results from the modified data were presented.

IAT EFFECTS

As outlined in the procedure, an IAT effect is a difference score computed by subtracting the mean natural log (ln) response latency in one IAT condition from the other. The pleasant self IAT was designed to assess the degree to which self is evaluated positively. In this case, the IAT effect was computed by subtracting each participant's mean log response latency on trials in which pleasant and me shared the same response key from his mean log response latency on trials in which unpleasant and me shared the same response key. Larger positive IAT effects correspond to faster response latencies on trials in which pleasant and me were paired than on trials in which unpleasant and me were paired. Thus, larger positive values on the pleasant self IAT effect reflect a more positive view of self. The other IAT effects were computed in the same fashion. Larger positive values on the powerful self IAT and the sexy self IAT effects suggest a view of self as, respectively, more powerful and more sexually

TABLE 2:   IAT Effects

IAT effect (ln)	Nonsex Offenders		Child Molesters		df	F	r
	n	M (SD)	n	M (SD)			
Self							
Pleasant	28	.26 (.15)	25	.33 (.18)	1, 51	1.83	.19
Powerful	28	.01 (.18)	26	.01 (.16)	1, 52	0.02	.02
Sexy	27	.31 (.15)	21	.24 (.23)	1, 46	1.27	−.16
Child							
Pleasant	29	.00 (.20)	27	.08 (.18)	1, 54	2.49	.21
Powerful	28	−.29 (.15)	25	−.27 (.17)	1, 51	0.30	.08
Sexy	29	−.05 (.20)	24	.07 (.16)	1, 51	6.01*	.33

Note. IAT = Implicit Association Test; ln = natural log. Correlation coefficients (*r*) were reported as effect size estimates indicating the magnitude of the difference between groups.
*$p < .05$.

attractive. With regard to the child IATs, larger positive values on the pleasant, powerful, and sexy child IAT effects imply a view of children as, respectively, more pleasant, more powerful, and more sexually attractive.

One-way ANOVAs were performed to compare the child molesters and nonsex offenders on the IAT effects (ln). In addition to significance tests, effect size estimates (correlation coefficient; *r*) were reported for each IAT effect (ln) to provide an indication of the magnitude of the differences between groups. According to Cohen (1992), correlations around .10 are small, .30 are medium, and .50 are large. As shown in Table 2, only one of the analyses of the six IAT effects yielded results that were supportive of the hypotheses. The groups differed significantly in their sexy child IAT effects, suggesting that the child molesters viewed children as more sexually attractive than did the nonsex offenders.

The components of the sexy child IAT effect were examined more closely with a mixed-design two-by-two ANOVA. The within-subjects factor was IAT condition (trials in which sexy and child shared the same response key vs. trials in which sexy and adult shared the same response key), and the between-subjects factor was group (child molester vs. nonsex offender). The dependent variable was mean log response latency. Although the analyses were performed on the natural log response latencies, the untransformed data are presented graphically to facilitate interpretation. The untransformed mean response latencies from the sexy child IAT are presented in Figure 4. The within-subjects main effect was not significant, $F(1, 51) = 0.13$, $p > .05$. This indicated that, collapsing across groups, mean log response latencies were not significantly different on the blocks of trials in which child and sexy shared the same response key ($M = 6.74$) than for the blocks of trials in which adult and sexy ($M = 6.75$) shared the same response key. Similarly, the between-subjects main effect was not statistically significant, $F(1, 51) = 0.25$, $p > .05$. This indicated that collapsing across IAT condition, the child molesters ($M = 6.76$) did not significantly differ from nonsex offenders ($M = 6.73$) in their overall response latencies.

Relevant to the hypothesis was the analysis of the interaction of group (child molesters vs. nonsex offenders) by IAT condition (trials in which child and sexy shared the same response key vs. trials in which adult and sexy shared the same response key). An interaction of these variables would suggest that child molesters and nonsex offenders view children differently on sexual attractiveness. As expected, the interaction of group by IAT
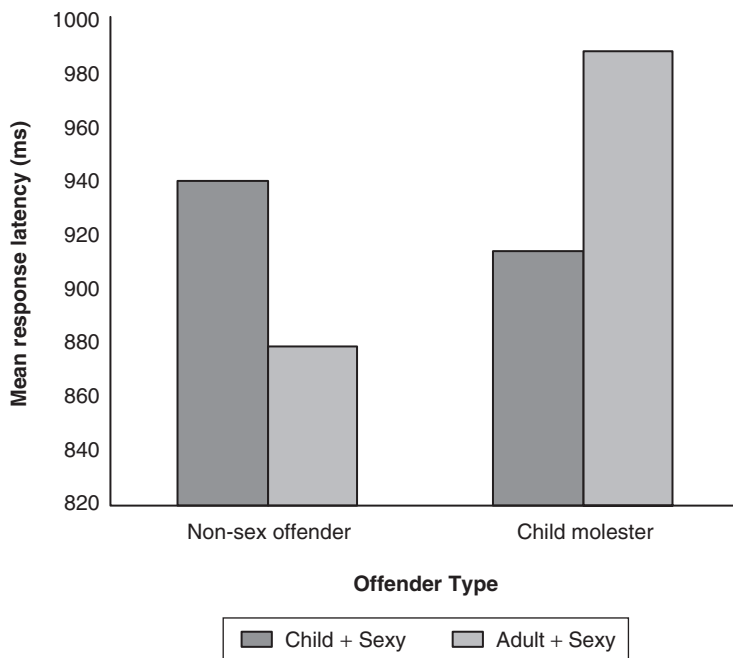
Figure 4:   Sexy Child Implicit Association Test (Untransformed Response Latencies)

condition was significant, $F(1, 51) = 6.01$, $p < .05$, indicating that the log response laten-cies in each IAT condition differed between the two groups. Note that the interaction term is identical to the result obtained in the analyses of the sexy child IAT effect reported in Table 2.

To determine the pattern of results responsible for the significant interaction, simple effects were examined with a series of one-way ANOVAs. Mean log response latency in each IAT condition was compared in child molesters and nonsex offenders separately. Among the child molesters, mean log response latencies were significantly faster on the tri-als in which child and sexy shared the same response key ($M = 6.72$) than on the trials in which adult and sexy shared the same response key ($M = 6.80$), $F(1, 23) = 4.90$, $p < .05$, $r = .42$. In contrast, for the nonsex offenders, the difference was in the opposite direction but did not reach statistical significance. On the trials in which child and sexy shared the same response key, the nonsexual offenders' mean log response latency was 6.75, and on the tri-als in which adult and sexy shared the same response key, the mean log latency was 6.70, $F(1, 28) = 1.70$, $p > .05$, $r = -.26$. These results suggest that the child molesters viewed children as more sexually attractive than adults, whereas the nonsex offenders were not sig-nificantly different in their view of children and adults in terms of sexual attractiveness.

IM

Child molesters and nonsex offenders were compared on IM, as measured by the BIDR-IM, in a one-way ANOVA. The child molesters ($M = 7.72$, $SD = 5.06$) scored significantly higher on the BIDR-IM than did the nonsex offenders ($M = 5.00$, $SD = 4.58$), $F(1, 54) = 4.45$, $p < .05$, $r = .28$.

ALTERNATE EXPLANATIONS

Although the main purpose of the present study was to investigate cognitions associated with child sexual abuse, the use of a correlational design, which compared nonequivalent groups, rendered the internal validity of the study vulnerable to threats from potentially confounding differences between the child molesters and nonsexual offenders on extraneous variables. Thus, the findings presented above are open to multiple explanations. Four potentially confounding variables in the present study were age, race, sexual orientation, and IM. Compared to the nonsex offenders, the child molesters were significantly older, less likely to be Aboriginal, more likely to be bisexual or homosexual (see Table 1), and higher on IM. One could argue that the results found for the IAT effects are a function of differences in age, race, sexual orientation, or IM rather than a reflection of real differences, or lack thereof, between child molesters and nonsex offenders.

To address the possibility that age and IM differences between groups may have had an impact on the results, one-way ANCOVAs parallel to the one-way ANOVAs reported above were performed on the IAT effects. Age was the covariate in the first set of ANCOVAs, and BIDR-IM was the covariate in the second set of ANCOVAs. The results of the ANOVAs and ANCOVAs were virtually identical in terms of effect sizes and statistical significance. Thus, the age and IM differences between the groups did not appear to have distorted the IAT results reported above.

To address the racial and sexual orientation differences between the groups, effect sizes (point-biserial correlations) were computed with, respectively, the Aboriginal and homosexual or bisexual participants excluded. The effect sizes found with only the non-Aboriginal participants and with only the heterosexual participants were generally very similar to those found with the entire sample. Thus, the differences between the child molesters and the nonsexual offenders in race and sexual orientation did not seem to greatly affect the results.

SECONDARY HYPOTHESES

Risk of sexual recidivism. In addition to comparing child molesters to nonsex offenders, it was also important to explore whether variation on the IATs was associated with risk of sexual recidivism among the child molesters. Risk was measured by the Static-99 and RRA-SOR, on which higher scores reflect greater risk. Mean scores were 5.52 ($SD = 2.10$) on the Static-99 and 3.26 ($SD = 1.46$) on the RRASOR. Intercorrelations between the IAT effects (ln), the Static-99, and the RRASOR are presented in Table 3. As hypothesized, greater risk on the Static-99 was significantly associated with higher sexy child IAT effects (ln), which reflect a view of children as more sexually attractive. Contrary to expectations, however, greater risk on the RRASOR was significantly associated with higher powerful child IAT effects (ln), which reflect a view of children as more powerful. Thus, offenders who viewed children as more sexually attractive and more powerful were at greater risk for sexual recidivism. There was also a trend toward significance in the expected direction with a more positive view of children on the pleasant child IAT effect (ln) associated with greater risk on the RRASOR ($p < .10$).

IM. The correlations between the IAT effects and the BIDR-IM are presented in Table 3. Although none of the correlations reached statistical significance, there was a trend toward significance with the pleasant self IAT effect (ln). Greater IM was associated with a more

TABLE 3: Intercorrelations Between the Static-99, RRASOR, BIDR-IM, and IAT Effects (ln) in Child Molesters

	1	2	3	4	5	6	7	8	9
1. Static-99	—	.78*** (27)	−.40* (27)	−.32 (25)	.28 (26)	.15 (21)	.05 (27)	.17 (25)	.43* (24)
2. RRASOR			−.36† (27)	−.31 (25)	.12 (26)	.23 (21)	.33† (27)	.40* (25)	.27 (24)
3. BIDR-IM				.38† (25)	.09 (26)	−.16 (21)	.30 (27)	.08 (25)	−.22 (24)
4. Pleasant self					.33 (24)	.35 (20)	.42* (25)	−.08 (24)	.27 (23)
5. Powerful self						.52* (21)	.16 (26)	−.26 (24)	.33 (23)
6. Sexy self							.52* (21)	−.30 (20)	.12 (20)
7. Pleasant child								.19 (25)	.20 (24)
8. Powerful child									.33 (23)
9. Sexy child									—

Note. Sample size is in parentheses. RRASOR = Rapid Risk Assessment for Sexual Offense Recidivism; BIDR-IM = Balanced Inventory of Desirable Responding-Impression Management Scale; IAT = Implicit Association Test; ln = natural log.
†*p* < .10. * *p* < .05. ** *p* < .01. *** *p* < .001.

positive view of self. When IM was statistically controlled in partial correlations, the associations between the pleasant self IAT and both the Static-99, $pr(22) = -.20$, $p > .05$, and the RRASOR, $pr(22) = -.20$, $p > .05$, were weakened. It is interesting that BIDR-IM was also associated with the Static-99 and the RRASOR.

Intercorrelations between IAT effects. Intercorrelations between the IAT effects (ln) for the child molesters are shown in Table 3. It is interesting that all three self-IATs correlated positively with each other, although only the relationship between the powerful self IAT and the sexy self IAT reached statistical significance. Among the child IATs, all intercorrelations failed to reach statistical significance.

DISCUSSION

The primary goal of the present research was to assess whether implicitly assessed cognitions purported to play an etiological role in child sexual abuse differed between a sample of child molesters and nonsex offenders. In addition, the relation between these cognitions and risk of sexual recidivism was examined. Six separate IATs were designed to assess views of self and children (relative to adults) in terms of evaluation, power, and sexual attractiveness. Contrary to expectations, none of the self IATs significantly differed between child molesters and nonsex offenders, nor did they correlate significantly with risk of sexual recidivism as measured by the Static-99 or the RRASOR. The results were not supportive of theoreticians' suggestions that a view of self as negative, socially weak, and unattractive plays a role in the etiology or maintenance of child sexual abuse (Finkelhor, 1984; Hall & Hirschman, 1992; Marshall & Barbaree, 1990).

Results for the child IATs were only partially consistent with expectations. There was a trend toward significance for the correlation between the pleasant child IAT effect and the RRASOR in the expected direction; a more positive view of children was associated with greater risk on the RRASOR. This association, however, was weakened when the BIDR-IM was taken into account. With regard to the powerful child IAT, no significant relationship was found with the Static-99, and contrary to the hypothesis, viewing children as more powerful was significantly associated with greater risk on the RRASOR. The findings did not support theoreticians' suggestions that viewing children as pleasant and socially weak is involved in the etiology of child molestation. Partial support was found, however, for the suggested link between a more positive view of children and maintenance of sexual offending. Whereas theoreticians suggest that viewing children as nonthreatening and socially weak would be associated with a greater likelihood of maintaining sexual offending, the results suggest that the reverse may be the case (Finkelhor, 1984; Hall & Hirschman, 1992; Marshall & Barbaree, 1990).

Although contrary to theory and expectations, the association between the powerful child IAT effect and the RRASOR appears to fit well with the cognitive distortion literature. Cognitive distortions have been described as justifications and rationalizations for sexual abuse of children (Ward & Keenan, 1999). A common cognitive distortion is that children are capable of informed consent to sexual activity with an adult (Abel, Becker, & Cunningham-Rathner, 1984; Abel et al., 1989; Bumby, 1996; Hanson, Gizzarelli, & Scott, 1994), which implies that children may be attributed greater social power. Hence, greater risk of sexual recidivism may be associated with imbuing children with greater social power.

For the sexy child IAT, the hypotheses received almost complete support. As expected, compared to the nonsex offenders, child molesters viewed children as significantly more sexually attractive on the sexy child IAT. The sexy child IAT was also significantly associated with greater risk of sexual recidivism on the Static-99. The correlation with the RRASOR, however, did not reach statistical significance. These findings concur with theory in which sexual attraction to children has been identified as playing a role in the etiology and maintenance of child sexual abuse (Finkelhor, 1984; Hall & Hirschman, 1992; Marshall & Barbaree, 1990). It was, however, unexpected that the sexy child IAT would not be more strongly correlated with the RRASOR because it has been conceptualized by some as a more focused measure of sexual deviance than the Static-99 (Roberts et al., 2002).

The findings in the present study fit reasonably well with past research using PPG, viewing reaction time (VRT), and the IAT. Greater sexual attraction to children (relative to adults) was found among child molesters compared to nonsex offenders in the current study on the sexy child IAT as well as in past research using PPG (e.g., Barsetti et al., 1998; Quinsey & Chaplin, 1988) and VRT (Abel, Jordan, Hand, Holland, & Phipps, 2001). There is also evidence from other researchers who have used the IAT that child molesters more strongly associate children with sex (Gray et al., 2005) and view children as more sexual (Mihailides et al., 2004) than do men who have not sexually abused children. There is an impressive degree of convergence across studies and methods that bolsters confidence in the construct validity of the sexy child IAT and makes a strong case for the involvement of sexual attraction to children in sexual abuse. Similarly, there was convergence between the current and past findings regarding maintenance of sexual offending. The sexy child IAT effect was significantly associated with risk of sexual recidivism in the current study, and there is considerable evidence that PPG-assessed sexual attraction to children is predictive of persistence in sexual offending (Hanson & Morton-Bourgon, 2004, 2005).

The current results have implications for assessment and treatment of child molesters. The finding that greater risk of sexual recidivism was moderately associated, although not always significantly, with a view of children as more pleasant, powerful, and sexually attractive as measured by the IAT suggests that these cognitions may be predictive of sexual recidivism. With the exception of sexual interest, cognitive predictors of sexual recidivism have been measured primarily by self-report methods with generally poor or unknown predictive validity (Hanson & Morton-Bourgon, 2004, 2005). The IAT may serve as a useful complement to existing batteries in assessing cognitions that are related to risk of recidivism.

Ideally, risk assessments not only provide an estimate of risk but also identify treatment targets (Andrews & Bonta, 2003; Beech, Fisher, & Thornton, 2003; Hanson & Harris, 2001). The current results suggest that for those child molesters who view children as more positive, powerful, and sexually attractive, targeting these cognitions in treatment may reduce their risk of reoffending. Because of the correlational design of the current study, however, assuming that these variables play a causal role in recidivism is speculation. To the extent that these factors do influence recidivism, administering IATs pretreatment and posttreatment could aid in treatment planning and provide an indication of treatment progress. Of course, application of the IAT to clinical work in the field would be contingent on further encouraging results from a larger body of research.

In the current study, there were several possible alternate explanations for the results discussed above. Follow-up analyses conducted to evaluate the validity of alternate explanations based on group differences in age, race, sexual orientation, and IM indicated that none of

these potential confounding variables appeared to have greatly influenced the results. These follow-up analyses, however, were post hoc and did not unequivocally rule out the possibility that threats to validity were present and had an impact on the findings.

The failure to find most of the hypothesized differences between groups is open to at least three different interpretations. First, the average child molester may simply not be very different from other criminals on many of the cognitions that were examined. For example, it has been argued and demonstrated that personal distress variables, such as low self-esteem, are not causally related to general criminal behavior (Andrews & Bonta, 2003; Gendreau, Little, & Goggin, 1996). Second, the IAT procedures may have failed to adequately capture the cognitions of interest. A third possibility is that few between-groups differences were found because there are multiple etiological pathways to child sexual abuse that create different types of child molesters characterized by different cognitions (Ward & Siegert, 2002). Some or all of these groups may have been present within the sample.

Certain issues warrant cautious interpretation of the results of the current study, such as the correlational retrospective design and small sample size. Although ideally the present study would contribute to knowledge about the etiology and maintenance of child sexual abuse, the findings should be interpreted with caution because of the research design. By collecting and statistically controlling for several potentially confounding variables, however, confidence in the validity of the current results was increased. Although the sample size was small, it was still possible to detect medium-sized effects ($r \geq .30$) in the tests of the primary hypotheses (i.e., between-groups comparisons on the IAT effects). For the secondary hypotheses, however, some of the medium effect sizes failed to reach statistical significance. For example, the correlation between the RRASOR and the pleasant child IAT was .33, but with a sample size of 27, it did not reach statistical significance ($p > .05$). Clearly, this is not a negligible association (Cohen, 1992; Rosenthal, 1991), but a larger sample size would have permitted greater confidence in the degree to which a similar association exists in the larger population of incarcerated child molesters. Thus, although the statistical power of the current study may have been adequate for its primary purpose, it was lacking for the secondary analyses.

There are many future directions for research given that investigators have only recently begun to adapt implicit measures to study cognitions of sex offenders. A high priority would be to further establish the construct validity of the IAT. Greater confidence that the sexy child IAT, for example, is truly tapping sexual interest would be provided by demonstrating convergence with other measures, such as PPG and VRT measures of sexual interest. Further confidence would be gained by demonstrating correspondence between specific treatment targets (e.g., sexual interest in children) and pre- to posttreatment change as measured by the IAT. Prospective studies in which IAT effects were predictive of sexual offending (e.g., recidivism) would provide additional confidence. Together, these three approaches would provide a reasonably comprehensive evaluation of the construct validity of the IAT in assessing cognitions of child molesters. Another avenue for future research would be to examine different types of child molesters and, more generally, different types of sex offenders. For example, it would be interesting to attempt to identify different types of child molesters according to Ward and Siegert's (2002) etiological pathways model and use the IAT to assess the degree to which they differ on the relevant cognitions. The IAT would also have potential value in exploring the offence-related cognitions of rapists and other types of offenders.

Overall, the results of the current study suggest that (a) implicitly measured cognitions regarding children as sexually attractive may be a distinctive characteristic of child molesters

compared to other criminals and (b) implicitly measured cognitions regarding children as more powerful and more sexually attractive may be associated with greater risk of sexual recidivism. The results suggest that the IAT has utility in assessing cognitions associated with child sexual abuse. The IAT appears to be a promising method of examining the cognitions of child molesters and an exciting area for future research that may eventually become a valuable complement to existing assessment techniques.

APPENDIX
Stimulus Words for IATs

Target-Concepts

Me words. Me, my, mine, myself
Not me words. It, they, them, their
Child words. Young, small, boy, girl, kid, child
Adult words. Mature, big, man, woman, grownup, adult

Attributes

Pleasant words. Vacation, rainbow, smile, sunshine, paradise, freedom
Unpleasant words. Rotten, poison, sickness, vomit, cancer, evil
Powerful words. Violent, destroy, command, powerful, confident, success
Weak words. Afraid, insecure, feeble, scrawny, timid, lamb
Sexy words. Fuck, naked, masturbate, sex, beautiful, love
Not sexy words. Yuck, stink, cold, ugly, impotent, disgusting

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