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The Utility of Post-conviction Polygraph Testing Amongst Sexual Offenders

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### Abstract

It is often difficult to ascertain the true extent and nature of sexually deviant behaviour, as much relies on self-report or historic information. The polygraph has been proposed as a useful tool in the treatment and supervision of sex offenders. The current review aims to provide a coherent, objective and recent synthesis of evaluation studies exploring the utility of the post-conviction polygraph (PCSOT) in the treatment and management of sexual offenders. This was assessed based on offence recidivism rates and disclosure, self-reported utility was also considered. Nineteen studies were identified from the US, UK, and the Netherlands with no randomised controlled trials identified. Overall, there was a significant increase in relevant disclosures associated with the polygraph. The impact on reoffending rates was significant for violent but not sexual offences. A number of methodological factors introduced the potential for bias in a significant number of studies reviewed in this review.

*Keywords:* sexual offender assessment, polygraph, risk assessment, disclosure, recidivism

## The Utility of Post-conviction Polygraph Testing Amongst Sexual Offenders

The magnitude of sexual offence convictions amongst males is estimated to be between 1-2% of the general population, however less than 2% of these arrive at a guilty verdict (Myhill & Allen, 2002). Such offences have a substantial negative impact at both a macro- and micro- level with a substantial economic cost and emotionally devastating impact on victims. In the UK, the Home Office stated that approximately 8% of prisoners are incarcerated for a sexual offence with rape being the most common of these offences (Councell & Olagundoye, 2003). Official figures indicate that since the introduction of new court orders, e.g. the Suspended Sentence Order (SSO) in 2005 (under the Criminal Justice Act 2003), there has been an increase in the number of offenders being supervised in the community.

Although rates of re-offending are inconsistent and tend to vary between samples and settings, a widely reported overall sexual recidivism base-rate over a lifetime is between 10% - 14% (Schmucker & Lösel, 2015). These figures are likely to be an underestimate of true recidivism rates due to factors such as underreporting and undetected offences (Meijer et al., 2008). Recidivism will also vary according to the degree of risk that an individual poses, for example, for those presenting with moderate to high risk, recidivism rates for sexual offences can reach 65% (Hilton et al., 2008) however more recent research indicates that risk can reduce dramatically (e.g. to 4.2%) as the time from release increases (Hanson et al., 2014).

There are a number of validated assessment tools which are used to assess and categorise the risks posed by convicted or suspect sexual offenders. Although these tools are useful in providing a standardised measure of risk, there appears to be a preoccupation with

the assessment of risk rather than its management, and many assessments rely on self-report requiring honest responding for accurate measurement (Beech et al., 2003). For those tools which categorise reoffending rates into discrete and separate categories, predications of more 'serious' reoffending has been found to be limited (Kemshall, 2003).

The polygraph, a tool measuring physiological responses to pre-defined questions, has been advocated as a useful means of dealing with these shortfalls, as it may encourage offenders to reveal more information. As a result, the polygraph test can lead to the exposure of detailed and unknown information, which may trigger actions that could result in improvements to an offender's risk management plan and assist with more effective supervision and management. In addition, challenges to successful treatment programmes, such as a lack of honesty or a continuing influence of cognitive distortions can reduce the benefit of such interventions. The polygraph can help offenders overcome barriers to honesty, such as denial, feelings of guilt and shame by encouraging disclosure early on in the treatment process (Grubin et al., 2004).

The acceptance of the polygraph in sex offender management strategies differs between countries. In the United States (for example) the polygraph has received wide acceptance for supervising and monitoring sexual offenders on parole or probation (English et al., 2000). In many US states, the polygraph is used to assess recidivism and adherence to community restrictions, with almost 80% of community treatment programmes using this method (McGrath et al., 2010). In contrast to the US, in the UK the polygraph has not been used as an investigative tool to assist in determining guilt or innocence (Gannon et al., 2011) and only recently has it been given serious consideration, for example with the introduction of pilots, as a potential means of facilitating the assessment and treatment of sex offenders.

With respect to Dutch countries, the post-conviction polygraph examination as a means of assessing, treating, and monitoring sex offenders was first presented and clinically used in the

Netherlands in 2001 (Sosnowski & Wilcox, 2001). Despite this relatively little research has been conducted in this country.

The most common type of polygraph use in sex offender testing is the post-conviction polygraph examination (PCSOT). The PCSOT measures change within the automatic nervous system in response to offence- relevant questions which may indicate deceptive responding. There are three types of PCSOT's; the specific issue denial test (SID, Grubin, 2008), the sexual history disclosure examination (SHDE; Wilcox et al., 2005) and the maintenance examination (Wilcox, 2000). The SID focuses specifically on an offender's behaviour or an allegation against them. The SHDE is a comprehensive psychosexual evaluation employed to gather information on an offender's complete sexual history and obtain a more thorough understanding of their previously undisclosed sexual activities. The maintenance examination polygraph is periodically conducted in order to assess the offender's adherence to treatment and supervision restrictions (e.g. Community Rehabilitation Order/Licence Conditions) during their time on probation or licence. These types of PCSOT's differ from alternative applications of the polygraph such as the Concealed Information Test (CIT; Verschuere, Ben-Shakhar, & Meijer, 2011) which has different underlying theoretical (and practical) assumptions and focusses on the pre-conviction period in relation to offending.

In efforts to decrease recidivism and obtain more accurate information regarding an individual's offending behaviour, the PCSOT has been used in numerous jurisdictions across the US, and is usually implemented within a containment approach towards sex offender management. The containment approach offers a popular framework for managing offending, as it utilises input from both supervisory and treatment services. The approach is used with convicted sex offenders who are placed on probation, or amongst those who are ultimately released back into the community after serving time in prison. Within this approach, the role

of the polygraph examiner is addition to the supervision of the offender, and can provide verification of an offender's self-report regarding their compliance to treatment and licence conditions. Examiners are expected to adhere to guidelines when administering the test (Honts & Handler, 2013) to encourage fair testing. Despite its popularity amongst professionals using the PCSOT, with many supporting its use in facilitating disclosure and enhancing compliance, research exploring the utility of the PCSOT is limited, critics are widespread, and research is lacking.

Due to the potential magnitude of risks posed by offenders, it is essential that a rigorous process is employed for their monitoring, particularly those in the community. For this reason Hanson & Wallace-Capretta (2000) have recommended that professionals avoid relying on offenders' responses to post-treatment questionnaires, as such questionnaires may not reflect true attitudes and behaviours. For this reason, amongst others, a PCSOT may be useful in evaluating to what extent an offender has been managing their dynamic risk and offending behaviour whilst subject to supervision.

### **A Critique of the Polygraph with Sexual Offenders**

During the past decade there has been an increase (albeit limited) in studies exploring the utility of the polygraph in sex offender research, although the topic remains under researched. For proponents of the technique, the PCSOT contributes to the derivation of a more accurate and complete picture of an individual's offending, high-risk behaviours and sexual history, while also serving to enhance compliance with probation conditions. Proponents highlight three key benefits resulting from the use of post-conviction polygraph testing including:

- An increase in self-reports of previous offences by offenders;
- A superior assessment of therapeutic engagement and progress following a sexual offence conviction;
- A deterrent for future offending

Critics of the polygraph commonly focus their challenges upon the accuracy of the procedure itself and its underlying premise, claiming that it is difficult to determine the origins of physiological responses which are recorded by the polygraph (National Academy of Sciences, 2003).

Another common criticism of polygraph testing is that the process itself is likely to elicit an emotional reaction. Being subjected to a polygraph assessment may lead the individual to feel anxious and misclassify innocent subjects. False confessions may also be made due to 'false positive' outcomes, whereby an innocent individual is found deceptive, and suggestible influences from the examiner or exam conditions (Leo & Ofshe, 1998). However, in response to these concerns, polygraph examiners often attempt to control for subjects' anxiety levels by conducting a pre-polygraph interview which explores offender's levels anxiety related to testing procedures **by recording a baseline reading**. The examiner may also formulate a number of control questions comprised of 'known' or 'probable' lies, which are irrelevant to the focus of the polygraph examination, but can assess the validity of the test through the observation of psychological changes to known lies (Honts & Reavy, 2015).

The debate is on-going with regards to the validity and reliability of polygraph techniques, including those executed in post-conviction settings. For example, the outcome of false positive (i.e. a guilty outcome for innocent individuals) and false negative responses



(i.e. a not-guilty outcome for guilty individuals) continues to be issue challenging the validity of the tool. However, for some this argument is irrelevant as that accuracy of the polygraph in distinguishing guilty from innocent individuals is not seen to be the focus of the PCSOT.

According to such individuals, attention should be given to the information given by individuals during the test which can give better insight into risk and management considerations.

Most critics recognise that the PCSOT increases disclosures, but potentially generate incredible information due to the poor scientific validity of the method (Cross & Saxe, 2001). For example, opponents of the polygraph contend that individual differences, such as body mannerisms of clients, the amount of examiner experience in testing special populations, quality of examiner training, and various types of therapist/examiner partnerships bias the polygraph results. However, it could be argued that the majority of studies are biased by such variables if not adequately controlled (Almeyer, et al., 2000). In addition, research indicates that actuarial measures (when used in isolation) have little utility for individual offenders as the statistical variation gathered from group models is too large to make personalised predictions of reoffending (Gannon, Beech & Ward, 2008). The polygraph may be useful when combined with other measures of risk, as individual predictions of risks and results of different risk tools often diverge (e.g. Barbaree, Langton, and Peacock., 2006 found that less than 5% of their sample was consistently identified as high risk or as low risk across five actuarial risk tools for sexual offenders including the VRAG, SORAG, RRASOR, Static-99, MnSOST-R).

The issue of ‘countermeasures’ is a long-standing concern amongst individuals cautious of the polygraph. Countermeasures are purposeful techniques used by the examinee to encourage a ‘truthful’ outcome from the polygraph test. The individual may be lying or

truthful when engaging in countermeasures. Innocent individuals may use countermeasures as an additional safety tactic in an attempt to elicit extra caution, and to try and avoid any possibility of a deceptive outcome. Repeated testing of the same individual may also threaten the accuracy of testing due to habituation to the experience, which may aid an offender's effective use of countermeasures (Honts, 2004). To date, no study has attempted to measure the features or correlates of countermeasures specifically.

Individual differences in responses during the PCSOT are another matter for potential concern. For example, not all psychopathic individuals have been found to encounter heightened physiological arousal when deceiving others (Zuckerman & Driver, 1985). Therefore it may be that individuals with high levels of psychopathy are less susceptible to polygraph lie detection. This is particularly relevant to forensic populations where psychopathic individuals are overrepresented (Shaffer et al., (2015). Studies have not yet considered the usability of the polygraph with specific groups of such as young children or those with active mental illnesses, whose test may also be comprised, due to the nature of these impairments affecting the accuracy of the outcomes (Blasingame, 1998). Again, mental illness is also a common feature of forensic populations (Fazel & Seewald, 2012).

Ethical concerns arise in the context of treatment, as suggestions have been made that the testing process can hinder therapeutic alliance for subsequent treatment (Iacono, 2008). This then calls into question whether the use of the polygraph is sufficient to outweigh potential barriers it may cause to treatment engagement. Protection from self-incrimination during the polygraph is sometimes offered to offenders in an attempt to encourage disclosure. This presents another ethical and policy concern associated with decisions in criminal justice. Such legal complexities raise ethical concerns as individuals do not receive the 'punishment' they may otherwise receive. This highlights the contrast between requiring honesty from the

offender for the successful completion of a treatment program when relying on a test that is based on deception (Meijer et al., 2008).

The systematic review is needed in an attempt to shed some light on the ongoing debate which remains with regards to the utility and efficacy of the post-conviction test in forensic settings. The review will present a coherent, critical and updated synthesis of all relevant studies identified in order to explore the evidence, in light of ongoing criticisms, and offer an overall summary of the key conclusions made in the existing academic literature.

### **Method**

We conducted a systematic review exploring the utility of post-conviction polygraph testing amongst sexual offenders following PRISMA (Preferred Reporting Items for Systematic Reviews) guidelines for structuring the review and evaluating study outcomes.

**Eligibility.** Studies evaluating the utility of post-conviction polygraph testing amongst sexual offenders were included. All studies included the administration of a polygraph with questions focusing on sexual offending. Polygraph studies in pre-conviction settings, without considerable evidence that the individual was guilty of the offence, were not considered for review due to the different types of questions which featured in these tests, and the fact that some individuals assessed in a pre-conviction setting will not be guilty of the allegations made against them. Eligible studies could be published or unpublished. There was no limit with regards to the time of appearance. Unpublished studies that were already accepted for publication were later coded as published studies. There were no restrictions to country of origin or reported language.

Due to the relatively limited amount of research exploring the utility of the polygraph in a post-conviction setting, studies without a control group were also included for review,

with reference was drawn to this as a methodological weakness. Due to the limited amount of research including comparison and control groups, studies without such conditions were also included. Conditions could be randomly or purposefully assigned.

There was no restriction with regards to individual characteristics including previous offence history, stage of treatment engagement, age, gender, or ethnicity and country of origin/residence.

**Information sources.** The following databases were searched: 1) Embase 2) Pubmed 3) PsycInfo 4) Medline 5) Cochrane library 6) Web of Science. An internet search was also conducted to retrieve unpublished studies, reviews and materials in progress. To our knowledge there are no guidelines on how to perform a most efficient internet search. Google was the primary search engine used to reveal relevant materials. Specific sites and use links were accessed in an attempt to find sites that deal with the post-conviction polygraph sexual offender management, monitoring and treatment. An additional focus was on institutional sites that promote correctional treatment (e.g. the Correctional Service of Canada, U.S. State Departments for Corrections, UK Home Office etc.) and sites that specifically deal with sexual offending (e.g. Centre for Sex Offender Management). Reference lists from all retrieved studies were examined for further studies.

**Searches.** Searches were performed in November 2014 and employed the following search terms: [(sex\* or paraphil\* or rape or rapist or molest\* or exhibitionis\* or voyeur\* or pedophil\* or paedo\* or incest\* or fetish\* or necrophil\* or frotteur\*) and (offen\* or crim\* or delinquen\* or perpetrator\* or prison\*)] and (polygraph\* or PCSOT\*).

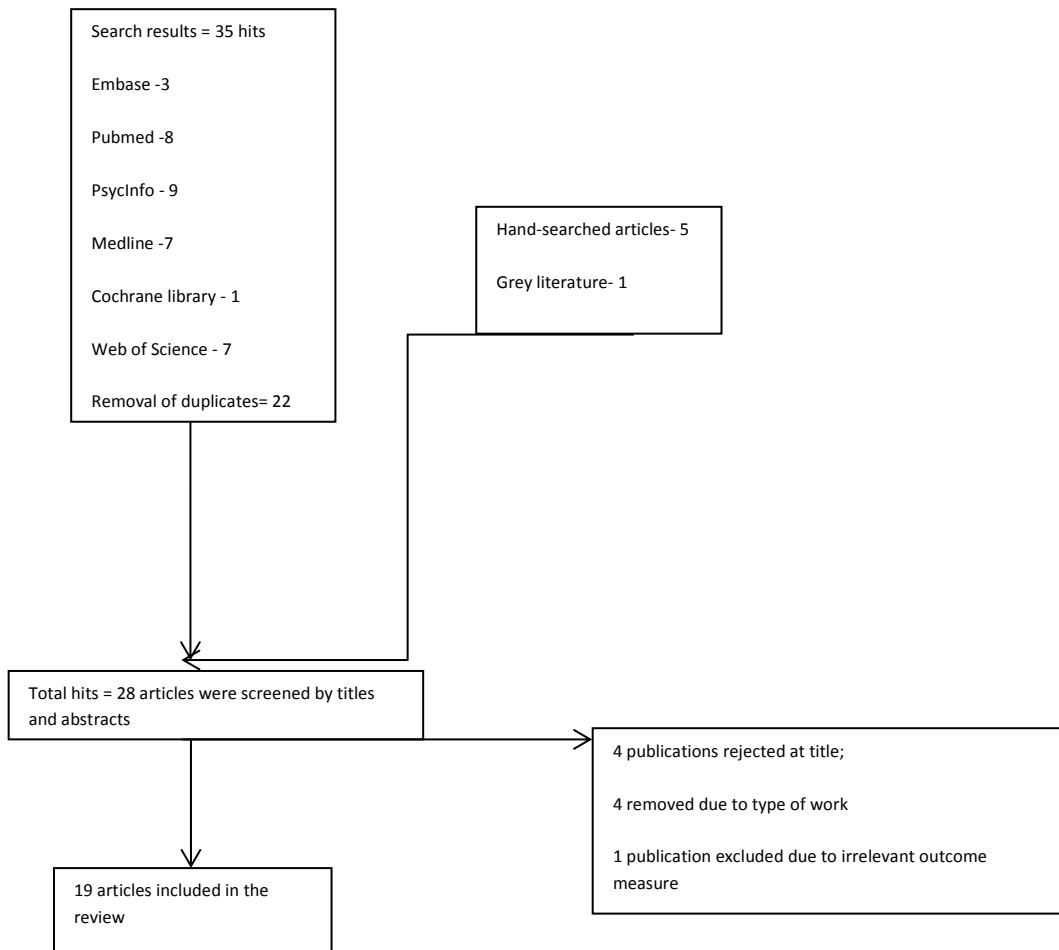
**Data extraction.** Studies were coded by two independent reviewers (both members of the University of Nottingham). A coding protocol was developed to record the important substantive and methodological features of each study (Table 1 for a condensed version)

including sample characteristics, study/methodological characteristics, outcomes and potential study weaknesses inviting consideration.

**Outcome measures.** Studies had to report a minimum 6 month follow up if recidivism was the outcome measure **due to potential memory bias**. Disclosure of sexually deviant thoughts or fantasies, new offences, plans to commit new offences, and/or failure to comply with treatment regulations of license conditions could be included topics of disclosure. The proportion of individuals who make a disclosure in each group will be reported as a percentage. Although selected studies will be focusing on the PCSOT, some studies may consider disclosure at different points in the polygraph process: on referral, after clinical interviews, and after polygraph testing.

## Results

*Figure 1: The Process of Study Selection and Search Results*



**Sample Characteristics.** Details of the sample characteristics in the reviewed studies are displayed in Table 1. Overall, the sample size across studies ranged from 25 (Buschman et al., 2009) to 635 (Gannon et al., 2014) and the age of participants spanned from 13- 76 years. However, demographic data was not made available for all participants in three of the studies (Kokish et al. 2005; Bourke et al., 2014; Cook et al., 2014).

The ethnicity of the offenders was predominantly white/ Caucasian. All offenders were male with the exception of one study (English, Jones, Patrick, & Pasini-Hill, 2003) where 4.3% of the sample was female.

Twelve studies included offenders who offended against both adult and child victims. Six studies included only offenders with convictions against children, some of which included juvenile offenders who had offended against peers or younger children (Schneck et al., 2014; Grubin et al., 2014; Van Arsdale et al., 2012; Bourke et al., 2014; Stovering, Nelson & Hart, 2013, Buschman et al., 2009).

All studies were carried out in the USA aside from five studies that were conducted in the United Kingdom (Grubin, 2010; Grubin & Madsen 2006; Grubin et al., 2004; Grubin et al., 2014; Gannon et al., 2014) and one conducted in the Netherlands (Buschman et al., 2009).

All but two studies included participants in community settings only; the other two studies compared the usefulness of the polygraph in both prison and community samples (Ahlmeyer et al., 2000; Heil, Ahlmeyer, & Simons, 2003).

In thirteen studies it was reported that some/all of the participants were also receiving (inpatient and outpatient) psychological therapy (O'Connell, 1997; Stovering, Nelson, & Hart., 2013; Heil, Ahlmeyer, & Simons, 2003; Van Arsdale et al., 2012; Cook et al., 2014; McGrath et al., 2007; English et al., 2003; English et al., 2000; Schenk et al., 2014; Kokish et

al. 2005; Grubin et al., 2004; Grubin & Madsen, 2006; Buschman et al., 2010). However, one study controlled for these treatment effects in the analysis by comparing a treatment only with a combined polygraph treatment group (McGrath et al., 2007). Treatment programs frequently targeted sexual offending and were implemented in a variety of settings including prisons and community treatment facilities.

The most common test reported was the sexual history disclosure polygraph which was employed in six of the included studies (Emerick & Dutton, 1993; O'Connell, 1997; English et al., 2000; Van Arsdale et al., 2012; Heil, Ahlmeyer, & Simons, 2003; Buschman et al., 2009). The maintenance polygraph test was used in three studies (McGrath et al., 2007; Gannon et al., 2014; Grubin et al., 2004) and the specific issue test in two of the included studies (Schenk et al., 2014; Bourke et al., 2014). Combinations of test types were used in four of the reviewed studies (Grubin, 2010; English et al., 2000; Stovering, Nelson, & Hart, 2013., English et al., 2003).

**Study Design.** Control groups were not a common feature in the included cohort, and only four of the included studies reported the inclusion of a control group in their methodology (Grubin, 2010; McGrath et al., 2007; Gannon et al., 2014; Heil, Ahlmeyer, & Simons, 2003).

Nine studies employed a single intervention group study design with no comparison group that assessed participants before and following a polygraph but did not follow-up after completion of the polygraph (English et al., 2000; Schenk et al., 2014; Van Arsdale et al., 2012; Bourke et al., 2014; Stovering, Nelson, & Hart., 2013; O'Connell, 1997; Emerick & Dutton., 1993; Buschman et al., 2009; English et al., 2003). Two studies explored self-reported accuracy and utility from a single intervention design (Kokish et al., 2005; Grubin & Madsen, 2006).



Four studies followed a quasi- experimental design with a polygraph intervention and comparison group, (McGrath et al., 2007; Gannon et al., 2014; Cook et al., 2014; Schenk et al., 2014); others included a polygraph unaware group (Grubin et al., 2004), a between samples comparison, i.e. parolee vs. prisoner (Heil et al., 2000; Heil, Ahlmeyer, & Simons, 2003), or a within subjects comparison between multiple polygraphs (Ahlmeyer et al., 2000). No randomized controlled trials were identified.

The polygraph was conducted on a voluntary basis in all but six studies, where it was either a mandatory part of treatment or supervision (McGrath et al., 2010; Schneck et al., 2014; Cook et al., 2014; Stovering, Nelson & Hart, 2013; English et al., 2003; O'Connell, 1997). Ahlmeyer et al., (2000) included both volunteer and mandated offenders due to the inclusion of prison and community samples).

**Outcomes Reported.** The most frequent primary outcome from the included studies was offense-related disclosure of previously unknown information, with this being the focus in twelve of the studies. **Offence-related disclosures may include engaging in risky behaviours (Cann, 2007) or experiencing deviant offence-related thoughts/fantasies (Wilcox & Buschman., 2014).** The timespan of these covered periods in suspense of, during or shortly following a polygraph examination. Topics of disclosure could be directly related to polygraph questions, but also could occur independently of these. All disclosures of interest included information on the individual's past or future forensic risk, including their compliance with supervision or treatment.

Another reported outcome, which featured in two of the included studies focused on the influence of the polygraph on rates of recidivism (McGrath et al., 2007; Cook et al., 2014). For both studies, reported recidivism was based on new convictions for criminal

offences occurring following the polygraph. Both studies measured convicted re-offenses over a five year period.

Two studies in the review explored the self-reported accuracy and utility of the polygraph with offenders (Kokish et al., 2005; Grubin & Madsen, 2006). Both studies implemented self-report measures in their methodology. One study used a 12-item survey with offenders (Previous Experiences of the Polygraph Questionnaire PEPQ) to obtain this information (Grubin & Madsen, 2006). This survey explores offenders perceptions regarding the usefulness of the polygraph in increasing self-reported disclosure and encouraging honesty with supervisory and treatment professionals. The other study (Kokish et al., 2005) utilised a questionnaire specifically constructed for the purpose of their research. The questionnaire asked respondents whether mandatory polygraph examinations were helpful or/and harmful to their treatment and whether they felt the polygraph outcome was accurate.

One of the included studies explored whether the expectation of an upcoming polygraph (in 3 months) was sufficient to decrease an individual's level of risk and help them avoid engaging in their identified high risk behaviours (Grubin et al., 2004). The number of disclosure were compared between two conditions, one in which individuals were informed of an upcoming polygraph and the other group in which individuals were only told that their behaviours would be reviewed, but with no mention of the polygraph. Both groups were matched with regards to demographic characteristics and level of presenting risk.

**Disclosure.** Five studies reported an increase in the number of disclosures relevant to the number of victims for those individuals who had the polygraph (Ahlmeyer et al., 2000; Emerick & Dutton, 1993; Bourke et al., 2014; Heil, Ahlmeyer & Simons, 2003; Van Arsdale et al., 2012).

Five studies reported an increase in disclosures regarding the number of offenses (some reporting previously unknown contact offences) for polygraphed participants (Ahlmeyer et al., 2000; O'Connell, 1997; Cook et al., 2014; Bourke et al., 2014; Heil, Ahlmeyer & Simons, 2003) and six studies reported an increase in the disclosure of rule violating behaviours (e.g. licence violations) or engagement in risky behaviours indicative of a cause for concern with regards to the person's sexual risk (Ahlmeyer et al., 2000; English et al., 2003; Grubin & Madsen 2006; Buschman et al., 2009; Gannon et al., 2014; Grubin et al., 2004). Risk behaviours included masturbation to deviant fantasies, violation of treatment or supervision arrangements, and contact with potential victims or engagement in substance misuse. Seven studies reported an increase in admissions of cross-over offenses (Schenk et al., 2014; English et al., 2003; Emerick & Dutton, 1993; O'Connell, 1997; Bourke et al., 2014; Heil, Ahlmeyer & Simons, 2003; Van Arsdale et al., 2012). Cross over included a higher proportion of offences against victims of multiple ages, across genders, offender-victim relationships and a wider variety of offenses. Seven studies found an increase in disclosure signalled a change in offenders' level/ category/seriousness of risk (e.g. preference for a more explicit category of preferred indecent image/ higher scores on risk assessment tools such as the Static 99) as result of a polygraph (Grubin 2010; Emerick & Dutton., 1993; Cook et al., 2014) Buschman et al., 2009; Van Arsdale et al., 2012; Grubin et al., 2014; Grubin et al., 2004).

In a study comparing the impact of the polygraph on inmate and parole samples, offence-related disclosure was only significantly increased amongst inmates (Heil, P., Ahlmeyer, & Simons, 2003).

**Recidivism.** Two studies included in the review explored the influence of the polygraph on rates of recidivism (McGrath et al., 2007; Cook et al., 2014). McGrath et al. found that after a fixed 5-year follow-up period, individuals in the polygraph group were

significantly less likely to be charged with committing a new non-sexual violent offense (2.9% vs. 11.5%). However, there were no significant differences between conditions for sexual re-offenses (5.8% vs. 6.7%). Cook et al. also found that individuals subjected to the polygraph were significantly less likely to receive a conviction for violent and sexual recidivism combined or violent-only offences. Similarly to McGrath's findings, there was no significant impact of the polygraph on sexual-only recidivism. Cook et al. also found that reoffending participants were on supervision significantly longer prior to partaking in the polygraph examination. The authors suggested that offenders who fear being detected, as they are guilty of committing another offence, avoid the polygraph. However, the reasons for avoidance were not explicitly explored in the study, and it could be that the need for a polygraph was simply overlooked or the offender was in treatment, but not progressing to a stage where the polygraph was scheduled to be undertaken.

**Self-Reported Accuracy and Utility.** Results from Grubin & Madsen revealed low levels of self-reported inaccuracy regarding the polygraph outcomes, with 15% stating the polygraph resulted in a false positive outcome and 16% that it resulted in false negative findings. Overall, participants' perceived accuracy of the polygraph was 85%. With regard to self-reported increases in disclosure, 44% of participants stated the polygraph made them more honest with professionals. Amongst participants expecting to be subject to the polygraph, 44% reported an increase in the likelihood of their disclosing offence relevant information to supervisory and treatment agents. With regards to the polygraph as a deterrent for future risk, 56% reported that the test was encouraging for avoiding reoffending, and 68% stated it helped them with avoiding engagement with risk behaviours. **The use of the polygraph as a deterrent to future reoffending or engagement in risk behaviour has also been commented upon by Buttars, Huss, & Brack (2016) who found that periodic polygraph testing was a moderate -strong deterrent to future offending.**

Results from Kokish et al. also suggest a propensity for high levels of self-reported disclosure amongst polygraphed offenders, with 72% stating that the test made them more honest with themselves and their therapists. Similar levels of reported accuracy were reported as found by Grubin & Madsen, with regard to false positive outcomes at 19%; however, fewer incidents of false negatives were reported at 6%.

**Timing of Disclosure.** There were no significant differences between the aware and unaware conditions with regard to the number of disclosed 'high risk' behaviours in the three months leading up to the polygraph test, which suggested that the expectation of an upcoming polygraph test was not sufficient enough to deter individuals from engaging in risk behaviours.

Bourke et al. 2014 found offenders were more likely to make offence-relevant disclosures during the polygraph (52.8%) than beforehand during the pre-test interview (20.5%) or during the post-test debrief (32.3%). Pre-test disclosures yielded information from 29 offenders' highlighting an additional 102 compared to an additional 170 victims disclosed by 54 individuals during the post-test interview. Ahlmeyer et al. (2000) also found offence-related disclosures during polygraph, or shortly after during the post-test interview if a deception-indicated result were found. In contrast, Grubin et al. 2004 found that subjects were most likely to report high risk behaviours to the examiner during the pre-test interview (84%); however, following a failed test, 80% of participants reported additional and unknown information about their high-risk behaviours during the post-test interview. Grubin et al. however, did not specify 'during the test' so that it is difficult to identify exactly when disclosures were made.

Stovering et al. (2013) studied the number of unique disclosures made over a wider time period taking into account number of unique victims disclosed at each of four time

periods over the course of a mandated sex offender treatment program (adjudication, assessment/education, at the polygraph examination, and during continued treatment (from after the polygraph until discharge). Results indicated that the largest number of victims was disclosed during the assessment/education phase (from the first day of treatment until taking the polygraph). Although additional victims were also disclosed during the polygraph examination itself and during continued treatment after the polygraph, this represented a small number of additional victims. For example, only one additional victim was disclosed during the polygraph, and 19 in continued treatment compared to 87 and 157 during the adjunction and assessment/education phase retrospectively.

### **Discussion**

The main finding of this systematic review is that the polygraph **appears to be a useful technique in eliciting a greater number of offence**-related disclosures amongst sexual offenders. The polygraph appears to lead to an increase in disclosures associated with a number of risk-related areas, including the number and variety of offences and victims, risk behaviours and violations of licence and treatment conditions. All of these factors influence how an individual's presenting level of risk is perceived, and this can dictate how we manage and treat this risk in the future. An increase in the reported levels of disclosure regarding crossover offending in seven of the included studies suggests an opportunistic and malleable nature to sexual offending which challenges the validity of traditional sex offender typologies (based on a known victim type). A higher degree of crossover is also indicative of higher risk associated with sexual recidivism as it is suggestive of deficits in impulsivity and self-regulation (Hanson & Morton-Bourgon, 2004). Information on crossover offending is useful for focusing supervision and treatment efforts on each individual's relevant offending

patterns (Heil et al. 2003). Therefore, the polygraph may help in generating more accurate information to allocate resources, evaluate risk, or devise individualised interventions.

Despite these increases in disclosure rates, offenders may continue to conceal information and disclose only the bare minimum they feel necessary. Or indeed, offenders may fabricate their confessions after being found deceptive to prevent the examiner from revealing the truth, or to satisfy what they believe the examiner wants to hear. **Additionally, it is not always possible to ascertain what in these studies is conceived as a 'sex offence,' and therefore it might be that offenders are simply disclosing more of events that they would not have previously considered to be offences (e.g. having sex with someone who is intoxicated).** Thus, it is difficult to ascertain to what extent the newly disclosed information can be trusted as wholly accurate and complete. (Kokish, Levenson, & Blasingame, 2005; Grubin & Madsen, 2006). This is why it is crucial to continue with thorough investigative procedures following an admission. In addition, immunity from criminal prosecution was a feature of many of the included studies which may also have increased disclosure.

Studies reported different findings with regard to the timing of disclosures made in relation to the polygraph test. Therefore, it is likely that additional factors play a role in the timing of disclosures, such as the impact of treatment or good offender- practitioner relationships (Wood et al., 2010). **Unfortunately none of the included studies compared disclosures between polygraph and non-polygraph groups, when both groups were in treatment. Therefore it is difficult to determine how much additional information is the effect of the polygraph as additional to the disclosures that occur during treatment.**

In studies that showed a decrease in recidivism rates following a polygraph examination, this effect was significant only for violent reoffending, perhaps due to lower base rates for sexual offences, which may preclude statistically significant outcomes (Falshaw et al., 2004). This means that although the polygraph increased information about

offenders' risk behaviours, this was not associated with sexual reoffending rates. This confirms previous research demonstrating that (threat of) sanctions have little impact on sexual recidivism (Andrews & Bonta, 2007). It appears, however, that the polygraph can separate those who reoffend less often from frequent reoffenders in that those who avoid undertaking the polygraph tend to reoffend more often, perhaps due a fear of detection. Therefore, in the future it might be beneficial to focus on increasing supervision for those individuals who appear to be actively avoiding the polygraph.

There was a large degree of variance between studies with regards to the type of polygraph test administered dictated by the content of the questions and the purpose of the test. It is unknown whether the type of polygraph test administered impacts upon the validity of the outcomes; however, some researchers have suggested that the method of questioning employed may have an influence on the outcomes (Saxe et al., 1985). The type of polygraph test employed was not specified in four of the included studies (Kokish et al.; Ahlmeyer et al., 2000; Grubin et al., 2014; Grubin & Madsen, 2006).

**Limitations.** It is possible that some studies have escaped identification due to limited accessibility of their data, or ongoing execution. However, given our comprehensive search strategy, it is likely that the studies reported here adequately represent the present state of polygraph research with sex offender populations.

The main limitations in terms of the conclusions that can be drawn on the effectiveness of the polygraph in the management of sex offenders lie within the poor quality of the available evidence. In the included recidivism studies, assignment to treatment conditions was not random (e.g. Ahlmeyer, 2000) and polygraphed offenders may have underwent lengthier periods of treatment and supervision, arguably reducing their risk to reoffend. In the absence of random allocation to condition, it is possible that other factors



contributed to the likelihood of reoffending aside from the polygraph. A small proportion of the included studies rely to some extent on casefile data, therefore the information used may have been initially gathered for clinical and treatment purposes rather than for research, and missing or unreported data may weaken the accuracy of the conclusions made.

**Previous Experiences with the Polygraph.** It was not always possible to ascertain whether offenders had undergone polygraph testing previously and, if so, how many times and during what time frame. It is possible that some studies included participants who had previous exposure to the polygraph and this could have impacted upon study findings. Previous research suggests that experience of the polygraph may increase the number of false negative results due to practice effects and therefore could also influence the content and rates of disclosures (Rovner et al., 1979). However, Ben-Shakhar & Dolev (1996) showed that practice is not necessary for a successful implementation of countermeasures, and therefore previous exposure to polygraphy may not necessarily impact on disclosures.

**Study Design.** Small sample sizes without comparison groups weaken the generalisability of findings. A substantial number of the studies were multiple case or single intervention group designs. In a number of studies, individuals undergoing a polygraph were also concurrently receiving treatment for their sexual offending. Retrospective methodologies and the absence of an appropriate control group make it difficult to disentangle the impact of therapy/supervision from the effect of the polygraph examination, and research indicates that engagement in sexual offender treatment reduces recidivism and disclosure (Hanson et al., 2002). Therefore, it is possible that an increase in disclosure for the polygraph was due to the fact that these individuals were also receiving psychological treatment, which also encourages openness and for some therapies it is a requirement or fundamental aim that participants acknowledge their offence and accept their responsibility in it.

Only two studies have considered the impact of the polygraph on recidivism. For studies considering the influence of the polygraph on rates of recidivism, the length of the follow-up was a maximum of 5 years. Given the slow rate to reoffending and generally low base rates of sexual offending, such time frames may not be sufficient to gain an accurate picture of recidivism. Longitudinal research shows that sexual recidivism increases with extended follow-up (Loucks 2002). After 20 years, it is estimated that rates of recidivism in the general sex offending population will approach 30% - 40% (Hanson et al., 2003).

A major confounding variable amongst the included studies is sampling bias. Many studies included voluntary participants who represent a subgroup of offenders (noted by the discrepancy between the number approached and those agreeing to participate). Volunteers are perhaps more compliant and eager to please, making them more likely to disclose or adhere to experimenter effects during the polygraph. In one of the included studies (Ahlmeier et al., 2000) volunteering inmates were significantly more likely to disclose victims during the polygraph than mandated parolees. Therefore, results from voluntary participants cannot be generalised to all sexual offenders.

**Sample Characteristics.** Participants included in the reviewed studies represent a homogenous group of individuals and therefore it is difficult to generalise these findings to other groups. Participants were predominantly white, middle-aged males from the US or UK (with one study from the Netherlands) and demographic data was missing in a substantial number of the studies, making it difficult to explore whether such characteristics influenced disclosure or reoffending rates. Also, to date there is no known research exploring gender differences in admissions made during or following a polygraph. Therefore it is possible that female offenders will be affected differently by the test.

**Issues with Self-reported Utility.** For those studies including self-reported rates of polygraph utility, it is likely that social desirability impacted upon participant responses, particularly where self-report was obtained during face-to-face interviews or whilst a therapist was present in the room. Offenders are likely to want to make a good impression on those with whom they are working and therefore are more likely to be compliant and report that such influences are useful. However, others may argue that some offenders may be more likely to state that the polygraph is not useful to undermine confidence in the test.

**Drop-out.** There were substantial drop-out rates amongst the included studies which is likely to skew the data. It was not possible to determine systematically why offenders dropped out at various times during certain studies, but it is likely that participants completing the studies represent a different subgroup to those who drop-out of the study, the latter most likely being less compliant and more resistant to making disclosures during the polygraph. Also, because no detailed information was offered in studies with regards to characteristics of those who dropped out, it is possible that those offenders confronted with a deceptive outcome result may have simply dropped out.

### **Conclusion**

The studies included in this systematic review provide a foundation for understanding the utility of the PCSOT amongst forensic samples. The review has a particular focus on disclosure. As with a number of other techniques, current studies suggest the polygraph may be useful in increasing offence-related admissions which promotes more realistic risk assessments. However, these findings are tempered by the severe lack of empirical inquiry and the significant issues surrounding quality of included studies. However, the initial results provided by studies, particularly the increased disclosure across a wide range of risk relevant information justify larger, integrated, and more rigorous PCSOT evaluations in the future.

Such study should take into account the methodological shortcomings identified in the current literature and employ more rigorous methods in order to expand the evidence base for the use of the polygraph in sex offender management and treatment. Future research may also benefit from comparing polygraph disclosure with elicited from other communicative techniques, such as motivation interviewing, and other techniques that influence denial through their impact on motivational/insight; threats to self-esteem; and fear of negative, extrinsic consequences (Lord & Willmot, 2004).

The parameters of polygraph testing that need to be investigated include how it should be designed in relation to theories of lie detection, the frequency of polygraphs for optimal disclosure, how and when the polygraph is most effectively administered (pre/post-conviction), and what types of offenders may be eligible for testing. Only then will we know what sort of test format is most effective, with whom and for what.

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Note. References marked with an asterisk indicate studies included in the systematic review.

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Table 1: A table summarising key study qualities

<b>Study ID #</b>	<b>Study size</b>	<b>Control/ comparison</b>	<b>Setting</b>	<b>Study setting country</b>	<b>Voluntary participation</b>	<b>Outcomes</b>
<b>Grubin, (2010).</b>	342	Control-absence of polygraph	Community Probation	UK	Yes	Reported no. of disclosures 14 times greater amongst polygraphed offenders.  No differences in risk severity of content in disclosures made between polygraphed and non-polygraphed offenders.
<b>English, K., Jones, L., Pasini-Hill, D., Patrick, D., &amp; Cooley-Towell, S. (2000).</b>	232	None	Community- In therapy	USA	Yes	Increase in number of disclosures of high risk behaviours (e.g. deviant fantasies, use of child IIOC etc.) after the polygraph. The number of victims and offences increased from 3% to 35% (10 fold)
<b>Ahlmeyer, S., Heil, P., McKee, B., &amp; English, K. (2000).</b>	60	None	Community –on parole  <i>And</i>  In prison	USA	Inmates voluntary  Parolees mandated	There was an increased in offence related disclosures after the polygraph (particularly if a deceptive outcome DI was found)  Only 5% of DI inmates admitted nothing; 21% of DI Parolee
<b>McGrath, R. J., Cumming, G. F., Hoke, S. E., &amp;</b>	208	Comparison-  Polygraph vs no polygraph	Community	USA	No	The number of individuals charged with a new non-sexual violent offence was

Bonn-Miller, M. O. (2007).		Both groups receiving therapeutic input and correctional supervision				significantly lower for those who received a poly (2.9% v 11.5%)  No significant difference between groups regarding the number of individuals charged with sexual offence
Schenk, A. M., Cooper-Lehki, C., Keelan, C. M., & Fremouw, W. J. (2014).	32	None	Secure treatment facility	USA	Yes	Significantly more individuals admitted bestiality offences in the polygraph condition than they did on the self-report measure
Kokish, R., Levenson, J. S., & Blasingame, G. D. (2005)	95	None	Community-outpatient treatment	USA	Yes	19% of respondents stated the polygraph resulted in a false positive outcome  6% stated the polygraph resulted in false negative  72% of participants stated the polygraph made them more honest with others and themselves  11% stated the polygraph was harmful to their wellbeing
Grubin, D., & Madsen, L. (2006).	114	None	Community in treatment	USA	Yes	Overall perceived accuracy of the polygraph was 85%  44% said the polygraph made them more honest with probation

						<p>officer and treatment provider</p> <p>34% said the polygraph made them more honest with family and friends</p> <p>56% said the polygraph was moderately helpful in helping them avoid reoffending</p> <p>68% said the polygraph was moderately helpful in helping them avoid engagement with risky behaviours</p> <p>44% said receiving a polygraph in the future would increase the likelihood of disclosing to the police</p> <p>Those who had had polygraph disclosed that they were significantly less likely (at the <math>p=.04</math> level) to go to places to view children than those who were awaiting their first test</p>
<p>Grubin, D., Madsen, L., Parsons, S., Sosnowski, D., &amp; Warberg, B. (2004)</p>	34	Comparison: polygraph aware and unaware	Community treatment	UK	Yes	<p>No significant differences in the avoidance of high risk behaviour between polygraph aware and polygraph unaware participants</p> <p>Poly 1: 97% of entire sample disclosed average of</p>

						<p>2.45 high-risk behaviours previously unknown during or following the polygraph</p> <p>Poly 2: all subjects expected the second polygraph. 71% disclosed an average of 1.57 high-risk behaviours- suggesting polygraphed offenders engage in less high-risk behaviours following an initial polygraph test</p> <p>Results from an offender feedback Questionnaire- 57% reported that knowledge of impending polygraph decreased risk behaviours 52% reported that poly encouraged them to disclose more to probation officer questionnaire</p>
<p>Grubin, D., Joyce, A., Holden, E. J., Janssen, D. F., Pfäfflin, F., &amp; Rehder, U. H. (2014).</p>	31	None	Community on bail	UK	Yes	<p>35% of participants made new disclosures following a DI outcome on the polygraph examination</p> <p>‘Low risk’ judgements’ of risk before the polygraph were confirmed in only 26% of participants following the polygraph</p>

						Offenders risk level was modified upwards for 74% of individuals completing the polygraph
Gannon, T., Wood, J., Pina, A., Tyler, N., Barnoux, M. F., & Vasquez, E. A. (2013).	303	Control-polygraph and no polygraph	Community Probation	UK	Yes	<p>A higher proportion of polygraphed offenders made at least one disclosure</p> <p>There were no differences between polygraphed and non-polygraphed offenders regarding the seriousness of disclosures</p> <p>The total number disclosures 3 times greater for those in the polygraph condition</p>
Van Arsdale, A., Shaw, T., Miller, P., & Parent, M. C. (2012).	60	None	Community treatment	USA	Yes	<p>The number of victims disclosed significantly increased post-polygraph and there was an increase in disclosure of male victims</p> <p>There were significantly more contact offense admissions than exposure or force admissions following the polygraph</p> <p>15% of those polygraphed disclosed own sexual abuse victimisation which may be considered in treatment</p>



<p>Heil, P., Ahlmeyer, S., &amp; Simons, D. (2003).</p>	489	None	<p>Community – Parole  And  Prison</p>	USA	Yes	<p>Inmate sample:  Increase in number of victims, no. of offenses and offenses category disclosures following the administration of the polygraph in treatment.</p> <p>Parolee sample:  The number of victims, offenses and offenses category disclosures increased following the polygraph in treatment. More admissions of more than one sex offenses category, offending against both children and adults, males and female victims, strangers and non-strangers, molesting relatives/non-relatives all following the polygraph.</p> <p>The most dramatic increase was the number of admissions of having both child and adult victims</p> <p>Polygraph and treatment were critical factors in increasing the rate of crossover admissions amongst inmates. Impact of the polygraph on admissions was not</p>
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						<p>so strong for parolees.</p> <p>Both groups admitted more sexual offences than was recorded in the presentence investigation report.</p>
<p>Bourke, M. L., Fragomeli, L., Detar, P. J., Sullivan, M. A., Meyle, E., &amp; O'Riordan, M. (2014).</p>	127	None	Community-on bail	USA	Yes	<p>Following the polygraph 57% of total sample admitted contact sexual offence against a minor 52.8% of these admissions were during the polygraph, 20.5% during pre-test interview, and 32.3% during post-test.</p> <p>Pre-test yielded an additional 102 victims by 29 offender and post-test an additional 170 victims disclosed by 54 suspects.</p> <p>10 participants admitted to actively abusing a child post-polygraph</p> <p>34% of those who disclosed contact offences also identified the victim by name</p>
<p>Cook, R., Barkley, W., &amp; Anderson, P. B. (2014)</p>	166	Control-Polygraph or no polygraph	Community	USA	No	<p>Individuals having a polygraph were significantly less likely to violently reoffend than those without a polygraph</p> <p>No significant differences in rates</p>

						of sexual recidivism between those who had a polygraph and those who did not
Stovering, J., Nelson, W. M., & Hart, K. J. (2013)	74	None	Community in residential treatment	USA	No	<p>Juvenile sex offenders further disclosed, on average 2.39 additional victims, after being adjudicated to a residential treatment program. Most additional victim reports occurred between the period of entering treatment program (Time 1 - 87 total victims reported by all) to the polygraph test (Time 2-157 total victims reported by the 74 participants BUT participants were told of upcoming polygraph here), with fewer victims being reported during the polygraph test [Time 3 (at their polygraph examination) - 1 victim reported and Time 4 (post-polygraph) - 19 total victims reported].</p> <p>96% of respondents rated the polygraph helpful</p>
O'Connell, M. A. (1997).	127	None	Community-in treatment	USA	No	A significantly greater number of reported incidents of deviancy (for all categories) were disclosed following the polygraph

						There was an increase in the number of disclosures of cross-over offending across different areas of sexual deviancy (e.g. extra familial/interfamilial)
McGrath, R. J., Cumming, G. F., Hoke, S. E., & Bonn-Miller, M. O. (2007).	76	None	Community	USA	Yes	<p>There were significant increases in disclosure of child victims and assaults following the polygraph examinations</p> <p>There was an increase in disclosures regarding an increase in degree of force, abuse of both genders, and having multiple victim relationships following the polygraph.</p> <p>The mean number of sexual offences increased from 27 noted in the file to 77 offenses following the polygraph</p>
Buschman, J., Bogaerts, S., Foulger, S., Wilcox, D., Sosnowski, D., & Cushman, B. (2009). Sexual	25	None	Community In treatment	Netherlands	Yes	<p>The polygraph revealed:</p> <p>Drop in mean age started to view indecent image of children (IIOC) from 41 to 18</p> <p>After the polygraph all offenders admitted grooming children and contact sexual behaviour</p>

						<p>After the polygraph offenders disclosed an interest in more extreme IIOC</p> <p>There was no change in reported preferred age for child in the IIOC following the polygraph</p> <p>There was an increase in the number of individuals disclosing cross-over between victims; boys and girls, gender combinations in IIOC and IIOC featuring adults</p> <p>The polygraph revealed an increase in disclosures of offender interest pre-pubescent children</p> <p>15 offenders disclosed engaging in high risk behaviours following a polygraph</p>
English, K., Jones, L., Patrick, D., & Pasini-Hill, D. (2003).	180	None	Community	USA	No	<p>Disclosure of assault against male victims (sexual) increased from 20-36% after exposure to combined treatment and polygraph</p> <p>Disclosure or cross over offences increased from 10 to 29% (both genders); from 10 to 33% (adult and children) following the polygraph/treatment</p>

						<p>Increased reporting of incestuous offences from 38 to 58% following the polygraph</p> <p>Increased report of deviant behaviour in all offending categories (particularly bestiality which saw a nine-fold increase from 4.4% known to engage in bestiality to 36.1%) following the polygraph</p>
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