The Utility of Post-Conviction Polygraph Testing Among Sexual Offenders

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Abstract
It is often difficult to ascertain the true extent and nature of sexually deviant behavior, 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 offense recidivism rates and disclosure; self-reported utility was also considered. Nineteen studies were identified from the United States, the United Kingdom, and the Netherlands with no randomized 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 offenses. 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 magnitude of sexual offense convictions among males is estimated to be between 1% and 2% of the general population; however, less than 2% of these arrive at a guilty verdict (Myhill & Allen, 2002). Such offenses 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 United Kingdom, the Home Office stated that approximately 8% of prisoners are incarcerated for a sexual offense, with rape being

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the most common of these offenses (Councell & Olagundoye, 2003). Official figures indicate that since the introduction of new court orders, for example, 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 reoffending are inconsistent and tend to vary between samples and settings, a widely reported overall sexual recidivism base-rate over a lifetime is between 10% and 14% (Schmucker & Lösel, 2015). These figures are likely to be an underestimate of true recidivism rates due to factors such as underreporting and undetected offenses (Meijer, Verschuere, Merckelbach, & Crombez, 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 offenses can reach 65% (Hilton, Harris, Rice, Houghton, & Eke, 2008); however, more recent research indicates that risk can reduce dramatically (e.g., to 4.2%) as the time from release increases (Hanson, Harris, Helmus, & Thornton, 2014).

There are a number of validated assessment tools, which are used to assess and categorize the risks posed by convicted or suspect sexual offenders. Although these tools are useful in providing a standardized 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, Fisher, & Thornton, 2003). For those tools that categorize reoffending rates into discrete and separate categories, predications of more “serious” reoffending have 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 programs, 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, Jones, Pasini-Hill, Patrick, & Cooley-Towell, 2000). In many U.S. states, the polygraph is used to assess recidivism and adherence to community restrictions, with almost 80% of community treatment programs using this method (McGrath, Cumming, Hoke, & Bonn-Miller, 2007). In contrast to the United States, in the United Kingdom the polygraph has not been used as an investigative tool to assist in determining guilt or innocence (Gannon, Wood, Pina, Vasquez, & Fraser, 2012) 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 (PCSOT) 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 PCSOT. The PCSOT measures change within the automatic nervous system in response to offense-relevant questions that may indicate deceptive responding. There are three types of PCSOTs; the specific issue denial (SID) test (Grubin, 2008), the sexual history disclosure examination (SHDE; Wilcox, Sosnowski, Warberg, & Beech, 2005), and the maintenance examination (Wilcox, 2000). The SID focuses specifically on an offender’s behavior 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 to assess the offender’s adherence to treatment and supervision restrictions (e.g., Community Rehabilitation Order/License Conditions) during their time on probation or license. These types of PCSOTs 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 focuses on the pre-conviction period in relation to offending.

In efforts to decrease recidivism and obtain information regarding an individual’s offending behavior, the PCSOT has been used in numerous jurisdictions across the United States, and is usually implemented within a containment approach toward sex offender management. The containment approach offers a popular framework for managing offending, as it utilizes input from both supervisory and treatment services. The approach is used with convicted sex offenders who are placed on probation, or among 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 his or her compliance to treatment and license conditions. Examiners are expected to adhere to guidelines when administering the test (Handler, Honts & Nelson., 2013) to encourage fair testing. Despite its popularity among 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 and 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 behaviors. For this reason, among others, a PCSOT may be useful in evaluating to what extent an offender has been managing their dynamic risk and offending behavior while 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 detailed and complete picture of an individual’s offending, high-risk behaviors, 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:

- An increase in self-reports of previous offenses by offenders
- A superior assessment of therapeutic engagement and progress following a sexual offense 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 participants. False confessions may also be made due to “false positive” outcomes, whereby an innocent individual is found deceptive, and there are suggestible influences from the examiner or exam conditions (Leo & Ofshe, 1998). However, in response to these concerns, polygraph examiners often attempt to control for participants’ anxiety levels by conducting a pre-polygraph interview, which explores offender’s levels of 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 ongoing with regard 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 recognize that the PCSOT increases disclosures, but potentially generates non-credible 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 (Ahlmeyer, Heil, McKee, & English, 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 personalized 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, & 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 among 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, McCuish, Corrado, Behnkken, & DeLisi, 2015). Studies have not yet considered the usability of the polygraph with specific groups 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 regard 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 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 among 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 among 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 offense, 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 regard 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 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 regard to individual characteristics including previous offense history, stage of treatment engagement, age, gender, or ethnicity and country of origin/residence.

**Information Sources**

The following databases were searched: (a) Embase, (b) Pubmed, (c) PsycInfo, (d) Medline, (e) Cochrane library, and (f) 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, U.K. Home Office) 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 (see 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 offenses, plans to commit new offenses, 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**

**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 to 76 years. However, demographic data were not made available for all participants in three of the studies (Bourke et al., 2014; Cook, Barkley, & Anderson, 2014; Kokish, Levenson, & Blasingame, 2005; see Figure 1).
| Study Identification | Study size | Control/comparison Setting | Study setting Country | Voluntary participation | Outcomes |
|----------------------|------------|----------------------------|-----------------------|------------------------|----------|
| Ahlmeyer, Heil, McKee, and English (2000) | 60 | None | Community—on parole and in prison | United States | Inmates voluntary Parolees mandated | There was an increase in offense-related disclosures after the polygraph (particularly if a deceptive outcome/deception indicated (DI), was found) Only 5% of DI inmates admitted nothing; 21% of DI parolees indicated admission |
| Bourke et al. (2014) | 127 | None | Community—on bail | United States | Yes | Following the polygraph, 57% of total sample admitted contact sexual offense against a minor In all, 52.8% of these admissions were during the polygraph, 20.5% during pre-test interview, and 32.3% during post-test Pre-test yielded an additional 102 victims by 29 offender and post-test an additional 170 victims disclosed by 54 suspects Ten participants admitted to actively abusing a child post-polygraph Thirty-four percent of those who disclosed contact offenses also identified the victim by name |
| Buschman et al. (2009) | 25 | None | Community In treatment | Netherlands | Yes | The polygraph revealed Drop in mean age started to view IIOC from 41 to 18 After the polygraph, all offenders admitted grooming children and contact sexual behavior After the polygraph, offenders disclosed an interest in more extreme IIOC There was no change in reported preferred age for child in the IIOC following the polygraph There was an increase in the number of individuals disclosing crossover between victims: boys and girls, gender combinations in IIOC, and IIOC featuring adults The polygraph revealed an increase in disclosures of offender interest pre-pubescent children Fifteen offenders disclosed engaging in high-risk behaviors following a polygraph |
| Cook, Barkley, and Anderson (2014) | 166 | Control—Polygraph or no polygraph | Community | United States | No | Individuals having a polygraph were significantly less likely to violently reoffend than those without a polygraph No significant differences in rates of sexual recidivism between those who had a polygraph and those who did not |
| Study Identification                                                                 | Study size | Control/comparison       | Setting                     | Study setting country | Voluntary participation | Outcomes                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------|------------|--------------------------|-----------------------------|-----------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| English, Jones, Pasini-Hill, Patrick, and Cooley-Towell (2000)                     | 232        | None                     | Community—In therapy        | United States         | Yes                     | Increase in number of disclosures of high-risk behaviors (e.g., deviant fantasies, use of child IIOC) after the polygraph. The number of victims and offenses increased from 3% to 35% (10-fold) |
| English, Jones, Patrick, and Pasini-Hill (2003)                                    | 180        | None                     | Community                   | United States         | No                      | Disclosure of assault against male victims (sexual) increased from 20% to 36% after exposure to combined treatment and polygraph. Disclosure of crossover offenses increased from 10% to 29% (both genders); from 10% to 33% (adult and children) following the polygraph/treatment. Increased reporting of incestuous offenses from 38% to 58% following the polygraph. Increased report of deviant behavior in all offending categories (particularly bestiality that saw a nine-fold increase from 4.4% known to engage in bestiality to 36.1%) following the polygraph. |
| Gannon, Wood, Pina, Tyler, Barnoux, and Vasquez (2014)                              | 303        | Control—polygraph and no polygraph | Community Probation         | United Kingdom        | Yes                     | A higher proportion of polygraphed offenders made at least one disclosure. There were no differences between polygraphed and non-polygraphed offenders regarding the seriousness of disclosures. The total number of disclosures is three times greater for those in the polygraph condition. |
| Grubin (2010)                                                                       | 342        | Control—absence of polygraph | Community Probation         | United Kingdom        | Yes                     | Reported number of disclosures 14 times greater among polygraphed offenders. No differences in risk severity of content in disclosures made between polygraphed and non-polygraphed offenders. |

Table 1. (continued)
| Study Identification | Study size | Control/comparison | Setting | Study setting country | Voluntary participation | Outcomes |
|----------------------|------------|--------------------|---------|-----------------------|------------------------|----------|
| Grubin and Madsen (2006) | 114 | None | Community in treatment | United States | Yes | Overall perceived accuracy of the polygraph was 85% Forty-four percent said the polygraph made them more honest with probation officer and treatment provider Thirty-four percent said the polygraph made them more honest with family and friends Fifty-six percent said the polygraph was moderately helpful in helping them avoid reoffending Sixty-eight percent said the polygraph was moderately helpful in helping them avoid engagement with risky behaviors Forty-four percent said receiving a polygraph in the future would increase the likelihood of disclosing to the police Those who had had polygraph disclosed that they were significantly less likely (at the p = .04 level) to go to places to view children than those who were awaiting their first test |
| Grubin et al. (2014) | 31 | None | Community on bail | United Kingdom | Yes | Thirty-five percent of participants made new disclosures following a DI outcome on the polygraph examination “Low risk” judgments of risk before the polygraph were confirmed in only 26% of participants following the polygraph Offenders risk level was modified upward for 74% of individuals completing the polygraph |
| Grubin et al. (2004) | 34 | Comparison: polygraph aware and unaware | Community treatment | United Kingdom | Yes | No significant differences in the avoidance of high-risk behavior between polygraph-aware and polygraph-unaware participants Poly 1: 97% of entire sample disclosed average of 2.45 high-risk behaviors previously unknown during or following the polygraph Poly 2: All participants expected the second polygraph; 71% disclosed an average of 1.57 high-risk behaviors—suggesting polygraphed offenders engage in less high-risk behaviors following an initial polygraph test Results from an offender feedback questionnaire—57% reported that knowledge of impending polygraph decreased risk behaviors Fifty-two percent reported that poly encouraged them to disclose more to probation officer questionnaire |
### Table 1. (continued)

| Study Identification                  | Study size | Control/comparison | Setting                      | Study setting country | Voluntary participation | Outcomes                                                                                                                                                                                                 |
|--------------------------------------|------------|--------------------|------------------------------|-----------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heil, Ahlmeyer, and Simons (2003)     | 489        | None               | Community—parole and prison  | United States         | Yes                     | **Inmate sample**<br> Increase in number of victims, number of offenses, and offenses category disclosures following the administration of the polygraph in treatment<br> Parolee sample<br> 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, male and female victims, strangers and non-strangers, molesting relatives/non-relatives all following the polygraph<br> The most dramatic increase was the number of admissions of having both child and adult victims<br> Polygraph and treatment were critical factors in increasing the rate of crossover admissions among inmates. Impact of the polygraph on admissions was not so strong for parolees<br> Both groups admitted more sexual offenses than was recorded in the presentence investigation report |
| Kokish, Levenson, and Blasingame (2005) | 95         | None               | Community—outpatient treatment | United States         | Yes                     | Nineteen percent of respondents stated the polygraph resulted in a false positive outcome<br> Six percent stated the polygraph resulted in false negative<br> Seventy-two percent of participants stated the polygraph made them more honest with others and themselves<br> Eleven percent stated the polygraph was harmful to their well-being |
| Study Identification | Study size | Control/comparison | Setting | Study setting country | Voluntary participation | Outcomes |
|----------------------|------------|--------------------|---------|-----------------------|------------------------|----------|
| McGrath, Cumming, Hoke, and Bonn-Miller (2007) | 208 | Comparison—polygraph versus no polygraph Both groups receiving therapeutic input and correctional supervision | Community | United States | No | The number of individuals charged with a new non-sexual violent offense was significantly lower for those who received a poly (2.9% vs. 11.5%) No significant difference between groups regarding the number of individuals charged with sexual offense |
| McGrath et al. (2007) | 76 | None | Community | United States | Yes | There were significant increases in disclosure of child victims and assaults following the polygraph examinations 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 The mean number of sexual offenses increased from 27 noted in the file to 77 offenses following the polygraph |
| O'Connell (1997) | 127 | None | Community—in treatment | United States | 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 crossover offending across different areas of sexual deviancy (e.g., extra familial/interfamilial) |
| Schenk, Cooper-Lehki, Keelan, and Fremouw (2014) | 32 | None | Secure treatment facility | United States | Yes | Significantly more individuals admitted bestiality offenses in the polygraph condition than they did on the self-report measure |

(continued)
| Study Identification                  | Study size | Control/comparison | Setting                     | Study setting country | Voluntary participation | Outcomes                                                                                                                                 |
|--------------------------------------|------------|--------------------|-----------------------------|-----------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Stovering, Nelson and Hart (2013)    | 74         | None               | Community in residential treatment | United States         | No                      | 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]—one victim reported and Time 4 [post-polygraph]—19 total victims reported). Ninety-six percent of respondents rated the polygraph helpful. |
| Van Arsdale, Shaw, Miller, and Parent (2012) | 60         | None               | Community treatment         | United States         | Yes                     | The number of victims disclosed significantly increased post-polygraph and there was an increase in disclosure of male victims. There were significantly more contact offense admissions than exposure or force admissions following the polygraph. Fifteen percent of those polygraphed disclosed own sexual abuse victimization, which may be considered in treatment. |

Note. IIOC = indecent image of children.
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 who included juvenile offenders who had offended against peers or younger children (Bourke et al., 2014; Buschman et al., 2009; Grubin et al., 2014; Schenk, Cooper-Lehki, Keelan, & Fremouw, 2014; Stovering, Nelson, & Hart, 2013; Van Arsdale, Shaw, Miller, & Parent, 2012).

All studies were carried out in the United States aside from five studies that were conducted in the United Kingdom (Gannon et al., 2014; Grubin, 2010; Grubin et al., 2014; Grubin & Madsen, 2006; Grubin et al., 2004) 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 13 studies, it was reported that some/all the participants were also receiving (inpatient and outpatient) psychological therapy (Buschman et al., 2009; Cook et al., 2014; English et al., 2000; English et al., 2003; Grubin & Madsen, 2006; Grubin et al., 2004; Heil et al., 2003; Kokish et al., 2005; McGrath et al., 2007; O’Connell, 1997; Schenk et al., 2014; Stovering et al., 2013; Van Arsdale et al., 2012). 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 (Buschman et al., 2009; Emerick & Dutton, 1993; English et al., 2000; Heil et al., 2003; O’Connell, 1997; Van Arsdale et al., 2012). The maintenance polygraph test was used in three studies (Gannon et al., 2014; Grubin et al., 2004; McGrath et al., 2007) and the specific issue test in two of the included studies (Bourke et al., 2014; Schenk et al., 2014). Combinations of test types were used in four of the reviewed studies (English et al., 2000; English et al., 2003; Grubin, 2010; Stovering et al., 2013).

**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 (Gannon et al., 2014; Grubin, 2010; Heil et al., 2003; McGrath et al., 2007).

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 (Van Arsdale, Shaw, Miller and Parent, 2012; Bourke et al., 2014; Buschman et al., 2009; Emerick & Dutton, 1993; English et al., 2000; English et al., 2003; O’Connell, 1997; Schenk et al., 2014; Stovering et al., 2013). Two studies explored self-reported accuracy and utility from a single intervention design (Grubin & Madsen, 2006; Kokish et al., 2005).

Four studies followed a quasi-experimental design with a polygraph intervention and comparison group (Cook et al., 2014; Gannon et al., 2014; McGrath et al., 2007; Schenk et al., 2014); others included a polygraph-unaware group (Grubin et al., 2004), a between-samples comparison, that is, parolee versus prisoner (Heil et al., 2003) or a within-participants 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 (Cook et al., 2014; English et al., 2003; McGrath et al., 2007; O’Connell, 1997; Schenk et al., 2014; Stovering et al., 2013). 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 12 of the studies. Offense-related disclosures may include engaging in risky behaviors (Cann, 2007) or experiencing deviant offense-related thoughts/fantasies (Wilcox & Buschman, 2011). 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 of 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 (Cook et al., 2014; McGrath et al., 2007). For both studies, reported recidivism was based on new convictions for criminal offenses occurring following the polygraph. Both studies measured convicted re-offenses over a 5-year period.

Two studies in the review explored the self-reported accuracy and utility of the polygraph with offenders (Grubin & Madsen, 2006; Kokish et al., 2005). 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) utilized 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 behaviors (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 behaviors would be reviewed, but with no mention of the polygraph. Both groups were matched with regard 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; Bourke et al., 2014; Emerick & Dutton, 1993; Heil et al., 2003; Van Arsdale et al., 2012).

Five studies reported an increase in disclosures regarding the number of offenses (some reporting previously unknown contact offenses) for polygraphed participants (Ahlmeyer et al., 2000; Bourke et al., 2014; Cook et al., 2014; Heil et al., 2003;
O’Connell, 1997) and six studies reported an increase in the disclosure of rule-violating behaviors (e.g., license violations) or engagement in risky behaviors indicative of a cause for concern with regard to the person’s sexual risk (Ahlmeyer et al., 2000; Buschman et al., 2009; English et al., 2003; Gannon et al., 2014; Grubin et al., 2004; Grubin & Madsen, 2006). Risk behaviors 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 crossover offenses (Bourke et al., 2014; Emerick & Dutton, 1993; English et al., 2003; Heil et al., 2003; O’Connell, 1997; Schenk et al., 2014; Van Arsdale et al., 2012). Crossover included a higher proportion of offenses against victims of multiple ages, across genders, offender–victim relationships and a wider variety of offenses. Seven studies found an increase in disclosure signaled a change in offenders’ level/category/seriousness of risk (e.g., preference for a more explicit category of preferred indecent/serious image) as result of a polygraph (Buschman et al., 2009; Cook et al., 2014; Emerick & Dutton, 1993; Grubin, 2010; Grubin et al., 2014; Grubin et al., 2004; Van Arsdale et al., 2012).

In a study comparing the impact of the polygraph on inmate and parole samples, offense-related disclosure was only significantly increased among inmates (Heil et al., 2003).

Recidivism

Two studies included in the review explored the influence of the polygraph on rates of recidivism (Cook et al., 2014; McGrath et al., 2007). 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 offenses. 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 offense 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 and 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. Among participants expecting to be subject to the polygraph, 44% reported an increase in the likelihood of their disclosing offense-relevant information to supervisory and treatment agents. With regard 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 behaviors. The use of the polygraph as a deterrent to future reoffending or engagement in risk behavior has also been commented upon by Buttars, Huss, and Brack (2016), who found that periodic polygraph testing was a moderate to strong deterrent to future offending.

Results from Kokish et al. also suggest a propensity for high levels of self-reported disclosure among 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 and 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” behaviors in the 3 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 behaviors.

Bourke et al. (2014) found offenders were more likely to make offense-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 with an additional 170 victims disclosed by 54 individuals during the post-test interview. Ahlmeyer et al. (2000) also found offense-related disclosures during polygraph, or shortly after during the post-test interview if a deception-indicated result was found. In contrast, Grubin et al. (2004) found that participants were most likely to report high-risk behaviors 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 behaviors 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 with 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 offense-related disclosures among 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 offenses and victims, risk behaviors, and violations of license and treatment conditions. All 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 information to allocate resources, evaluate risk, or devise individualized 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. In addition, it is not always possible to ascertain what in these studies is conceived as a “sex offense,” and therefore, it might be that offenders are simply disclosing more of events that they would not have previously considered to be offenses (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 (Grubin & Madsen, 2006; Kokish, Levenson, & Blasingame, 2005). 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, Kemshall, Westwood, Fenton, & Logue, 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 offenses, which may preclude statistically significant outcomes (Falshaw, Friendship, Travers, & Nugent, 2004). This means that although the polygraph increased information about offenders’ risk behaviors, this was not associated with sexual reoffending rates. This confirms previous research demonstrating that (threat of) sanctions have little impact on sexual recidivism (Bonta & Andrews, 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 to 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 regard 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, Dougherty, & Cross, 1985). The type of polygraph test employed was not specified in four of the included studies (Ahlmeyer et al., 2000; Grubin & Madsen, 2006; Grubin et al., 2014; Kokish et al., 2005).

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, Heil, McKee and English, 2000) and polygraphed offenders may have undergone 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 relies to some extent on case file 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 affected 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, Raskin, & Klircher, 1979). However, Ben-Shakhar and 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 generalizability 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. 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 offense 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% to 40% (Hanson et al., 2003).

A major confounding variable among 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 (Ahlmeyer 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 generalized to all sexual offenders.

**Sample Characteristics**

Participants included in the reviewed studies represent a homogeneous group of individuals and, therefore, it is difficult to generalize these findings to other groups. Participants were predominantly White, middle-aged males from the United States or
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the United Kingdom (with one study from the Netherlands) and demographic data were 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 affected participant responses, particularly where self-report was obtained during face-to-face interviews or while 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 dropout rates among 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 from 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 regard 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 among 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 offense-related admissions, which could assist in our understanding of a person’s risk and future management. 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 a study should take into account the methodological shortcomings identified in the current literature and employ more rigorous methods 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 that 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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**References**

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

*Ahlmeyer, S., Heil, P., McKee, B., & English, K. (2000). The impact of polygraphy on admissions of victims and offenses in adult sexual offenders. *Sexual Abuse: A Journal of Research and Treatment, 12*, 123-138.

Barbaree, H. E., Langton, C., & Peacock, E. J. (2006). Different actuarial risk measures produce different risk rankings for sexual offenders. *Sexual Abuse: A Journal of Research and Treatment, 18*, 423-440.

Beech, A. R., Fisher, D. D., & Thornton, D. (2003). Risk assessment of sex offenders. *Professional Psychology: Research and Practice, 34*, 339-352. doi:10.1037/0735-7028.34.4.339

Ben-Shakhar, G., & Dolev, K. (1996). Psychophysiological detection through the guilty knowledge technique: Effect of mental countermeasures. *Journal of Applied Psychology, 81*, 273-281.

Blasingame, G. D. (1998). Suggested clinical uses of polygraphy in community-based sexual offender treatment programs. *Sexual Abuse: A Journal of Research and Treatment, 10*, 37-45.

Bonta, J., & Andrews, D. A. (2007). Risk-need-responsivity model for offender assessment and rehabilitation. *Rehabilitation, 6*, 1-22.

*Bourke, M. L., Fragomeli, L., Detar, P. J., Sullivan, M. A., Meyle, E., & O’Riordan, M. (2014). The use of tactical polygraph with sex offenders. *Journal of Sexual Aggression, 21*, 1-14.

*Buschman, J., Bogaerts, S., Foulger, S., Wilcox, D., Sosnowski, D., & Cushman, B. (2009). Sexual history disclosure polygraph examinations with cybercrime offences: A first Dutch explorative study. *International Journal of Offender Therapy and Comparative Criminology, 48*, 572-586. doi:10.1177/0306624X09334942

Buttars, A., Huss, M. T., & Brack, C. (2016). An analysis of an intensive supervision program for sex offenders using propensity scores. *Journal of Offender Rehabilitation, 55*, 51-68. doi:10.1080/10509674.2015.1107003

Cann, J. (2007). *Assessing the extent of discretionary disclosure under the Multi-Agency Public Protection Arrangements (MAPPA)*. London, UK: Home Office.
Committee to Review the Scientific Evidence on the Polygraph, Board on Behavioral, Cognitive, and Sensory Sciences and Committee on National Statistics Division of Behavioral and Social Sciences. (2003). *The polygraph and lie detection*. Washington, DC: National Research Council, Haworth Press.

*Cook, R., Barkley, W., & Anderson, P. B. (2014). The sexual history polygraph examination and its influences on recidivism. *The Journal of Social Change, 5*, 1-10.*

*Councell, R., & Olagundoye, J. (2003). *The prison population in 2001: A statistical review*. London, UK: Home Office, Research, Development and Statistics Directorate.*

Cross, T. P., & Saxe, L. (2001). Polygraph testing and sexual abuse: The lure of the magic lasso. *Child Maltreatment, 6*, 195-206.

*Emerick, R. L., & Dutton, W. A. (1993). The effect of polygraphy on the self-report of adolescent sex offenders: Implications for risk assessment. *Annals of Sex Research, 6*, 83-103.*

*English, K., Jones, L., Pasini-Hill, D., Patrick, D., & Cooley-Towell, S. (2000). The value of polygraph testing in sex offender management*. Denver, USA: Colorado Department of Public Safety.

English, K., Jones, L., Patrick, D., & Pasini-Hill, D. (2003). Sexual offender containment. *Annals of the New York Academy of Sciences, 989*, 411-427. doi:10.1111/j.1749-6632.2003.tb07322.x

Falshaw, L., Friendship, C., Travers, R., & Nugent, F. (2004). Searching for “What Works”: HM Prison Service accredited cognitive skills programmes. *The British Journal of Forensic Practice, 6*, 3-13. doi:10.1177/0093854807312234

Fazel, S., & Seewald, K. (2012). Severe mental illness in 33 588 prisoners worldwide: Systematic review and meta-regression analysis. *The British Journal of Psychiatry, 200*, 364-373. doi:10.1192/bjp.bp.111.096370

Gannon, T. A., Beech, A. R., & Ward, T. (2008). Does the polygraph lead to better risk prediction for sexual offenders? *Aggression and Violent Behavior, 13*, 29-44

*Gannon, T., Wood, J., Pina, A., Tyler, N., Barnoux, M. F., & Vasquez, E. A. (2014). An evaluation of mandatory polygraph testing for sexual offenders in the United Kingdom. *Sexual Abuse: Journal of Research and Treatment, 26*, 178-203. doi:10.1016/j.avb.2014.12.003

Gannon, T. A., Wood, J. L., Pina, A., Vasquez, E. A., & Fraser, I. (2012). The evaluation of the mandatory polygraph pilot. Ministry of Justice Research Series. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/217436/evaluation-of-mandatory-polygraph-pilot.pdf

Grubin, D. (2008). The case for polygraph testing of sex offenders. *Legal and Criminological Psychology, 13*(2), 177-189.

*Grubin, D. (2010). A trial of voluntary polygraphy testing in 10 English probation areas. *Sexual Abuse: Journal of Research and Treatment, 22*, 266-278. doi:10.1177/1079063210369012

*Grubin, D., Joyce, A., Holden, E. J., Janssen, D. F., Pfäfflin, F., & Rehder, U. H. (2014). Polygraph testing of “low risk” offenders arrested for downloading indecent images of children. *Sexual Offender Treatment, 9*, 2-12.

*Grubin, D., & Madsen, L. (2006). Accuracy and utility of post-conviction polygraph testing of sex offenders. *The British Journal of Psychiatry, 188*, 479-483. doi:10.1192/bjp.bp.105.008953

*Grubin, D., Madsen, L., Parsons, S., Sosnowski, D., & Warberg, B. (2004). A prospective study of the impact of polygraphy on high-risk behaviours in adult sex offenders. *Sexual Abuse: A Journal of Research and Treatment, 16*, 209-222. doi:1079-0632/04/0700-0209/0

Handler, M., Honts C., & Nelson, R. (2013). Information gain of the directed lie screening test. *Polygraph, 42*, 192-202.
Hanson, R. K., Harris, A. J., Helmus, L., & Thornton, D. (2014). High-risk sex offenders may not be high risk forever. *Journal of Interpersonal Violence, 29*, 2792-2813. doi:10.1177/0886260514526062

Hanson, R. K., Morton, K. E., & Harris, A. J. R. (2003). Sexual offender recidivism risk: What we know and what we need to know. In R. Prentky, E. Janus & M. Seto (Eds.), *Understanding and managing sexually coercive behavior Annals of the New York Academy of Sciences* (Vol. 989, pp. 154-166). New York, NY: Academy of Sciences.

Hanson, R. K., & Morton-Bourgon, K. E. (2005). The characteristics of persistent sexual offenders: A meta-analysis of recidivism studies. *Journal of Consulting and Clinical Psychology, 73*, 1154-1163. doi:10.1037/0022-006X.73.6.1154

Hanson, R. K., & Wallace-Capretta, S. (2000). *Predicting recidivism among male batterers*. Ottawa, Ontario, Canada: Department of the Solicitor General.

*Heil, P., Ahlmeyer, S., & Simons, D. (2003). Crossover sexual offenses. *Sexual Abuse: A Journal of Research and Treatment, 15*, 221-236. doi:10.1177/107906320301500401

Hilton, N. Z., Harris, G. T., Rice, M. E., Houghton, R. E., & Eke, A. W. (2008). An in-depth actuarial assessment for wife assault recidivism: The Domestic Violence Risk Appraisal Guide. *Law and Human Behavior, 32*, 150-163. doi:10.1007/s10979-007-9088-6

Honts, C. R. (2004). The physiological detection of deception. In P. A. Granhag & L. A. Stromwall (Eds.), *Deception detection in forensic contexts* (pp. 103-123). Cambridge: Cambridge Press.

Honts, C. R., & Reavy, R. (2015). The comparison question polygraph test: A contrast of methods and scoring. *Physiology & Behavior, 143*, 15-26. doi:10.1016/j.physbeh.2015.02.028

Iacono, W. G. (2008). Effective policing: Understanding how polygraph tests work and are used. *Criminal Justice and Behavior, 35*, 1295-1308. doi:10.1177/0093854808321529

Kemshall, H. (2003). *Understanding risk in criminal justice*. Maidenhead, UK: Open University Press.

*Kokish, R., Levenson, J. S., & Blasingame, G. D. (2005). Post-conviction sex offender polygraph examination: Client-reported perceptions of utility and accuracy. *Sexual Abuse: A Journal of Research and Treatment, 17*, 211-221. doi:10.1192/bjp.bp.105.008953

Leo, R. A., & Ofshe, R. J. (1998). The consequences of false confessions: Deprivations of liberty and miscarriages of justice in the age of psychological interrogation. *Journal of Criminal Law and Criminology, 88*, 429-496

Lord, A., & Willmot, P. (2004). The process of overcoming denial in sexual offenders. *Journal of Sexual Aggression, 10*, 51-61. doi:10.1080/1355260041000167937

Loucks, N. (2002). *Recidivism amongst serious violent and sexual offenders*. Edinburgh: Scottish Executive Social Research.

*McGrath, R. J., Cumming, G. F., Hoke, S. E., & Bonn-Miller, M. O. (2007). Outcomes in a community sex offender treatment program: A comparison between polygraphed and matched non-polygraphed offenders. *Sexual Abuse: A Journal of Research and Treatment, 19*, 381-393. doi:10.1007/s11194-007-9058-z

Meijer, E. H., Verschuere, B., Merckelbach, H. L., & Crombez, G. (2008). Sex offender management using the polygraph: A critical review. *International Journal of Law and Psychiatry, 31*, 423-429. doi:10.1016/j.ijlp.2008.08.007

Myhill, A., & Allen, J. (2002). *Rape and sexual assault of women: Findings from the British Crime Survey*. London, UK: Home Office, Research, Development and Statistics Directorate. National Academy of Sciences. (2003). *The polygraph and lie detection*. Washington, DC: National Academies Press.
*O’Connell, M. A. (1997). *Using polygraph testing to assess deviant sexual history of sex offenders* (Doctoral dissertation). The University of Washington.

Rovner, L. I., Raskin, D. C., & KIrcher, J. C. (1979). Effects of information and practice on detection of deception. *Psychophysiology, 16*, 983-997.

Saxe, L., Dougherty, D., & Cross, T. (1985). The validity of polygraph testing: Scientific analysis and public controversy. *American Psychologist, 40*, 355-366.

*Schenk, A. M., Cooper-Lehki, C., Keelan, C. M., & Fremouw, W. J. (2014). Underreporting of bestiality among juvenile sex offenders: Polygraph versus self-report. Journal of Forensic Sciences, 59, 540-542.

Schmucker, M., & Lösel, F. (2015). The effects of sexual offender treatment on recidivism: An international meta-analysis of sound quality evaluations. *Journal of Experimental Criminology, 11*, 597-630. doi:10.1007/s11292-015-9241-z

Shaffer, C., McCuish, E., Corrado, R. R., Behnken, M. P., & DeLisi, M. (2015). Psychopathy and violent misconduct in a sample of violent young offenders. *Journal of Criminal Justice, 43*, 321-326. doi:10.1016/j.jcrimjus.2015.05.008

Sosnowski, D., & Wilcox, D. T. (2001). *Future European applications of the polygraph to sex offender assessment and treatment: A review of current UK research.* Paper presented at the Veldzicht Forensic Psychiatric Centre conference, Balkbrug, Netherlands.

*Stovering, J., Nelson, W. M., & Hart, K. J. (2013). Timeline of victim disclosures by juvenile sex offenders. The Journal of Forensic Psychiatry & Psychology, 24, 728-739.

*Van Arsdale, A., Shaw, T., Miller, P., & Parent, M. C. (2012). Polygraph testing for juveniles in treatment for sexual behavior problems: An exploratory study. OJJDP: Journal of Juvenile Justice, 1. Retrieved from http://www.journalofjuvjustice.org/JOJJ0102/article05.htm

Verschuere, B., Ben-Shakhar, G., & Meijer, E. (Eds.). (2011). *Memory detection: Theory and application of the Concealed Information Test.* Cambridge University Press.

Wilcox, D. T. (2000). Application of the clinical polygraph examination to the assessment, treatment and monitoring of sex offenders. *Journal of Sexual Aggression, 5*, 134-152. doi:10.1080/13552600008413304

Wilcox, D. T., & Buschman, J. (2011). Case studies in the utility of the polygraph. *Sexual Offender Treatment, 6*, 97-112.

Wilcox, D. T., Sosnowski, D., Warberg, B., & Beech, A. R. (2005). Sexual history disclosure using the polygraph in a sample of British sex offenders in treatment. *Polygraph, 34*, 171-183.

Wood, J., Kemshall, H., Westwood, S., Fenton, A., & Logue, C. (2010). Investigating disclosures made by sexual offenders: Preliminary study for the evaluation of mandatory polygraph testing. *Research Summary, 6*, 1-5.

Zuckerman, M., & Driver, R. E. (1985). Telling lies: Verbal and nonverbal correlates of deception. *Multichannel Integrations of Nonverbal Behavior, 9*, 129-147.