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Credibility assessment: Preliminary Process Theory, the polygraph process, and construct validity

John J. Palmatier [a,b,*], Louis Rovner [c]

[a] Nova Southeastern University, United States
[b] Slattery Associates Inc., 8600 NW. 53 Terrace, Suite 121, Miami, FL 33166, United States
[c] Rovner & Associates, 815 Moraga Drive, Los Angeles, CA 90049, United States

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ABSTRACT

The term "polygraph test," particularly in a forensic context, is used generally to describe diagnostic procedures using a polygraph instrument to assess credibility. Polygraph testing has been subject to greater scrutiny, debate, and empirical study than many other forensic techniques. It has been repeatedly demonstrated that, when used properly, the polygraph testing process functions with a high degree of predictive (criterion) validity. However, advocates have failed to address, in a substantive manner, the primary objection often cited by opponents that the polygraph procedure most used in applied day-to-day contexts, that is, Comparison Question Testing (CQT), is atheoretical and lacking construct validity. A review of the available research literature, including that from the neurosciences, psychophysiology, and other relevant disciplines, coupled with an intimate understanding of two commonly used polygraph procedures, the context in which they are used, and the scientific method, strongly suggests that such claims are no longer true, nor warranted. Here, we discuss the interplay of the two most advocated polygraph procedures, the CQT and CIT (Concealed Information Testing), with Preliminary Process Theory (PPT), contemporary writings on memory and other contributions from the research literature relevant to the instrumental assessment of credibility. We conclude that the available scientific evidence not only establishes a plausible theoretical construct that strengthens the practical application of the polygraph process in forensic and other settings, but also concurrently provides directions for future research by scientists interested in the applied assessment of credibility.

1. Introduction

Barry's (1996, 2006, 2009) Preliminary Process Theory (PPT) is the product of a continuing accumulation of knowledge derived from some 40 years of research focusing on the orienting response (OR), which we believe explains the differential physiological responding witnessed during the instrumental assessment of credibility, regardless of the protocol used (i.e., CIT/CQT). The PPT does so by offering what we believe is not only a plausible, but also substantive explanation regarding the attendant cognitive processing of stimuli and its relative significance, which yields the resultant variance observed in the physiological responses recorded during a polygraph examination. Here we offer a response to the often cited objections of polygraph opponents regarding the lack of theory (i.e., construct validity). In so doing, we bring together the relevant scientific literature establishing what we believe is not only a plausible theoretical construct strengthening the practical application of the polygraph process in forensic and other settings, but in so doing we also hope to spark interest in research and meaningful discussions regarding the assessment of credibility in applied contexts.

2. Background

In 1923, the Systolic Blood Pressure Deception Test (SBPDT), one of the antiquated forerunners to the modern polygraph test, was the first forensic technique subjected to review by the United States Supreme Court (National Research Council [NRC], 2003). The Court ruled that the SBPDT was not accepted by the scientific community as a valid forensic technique. One consequence of the Court's ruling is that today many jurists, laypeople and scientists alike (e.g., Ben-Shakhar, 2002; Happel, 2005; Iacono, 2008; NRC, 2003) simply reject the validity of what is the most-often used polygraph procedure (Honts, 2004), the Comparison Question Test (CQT) (Honts, 1996; Reid, 1947), due to the absence of a scientifically viable theoretical foundation.

Ben-Shakhar (2002) noted that the lack of an underlying theoretical rationale for the CQT has been the focus of debate for more than four decades. Unfortunately, a great deal of that discussion has focused on conceptual issues rather than the results of similarly conducted empirical studies. However, the purpose of this paper is not to discuss or debate at great length the many arguments made by opponents, or those

* Corresponding author at: Slattery Associates Inc., 8600 NW. 53 Terrace, Suite 121, Miami, FL 33166, United States. Tel.: +1 305 592 7917.
E-mail address: palmatierjohn@yahoo.com (J.J. Palmatier).

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who simply expound on others' opinions while adding their own objections (cf., Rakoff, 2009). While debate is an integral part of the scientific method, it is also implicit that experiments must be conducted and replicated so that contradictory findings may be resolved, and questions not yet answered be addressed. Although opponents (e.g., Iacono, 2008) continue to criticize the CQT for several different reasons, for instance, Meijer and Verschuere (2010) believe that the most controversial proposition is that truthful individuals "will be most concerned about the control questions" (p. 327), a close examination of the literature finds, that absent a few exceptions (e.g., Honts and Alloway, 2007; Honts and Schweinle, 2009; Horvath and Palmatier, 2008; Offe and Offe, 2007; Raskin et al., 2014) there is little apparent interest in CQT research. In place of scientific inquiry, there is instead what is best described as an abundance of ideological discussion offering imaginative hypotheticals and hyperbole in the absence of empirical evidence (cf., Iacono, 2001, 2008; Furedy, 1996). Here, our goal is to merge extensive personal (i.e., real-world) experience with relevant findings from the scientific literature and empirical studies, to examine objectively the two polygraph procedures most commonly used for the assessment of credibility. In providing such a conceptual framework, we contend that an inclusive theoretical foundation exists for the assessment of credibility using either the CQT (Reid and Inbau, 1977; Honts, 1996; Raskin et al., 2014), or the Concealed Information Test (CIT) (Verschuere et al., 2011), originally referred to as the Guilty Knowledge Test (GKT) (Lykken, 1959, 1960).

In 2003, an NRC report focusing on the polygraph concluded, in part, that "The theoretical rationale for the polygraph [the CQT] is quite weak, especially in terms of differential fear, arousal, or other emotional states that are triggered in response to relevant or comparison questions" (p. 213). We concur with the NRC's conclusions that at that time the CQT's theoretical grounding was at best "weak", while concurrently the theoretical grounding of the CIT was comparatively far more defensible.

Nevertheless, the relevant literature shows that studies using either a CQT or CIT protocol generally yield accuracy rates (i.e., the accurate classification of individuals as truthful or lying relative to ground truth) well exceeding chance (cf., Ben-Shakhar and Elaad, 2003, Elaad, 2009, 2011; Horvath and Palmatier, 2008; Offe and Offe, 2007) and in a limited review of the literature (Crewson, 2001), found to yield diagnostic and screening accuracy comparable to some medical and psychological protocols. Logically, a potential solution to the cited theoretical disparity would seem to be for both CQT and CIT advocates to join forces in an effort to explore, and possibly explain the differences, advantages, and disadvantages engendered in each protocol — especially considering that there is a broad range of real-world contexts and issues that may be more amenable to resolution using one protocol versus the other. For example, in the vast majority of day-to-day assessments (i.e., polygraph examinations) that are conducted, the issues that are examined arise from situations that are far beyond an examiner's control or input. More importantly, these scenarios too frequently present exigent circumstances, which preclude the use of a CIT protocol, generally due to an insufficient number, or the complete absence, of testable "items" (Krapohl, 2011; also see Podlesney, 2003). Collaboration between CQT and CIT advocates, however, has generally been nonexistent and we believe may be due more to the strong philosophical differences (cf., Ben-Shakhar, 2002; Iacono and Lykken, 2002; Raskin et al., 1999) embraced by a few individuals rather than any discrepant findings that are occasionally found in empirical studies.

History shows that CQT and CIT advocates have generally tried to promote their preferred methodology to the detriment of the other, and in so doing tried to explain why these two diagnostic methods are substantively different. For instance, Meijer and Verschuere (2010) appear to suggest that somehow, due to the type of stimuli used (i.e., the questions asked), and the sequence in which these questions are presented, lying in a CQT (i.e., not answering a question truthfully) is somehow different compared to not answering a question truthfully (i.e., lying) in a CIT. We concede that in a CQT protocol additional types of questions are asked that will be different from the questions asked in a CIT. In fact, in a CQT, a person being examined will be led to answer comparison questions (Horowitz et al., 1997; Raskin et al., 2014) with a deceptive, or minimally with a doubtful response using social expectancy (cf., Aarts and Dijksterhuis, 2003; Jacobson et al., 2011). Moreover, in some instances, the person being examined will actually be instructed to answer with a factual lie (Bell et al., 2008; Raskin and Honts, 2002). However, whether it is a comparison question, or a question addressing the issue at examination (i.e., a relevant question in a CQT, or critical item in a CIT), when an individual's verbal response to a question is factually different from what he knows or believes to be true, he is lying (i.e., being deceptive, Palmatier, 2010).

With more than sixty years of combined experience using both diagnostic methods (CQT and/or CIT), in laboratory-based, crime analogue settings (Horvath and Palmatier, 2008; Rovner, 1986; Rovner et al., 1978), as well as day-to-day in applied environments (e.g., Cauffiel, 1992), the authors have witnessed consistent differential physiological responding by those being examined depending of course on the questions asked and an individual's status (i.e., truthful or lying). In laboratory-based studies, status is generally directed through some form of random assignment. Outside the laboratory, however, status is often unknown irrespective of the type of protocol used, whether a CIT or a CQT. If a person's status ever is discovered, it is usually verified by a confession of the person who was examined, the confession of someone else linked to the issue assessed (e.g., Elaad, 1990; Elaad et al., 1992; Honts, 1996, 1998), or less frequently, the development of other independent verifiable evidence.

Although many of our observations are admittedly anecdotal in nature, we as scientist/practitioners have recognized that given the consistency of literally thousands of observations, coupled with our continued review of the contemporary research literature, we must strongly challenge what appears to be a prevailing view held by a few academics (e.g., Ben-Shakhar, 2002; Iacono, 2008; Meijer and Verschuere, 2010). From their writings, these individuals appear to strongly suggest, that when questions are asked in a CQT compared to answering questions in a CIT, the human mind somehow functions differently, or in a manner that according to Ben Shakhar (2002) "…has no grounding in psychological or psychophysiological research" (p. 107, last para.). We contend that this type of rhetoric may best be categorized as nothing more than ideological posturing as we have failed to find empirical research that would validate this or any similar conclusion.

For more than a decade, beginning with the seminal work of Spence et al. (2001), the literature relevant to a more cogent theoretical understanding of the brain and deception (e.g., Abe, 2009, 2011; Bell and Grubin, 2010) has continued to accumulate. With the advent of different noninvasive imaging techniques, such as fMRI (e.g., Cabeza and Kingstone, 2006) beginning in the 1980 to 1990 decades, information pertaining to, and gleaned from the neurosciences has grown exponentially (e.g., Gazzaniga, 2009; Gazzaniga et al., 2009). Contemporary research has begun to show the interdependence of various brain regions across the cortical anatomy (Koziol and Budding, 2009; von der Malsburg et al., 2009), the complexity of the human neural network (Sporns, 2011), and "… the inextricable linkage of mechanisms (if not mechanisms themselves) some serving cognitive, emotional, and motor components of behavior" (Heimer et al., 2008, p. xii).

Converging evidence from studies of the prefrontal cortex using external stimulation (cf., Karim et al., 2010; Karton and Bachmann, 2011; see also, Mameli, 2010; Priori et al., 2008), as well as brain neuroimaging studies, show that the default state of the human brain is truth, while deception (i.e. lying) is believed to be a cognitive inhibition of the truth (cf., Langleben et al., 2005; also see Johnson, 2014). This inhibitory inference is evidenced by increased activity in the prefrontal regions of the brain, such as the anterior cingulate cortex, and other cortical structures (e.g., Abe et al., 2007; Fullam et al., 2009). Verschuere et al. (2011b) more succinctly state that: