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A Review of The Polygraph: History, Current Status and Emerging Research

Deception is a tool we possess to help us to achieve a certain goal, such as, convincing someone of something that is not true, to avoid blame. Due to the impact that deception has in our day to day lives research into detection continues unabated, and the ability to detect deception remains one of the great challenges in modern psychology.

Studies have shown, when individuals actively attempt to detect deception, accuracy levels are barely above chance, ranging from 45% to 60%. Studies have shown that regardless of investigative experience, the accuracy of investigators do not differ significantly to that of a layperson. Considering how vital, but difficult, the detection of deception is for law-enforcement, there has been ample efforts to develop tools to aid investigators in this task. One tool that claims to assist in this regard is the Polygraph.

The first polygraph was created in 1921, by John A. Larson who devised an apparatus to simultaneously measure continuous changes in blood pressure, heart rate and respiration rate. The 1938 Leonarde Keeler included a measure of Galvanic Skin Response (GSR) which is the recording of electrodermal activity in the base of the finger, essentially this measures the generation of minute perspiration partials. The physiological channels that the polygraph measures today, now fully computerised with specialist software programs, have remained largely unchanged. They are cardiovascular activity, respiratory activity and GSR.

The polygraph was initially heralded by its supporters as a triumph of science and something that was capable of transforming criminal investigations, however, it has struggled to live up to these expectations. In 2003, the most extensive review of the scientific evidence on the polygraph to date was published by the US National Research Council. The review criticised the poor quality and heavily biased nature of most polygraph research. It summarised that Polygraph research has proceeded in relative isolation from related fields of basic science,

and has not made use of many conceptual, theoretical, and technological advances in basic science that are relevant to the physiological detection of deception.

Despite these criticisms, the polygraph is still in use today for different purposes, such as pre-employment screening in law enforcement and pre-employment or pre-clearance screening in agencies involved in national security. It is also used in clinical or forensic settings, focused on the treatment and supervision of sex offenders, for instance, where it has had some practical success, specifically here in the UK.

The polygraph is used in investigative contexts in a number of countries around the world, such as Israel, Japan, Turkey, Singapore, South Korea, Mexico, Pakistan, the Philippines, Taiwan, and Thailand, to name but a few. However, its use within an investigative context within the UK has not been developed or supported to the same extent.

While there is limited use within an investigative context at home, there is a large industry that exists within private practice in the UK, where the commercial success of the polygraph has been substantial. This is a big issue, as the commercial side of the industry operates off the promotion of the polygraph as being 99% accurate in its ability to detect deception, which is just not true and in which there is no solid empirical evidence to support this claim. The impact these practitioners can have on families, where for instance cases of infidelity are concerned, is something that is very difficult to audit. The promotion of the polygraph through popular television shows creates an acceptance of their validity for an audience who most likely won't have access to research to understand how in fact it really works, in a practical sense.

The important point to note with the polygraph, is that it must not be considered as a lie detector, but as a measure of physiology responses. In this sense the polygraph works 100% of the time, assuming that there is no issue with the equipment being used, as all it does it record

and measure physiological changes in the body. What these changes represent and how we go about eliciting them is where the debate arises.

The central issue lies in the way in which questions are asked of the examinee. For the purpose of this article we will focus on the two dominant polygraph tests, the Comparison Question Test (CQT) and the Concealed Information Test (CIT). Both tests use the same polygraph equipment, and share one fundamental premise, which is that certain psychological processes (deception) result in physiological cues (increased physiological activity), that can be measured and interpreted through the use of the polygraph, for the purpose of aiding in the detection of deception.

The CQT basically compares potential deceptive responses to known deceptive responses to determine guilt. For instance, 'did you kill this man with this weapon' being compared to the responses to 'did you ever take anything that wasn't yours'. The CQT has received much less academic support in the research literature, than the CIT. The CIT looks for increased physiological responses to information that you should not possess, for instance, the type of murder weapon used in a homicide offence. If, for instance, this information has been kept secure, one obvious criticism of the use of the CIT, then there is no reason why a suspect should be responding with heightened levels of activity to information that they should not have knowledge of. The CIT can be used, for example, as a recognition of suspects, for revealing concealed knowledge about the location of the crime, the type of the crime, the time the crime occurred and in general any type of information regarding the crime that is not known to the public.

The CIT works in the following way, for example, in a situation where a victim has been stabbed to death with a knife, the examiner would ask the suspect, who should have no knowledge of this information, how was Mr. X killed with a) bare hands, b) a gun, c) strangled,

d) a knife, e) a bat. When the irrelevant stimuli is presented, it is expected that the suspect will not show increased physiological responses; but when he is presented with the relevant item, in this case the knife, then if the suspect has some involvement in this offence his responses should show increased arousal for this item. This process is repeated a number of times with the position of the knife question, for instance, being altered to increase levels of probability.

At The University of Huddersfield, where the current authors are based, there is an emerging agenda of research which aims to investigate the potential role of the polygraph in a forensic context and to build on the previous research in this area. The results of the early studies showed that the CIT test was able to detect the presence of concealed information in a standard verbal CIT polygraph test, with an accuracy of 75%. This study was then built on through the use of visual stimuli, items being presented on a large screen in parallel to the questions being asked. The results of this study showed a larger increase in the detection of detection then using verbal stimuli alone.

The next stage of the research at Huddersfield is to explore the role of the polygraph in a group setting. This has been done by assigning participants to a group that has been asked to plan a terroristic attack. With each individual being given a role in the attack, such as sourcing vehicles, weapons or the location of the attack. The aim is to see if a person's role can be identified from their responses in a polygraph examination. The results from the initial group studies, albeit with a small sample, have shown early promise in that participant roles have been distinguished from the various group members. The impact of these types of studies on investigating potential terrorist suspects is one obvious practical benefit moving forward.

In its current state, the polygraph can serve as a viable investigative tool, and its value is likely to increase, as research continues to improve and address its shortcomings. The CIT holds the greatest potential in this regard. While it may not be possible to improve the

polygraph to the level where it can truly be thought of as 'The Lie Detector', it does appear to hold the potential of becoming an effective tool within an investigative setting through, for instance, identifying persons of interest.