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The Integrated Zone Comparison Technique and ASIT PolySuite Algorithm: A Field Validity Study

Abstract

This field study tested the validity of the Integrated Zone Comparison Technique[1] (IZCT) designed for specific issue testing and the ASIT PolySuite Algorithm for data analysis in a private commercial environment between April and December, 2009, at the G4S polygraph unit in Costa Rica. During this time period 27 cases were chosen to be tested with the IZCT. Out of these 27 cases, 21 were solved by confession. The 27 cases had a total of 113 suspects. Out of the 113 tests, 84 were confirmed results. Of these, there were 44 confirmed deceptive examinees and 40 confirmed innocent

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[1] Gordon, N. *et al.*, *A Field Study of the Integrated Zone Comparison Technique.* Polygraph, 2000, Vol. 29, No. 3, pp. 220–225.

examinees. Data analysis was performed with the Academy for Scientific Investigative Training's ASIT PolySuite©, which is an examiner-controlled computerized algorithm, using the Horizontal Scoring System[2] (HSS), as well as an experienced examiners analysis using a 3-Point Scale[3]. IZCT, using ASIT PolySuite, had an overall accuracy of 92.9% with Inconclusives, and 98.73% accuracy excluding them. Manual 3-point scoring had an overall accuracy of 91.7% with Inconclusives, and 98.71% excluding them.

Running head: Integrated Zone Comparison Technique

Key Words: Integrated Zone Comparison Technique, Data Analysis, ASIT PolySuite Algorithm, Horizontal Scoring System, 3-Point Manual Scoring System, Validity

This field study is the third published research study[4] on the Integrated Zone Comparison Technique (IZCT) and the fourth study that included the Horizontal Scoring System (HSS). The theory and philosophy of the IZCT was first published in 1996, in the textbook *Forensic Psychophysiology using the Polygraph*[5].

The IZCT has been taught at the Academy for Scientific Investigative Training since 1987[6]. It is currently being used in the fields of law enforcement, intelligence, and private security in numerous countries around the world. It is a modification of the Backster Zone Comparison Technique[7] format, in a structure that closely resembles the zone technique validated at the University of Utah[8]. It is a flexible technique format, allowing it to be used for Single-issue, Multi-faceted and Multi-issue investigations.

IZCT format is a thirteen-question test consisting of two weak relevant questions (sacrifice relevant, countermeasure indicator), three flexible relevant

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[2] Krapohl, D., *A Comparison of 3- and 7-position Scoring Scales with Laboratory Data.*

[3] Gordon, N. *et al.*, *A Field Study of the Integrated Zone Comparison Technique.* Polygraph,2000, Vol. 29, No. 3, pp. 220–225.

[4] Matte, J., *Forensic Psychophysiology using the Polygraph. JAM Publications,1996, Buffalo, NY.*

[5] Gordon, N. *et al.*, *A Field Study of the Integrated Zone Comparison Technique.* Polygraph, 2000, Vol. 29, No. 3, pp. 220–225.

[6] Backster, C., *Technique fundamentals of the Tri-Zone Polygraph Test.* New York, Backster Research Foundation, 1969.

[7] Matte, J., *Forensic Psychophysiology; Use of the Polygraph. JAM Publications, 1996, Buffalo, NY.*

[8] Gordon, N., *The Academy for Scientific Investigative Training's Horizontal Scoring System and Examiner's Algorithm for Chart Interpretation.* Polygraph, 1999, Vol. 28, No. 1.

questions, three probable lie comparison questions, one symptomatic question, and four irrelevant questions.

1.	Irrelevant:	Is today Sunday? (No)
2.	Symptomatic:	Do you understand I will only ask the questions I reviewed?
3.	Weak Relevant:	(Sacrifice) Do you intend to lie to any test question?
4.	Irrelevant:	Is today an actual day? (Yes)
5.	Exclusive Comparison:	During the first __ years of your life, …….?
6.	Flexible Relevant:	Primary or secondary relevant question, depending on type and facts of case
7.	Irrelevant:	Right now are you in the US? (Yes)
8.	Inclusive Comparison:	In your entire life did you ever ……..?
9.	Flexible Relevant:	Primary or secondary relevant question, depending on type and facts of case
10.	Irrelevant:	Right now are you in Switzerland? (No)
11.	Comparison:	Exclusive or Inclusive
12.	Flexible Relevant:	Primary or secondary relevant question, depending on type and facts of case
13.	Weak Relevant:	(Countermeasure indicator) Have you deliberately done anything to try and beat this test?

The thirteen questions in the IZCT structure are then reviewed with the examinee in the following order: (1, 4, 7, 10), (6, 9, 12), (5, 8, 11), 13, 3 and 2. The examiner then explains how the polygraph instrument works and as an anti-countermeasure procedure during this presentation surreptitiously records the examinee's respiration on a separate chart.

The first IZCT chart is collected as a Silent Answer Test (SAT), which is cognitively stimulated by instructing the examinee that during the test he/she is to remain silent and listen to the questions carefully to make sure he/she is comfortable with them, understands them, and most importantly, does not remember anything they have not told the examiner about, since this is their last opportunity to make changes in questions before their verbal answers are recorded. The SAT questions are asked in the following sequence: 1, 2, 3, 4, C5, R6, C8, R9, C11, R12, 13. Irrelevant questions 7 and 10 are not used, unless they are needed to re-establish a norm during the examination, or used due to an artifact committed by the examinee during the examination.

The sequence for the second chart is: 10, 2, C5, R12, C8, R6, C11, R9, 3 ("Did you lie to any test question?"), 13. To focus the examinee on their zone of threat, when the examiner begins this chart the examinee is instructed to make sure he/she answers each question truthfully, since the charts will be numerically evaluated and lying to any question in the test, no matter what it is about, could cause them to fail the entire examination.

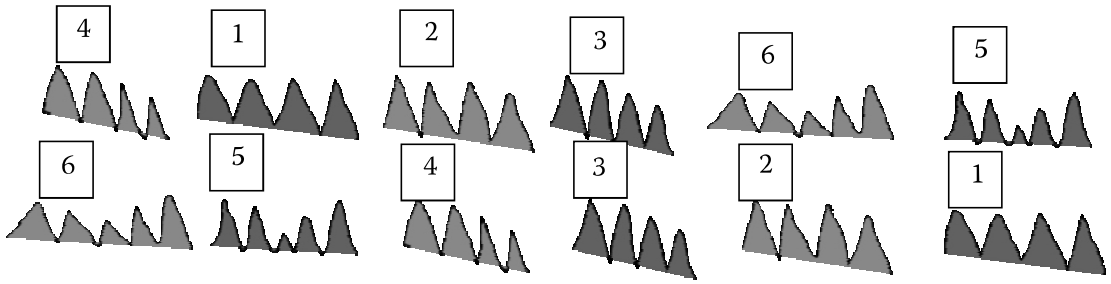
The third IZCT chart is administered with the relevant questions being asked before the comparison questions, and the relevant questions being rotated in the same manner. The sequence is: 1, 2, 3, R9, C5, R12, C8, R6, C11, 13. This allows for each relevant question to be asked paired with each comparison question once after three charts are administered.

If the need appears for additional data to be collected to reach a clear decision, or if there appear to be deliberate distortions, Chart 4 of the IZCT is used where all of the questions 1 to 13 are asked.
ASIT PolySuite combines the Horizontal Scoring System (HSS), with the Academy for Scientific Investigative Training's Algorithm for Manual Chart Interpretation[9] of polygraph data.

In the Horizontal Scoring System all four physiological channels of each relevant and comparison question are ranked horizontally from greatest to least, based on their significance in the chart. If the question format utilizes 3 comparison and 3 relevant questions, the most significant reaction in each channel is given a "6," and the least significant reaction is given a "1." If only 2 comparison and 2 relevant questions are used the channels are ranked from "4" to "1."

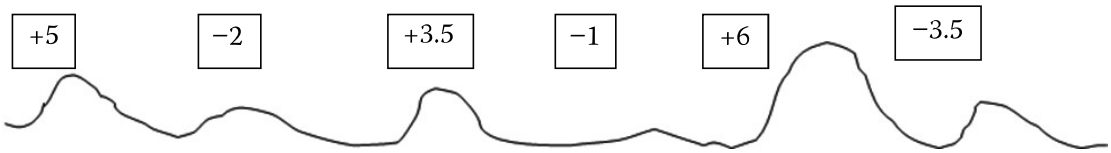
The below diagram shows Thoracic and Abdominal channels ranked horizontally from 6 to 1. Each question's abdominal and thoracic score is then averaged to ensure the pneumo tracings only account for 1/3 of the question's total score. Comparison question scores receive a positive numerical value and relevant question score receive a negative value.

[9] Honts, C., L. Driscoll, *An Evaluation and the Validity of Rank Order and Standard Numerical Scoring of Polygraph Charts.* Polygraph, 1987, Vol. 16, No. 4.

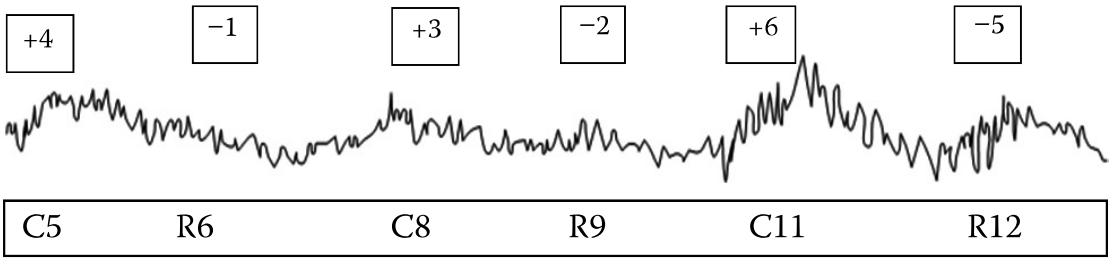


Avg. +5 **Avg. -3** **Avg. +3** **Avg. -3** **Avg. +4** **Avg. -3**

The electrodermal responses are ranked horizontally from 6 to 1. In case questions are equal in significance they are given the average of the rank positions they are competing for. In the electrodermal example below comparison question 8 and relevant question 12 are about equal. They are competing for the ranks of 4 and 3. Each question is given the average of those ranks, a 3.5.



The cardio responses are ranked horizontally from 6 to 1.



The average rank score for each question's pneumo channel can then be combined with the question's electrodermal and cardio ranks for a total question score. In the above example we have the following scores:

Average Pneumo					
+5	–3	+3	-3	+4	–3
EDA					
+5	–2	+3.5	–1	+6	–3.5
Cardio					
+4	–1	+3	–2	+5	–5
Total Question Scores					
C5	**R6**	**C8**	**R9**	**C11**	**R12**
+14	–6	+9.5	–6	+15	–11.5
SPOT SCORE:	**+8** (14–6)		+3.5 (9.5–6)		+3.5 (15–11.5)
SINGLE ISSUE CHART SCORE: **+15** (Combination of all Spot Scores)					

In the first two charts the rank of the relevant question is subtracted from the rank of the comparison preceding it. In the third chart we compare each relevant question with the comparison question that follows it[9].

The cut-offs using the Horizontal Scoring System (HSS) were established by Honts and Driscoll[10], who reported that accuracy for single issue tests, where three charts of data are collected consisting of 3 relevant and 3 comparison questions in each chart, would be above 90% when decisions of truth or deception were made using a ±13. Since that number reflected a total of 9 spot scores (13/9), decisions for Spot Scores for 3 charts of data are a ±4.5. When four charts of data are analyzed single-issue cut-offs are a ±18, and Spot Score cut-offs are a ±6.

Method

In many studies critics say that the choosing of the examinees is selective, and therefore might influence the final result. As a result the first author decided

to be selective and chose to implement and run this study only in the 27 cases selected where all of the possible suspects involved were tested. These 27 cases had 113 examinees. Twenty-three of the cases involved theft, 2 involved falsifying receipts, 1 involved using a firearm without necessity, and 1 involved using a vehicle without permission.
In all of the examinations a multi-faceted type IZCT test format was used, having a primary relevant and two secondary relevant questions.

All data were first analyzed using the Academy's ASIT PolySuite, with cut-offs of a ±1.5 for each relevant question, for each chart administered. The spot cut-off for three charts was ±4.5. If any of the spots reached the negative cut-off the test was determined as a deceptive result regardless of the score reached by the other two spots. If all three spots reach the positive cut-off the final call for this test was truthful. With any other combination the final call for that test was inconclusive.

Many examiners in the world consider the 3-point scale the easier and less subjective scoring system to use, and therefore the authors decided to validate the format with a standard 3-point scale and to check if there are any significant differences between the results of the Horizontal Scoring System and the traditional vertical 3-point scale when implemented using the IZCT format. The manual scoring using the 3-point scale employed spot cut-offs of a +3 or higher for truthfulness, and a -3 or lower for deception.

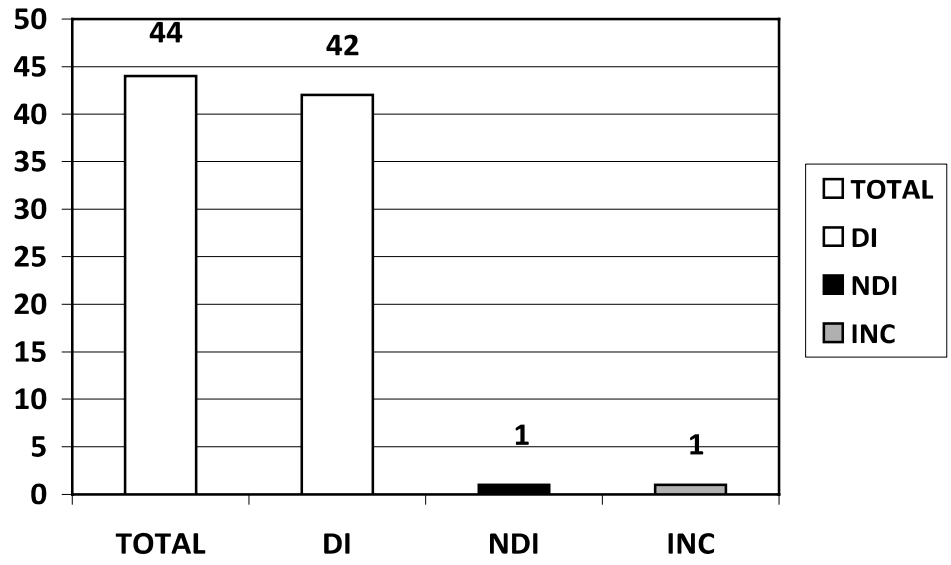
Results

A total of 27 cases were investigated using the IZCT during the period of April to December 2009. In these 27 cases there were 113 examinations conducted on all of the people who had any possibility of being involved. Forty-four of these suspects were deceptive, as later verified, and 40 were truthful, as later verified. All of the cases were verified by confession, and in some there was additional corroborating evidence of returned stolen items, or the showing of receipts for items paid for with stolen money.

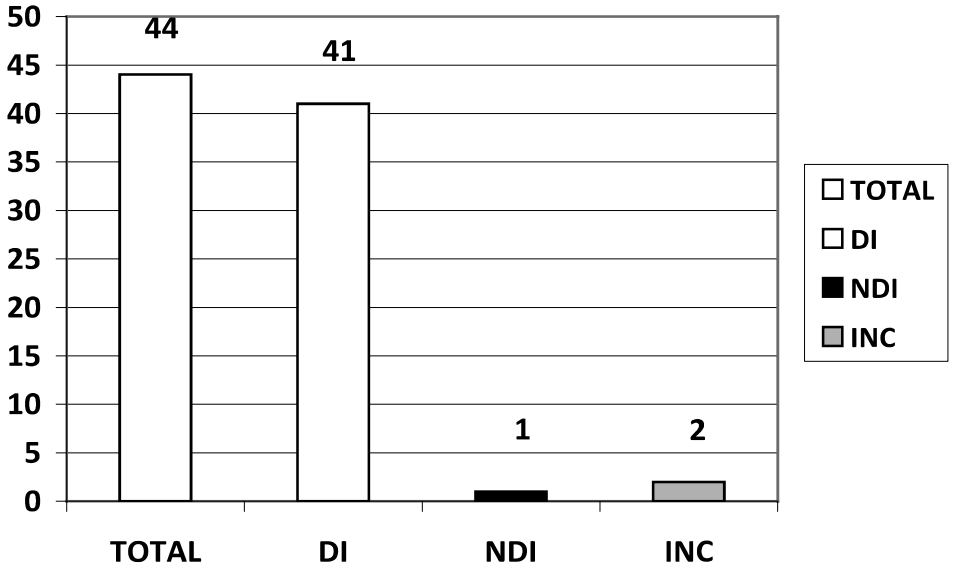
Of the 44 deceptive suspects, ASIT PolySuite correctly identified 43, had 1 False/Negative, and 1 Inconclusive outcome. Accuracy was 95.45% with Inconclusives and 97.72% without them. Of the 40 truthful suspects, ASIT PolySuite correctly identified 36 and had 4 Inconclusives. Accuracy was 90% with Inconclusives and 100% without them. There were no False/Positives.

Of the 44 deceptive suspects, the examiners using the 3-point scale correctly identified 41, had 1 False/Negative, and 2 Inconclusive outcomes. Accuracy was 93.18% with the Inconclusive, and 97.72% without it. Of the 40 truthful suspects, the examiners using the 3-point scale correctly identified 36 and had 4 Inconclusives. Accuracy was 90% with Inconclusive and 100% without them. There were no False/Positives.

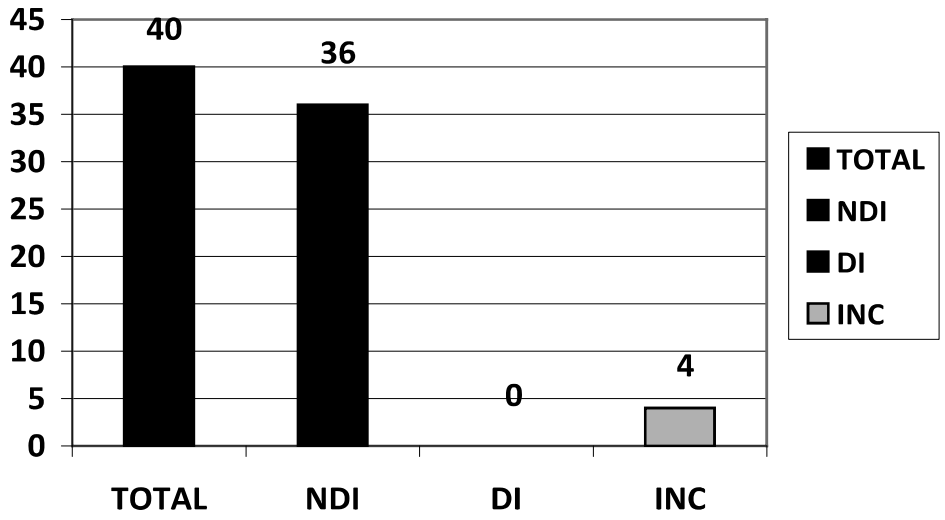
Accuracy of IZCT using ASIT PolySuite for DI Suspects:



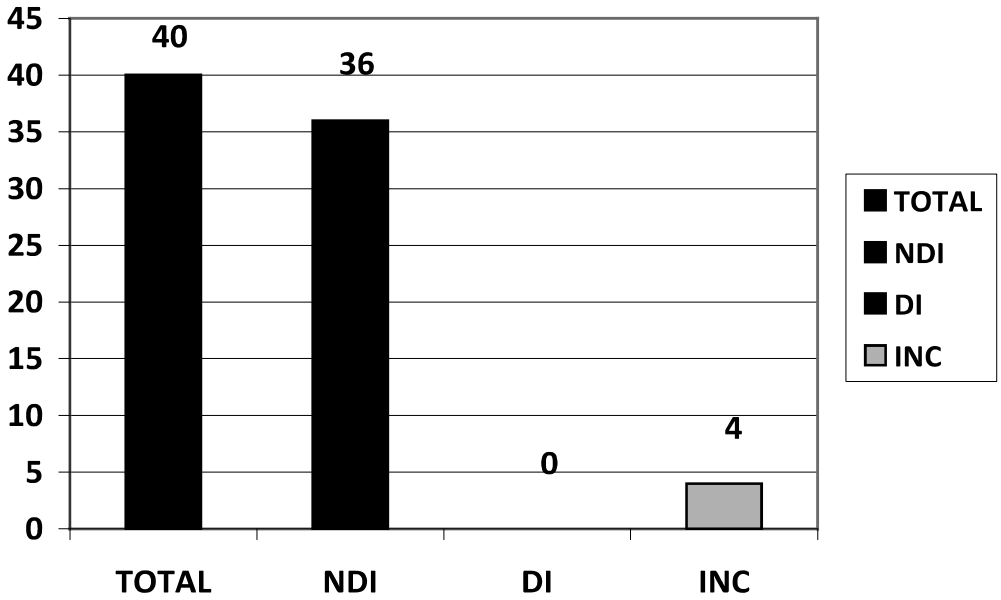
Accuracy of IZCT using 3-Point Scoring for DI Suspects:



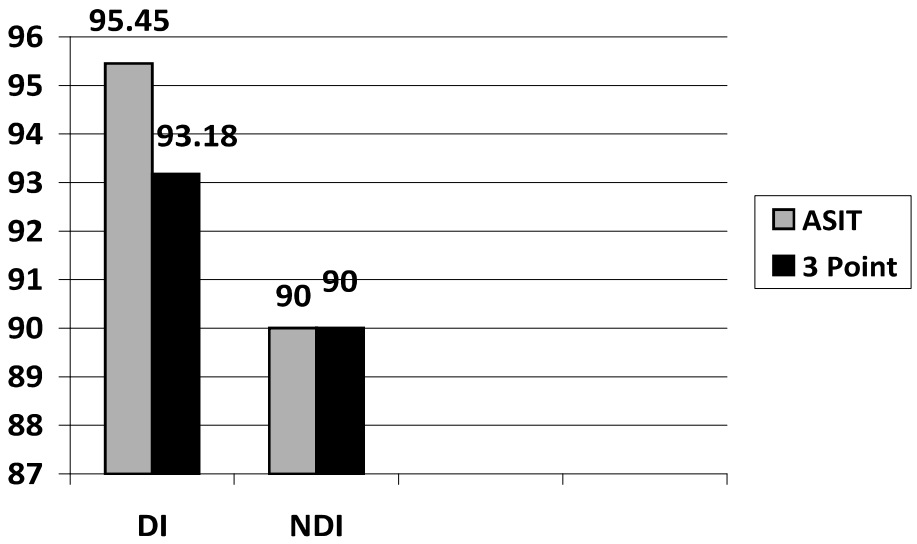
Accuracy of IZCT using ASIT PolySuite for NDI Suspects:



Accuracy of IZCT using 3-Point Scoring for NDI Suspects:



Overall Accuracy of IZCT using ASIT PolySuite vs. 3-Point Scoring



Conclusion

The result of this independent field validation study clearly demonstrates the efficacy of the IZCT for both truthful and deceptive suspects in multi-faceted law enforcement field investigations where the polygraph is employed as an investigative tool.

It should be noted that this study was consistent with the accuracy demonstrated in previous studies of the IZCT. All three studies performed to date have shown mean accuracy rates of truthful and deceptive examines at 90% or higher, which meets the industry standard of qualifying the IZCT to be used as a polygraph technique for both investigative and evidentiary cases.