

Defense Academy for Credibility Assessment

PDD 505 METHODS II



ZONE COMPARISON TEST (ZCT)

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1. History. Cleve Backster designed the Zone Comparison Test (ZCT), and variations of Backster's technique were subsequently adopted by USAMPS in 1961. As taught by DACA, the

ZCT and You Phase ZCT Psychophysiological Detection of Deception (PDD) formats have changed little from the original Backster techniques.

2. Principles. Both ZCT formats are comparison question techniques designed for single issue testing. The structured question sequencing and type of questions posed assist in reducing no opinion results.

3. Structure and Impact

3.1. The ZCT formats are structured to optimize intensity and distinctness between the relevant and comparison questions. In the ZCT and You Phase ZCT, a relevant question is always asked after a comparison question. The relevant questions (which are limited to a very specific issue) and the exclusive comparison questions create a dichotomy for the examinee. This dichotomy directs the attention of the deceptive/guilty examinee to the relevant questions and the attention of the non-deceptive/innocent examinee to the comparison questions.

3.2. In ZCT formats, a single issue is tested. The ZCT format requires primary and secondary relevant questions. The You Phase ZCT requires only the primary relevant issue--one degree of involvement.

3.3. Other hallmarks of the ZCT formats are the use of the sacrifice relevant and symptomatic questions. Their use and purpose are described below.

3.4. Suspect-Knowledge-You (SKY) questions are optional questions that may be asked on charts two and three of the ZCT; they may not be asked on the You Phase ZCT. The SKY is no longer taught at DACA. The use of these questions is described in Appendix 1.

3.5. All ZCT questions are reviewed during the pretest interview phase; the sequence in which the questions are asked is not revealed to the examinee.

4. Concepts

4.1. Psychological Set. The magnitude of physiological responses is a function of the relative salience of the test questions within a test, leading to diminished responding to some questions to which an examinee is deceptive. This phenomenon gives rise to the differential arousal to relevant and comparison questions for deceptive and truthful examinees, and for varying degrees of arousal to different relevant questions to which the examinee is deceptive. The term "psychological set" was first used to explain this effect by Backster in the 1960s, and it was widely adopted by the polygraph profession. It is a useful but incomplete heuristic. "Psychological set" has an established meaning in the field of psychology that refers to an unrelated concept.

4.2. Anticlimax Dampening Concept. This theory holds that a person's fear, anxieties, and apprehensions will be directed to that situation which holds the greatest threat to his/her well being or self preservation at that point in time. According to the concept, a guilty examinee's concern over an intense relevant question may result in a full or partial dampening of response to other questions such as less intense relevant questions and/or comparison questions. This concept

is based on the principle of psychological set and applies to both the deceptive and non-deceptive examinee.

4.2.1. The deceptive examinee focuses attention on the relevant question(s) which holds the greatest degree of concern for the examinee; the examinee may not be psychologically aroused by the other relevant questions on the examination.

4.2.2. Similarly, the truthful examinee's attention is focused on the comparison question(s) that has the greatest concern and may be less responsive to other comparison question(s) on the examination that he/she perceives as weaker.

4.2.3. This concept explains why an examinee responds significantly more to one relevant or comparison question than to others that are presented during a PDD examination and why some relevant questions have significantly higher (minus or positive) numbers assigned.

4.3. Super Dampening. The super dampening concept holds that there will be a suppression of general responding to relevant and comparison questions because of an outside issue that could be more significant than the issue examined. The presence of an outside issue usually results in poor response, random response, or lack of response to relevant and/or comparison questions.

4.4. Spot Analysis. This concept refers to the procedure wherein each component tracing is separately evaluated by comparing the response of a relevant question to the response of a comparison question. Relevant questions are paired with a specific comparison question(s) for analysis. The relevant and comparison question-pair is a test data analysis (TDA) spot. In the ZCT format, there are three TDA spots; in the You Phase ZCT there are two TDA spots. (See figures F1 and F2.)

Figure F1. ZCT TDA Spots

Spot I	R5 compared to C4 or C6
Spot II	R7 compared to C6
Spot III	R10 compared to C9

Figure F2. You Phase ZCT TDA Spots

Spot I	R5 compared to C4 and/or C6
Spot II	R7 compared to C6 and/or C8

4.5. Numerical Test Data Analysis. Numerical TDA is a systematic evaluation of the ZCT formats (or any comparison question format) in which numeric values are awarded to physiological responses occurring as a result of applied stimuli. The three- and seven-position numerical evaluation procedures are used to evaluate comparison question formats. (See figure F3.) DACA supports the use of the seven-position scale only.

Figure F3. Values for the Three- and Seven-Position Scales

Three-Position Scale	-1	0	+1				
Seven-Position Scale	-3	-2	-1	0	+1	+2	+3

5. Format Requirements and Data Collection

5.1. Question Review. All examination questions are reviewed with the examinee during the pretest interview. Examination questions should be reviewed in the following order: (1) Sacrifice Relevant, (2) Relevant, (3) Comparison, (4) Irrelevant, and (5) Symptomatic questions.

5.2. Question Sequence. With the possible exception of irrelevant questions, all questions reviewed during the pretest phase of the examination are asked during the data collection phase. (See figures F4 and F5.) Appendices 2 and 3 provide examples of ZCT confirmatory and urinalysis PDD examinations.

Figure F4. ZCT Question Sequence

I1	Are you now in South Carolina?	Yes
SR2	Regarding that stolen money, do you intend to answer each question truthfully?	Yes
SYM3	Do you believe I will only ask you the questions we reviewed?	Yes
C4	Prior to 1996, did you ever steal anything from someone who trusted you?	No
R5	Did you steal any of that money?	No
C6	Prior to coming to South Carolina, did you ever steal anything?	No
R7	Did you steal any of that money from Jones' footlocker?	No
SYM8	Is there something else you are afraid I will ask you a question about?	No
C9	Prior to this year, did you ever steal anything from an employer?	No
R10	Do you know where any of that stolen money is now?	No

Figure F5. You Phase ZCT Question Sequence

I1	Are you now in South Carolina?	Yes
SR2	Regarding that stolen money, do you intend to answer each question truthfully?	Yes
SYM3	Do you believe I will only ask you the questions we reviewed?	Yes
C4	Prior to 1996, did you ever steal anything from someone who trusted you?	No
R5	Did you steal any of that money?	No
C6	Prior to coming to South Carolina, did you ever steal anything?	No
R7	Did you steal any of that money from Jones' footlocker?	No
C8	Prior to this year, did you ever steal anything from an employer?	No
SYM9	Is there something else you are afraid I will ask you a question about?	No

5.3. Question Rotation. Only comparison questions may be rotated and done so systematically.

5.4. Chart Requirements. In most instances, the collection of three charts is appropriate. A fourth chart is only authorized if an artifact occurred which precluded a conclusive decision from being rendered in a TDA spot. The numerical total required for a conclusive decision remains the same as for a three-chart ZCT series. If after three charts a conclusive decision can be rendered from those components not affected by artifacts, the examination is complete.

5.5. Conduct of an Acquaintance Test (ACQT). The known solution ACQT should be collected as the first chart of the ZCT formats. It is conducted in part to acquaint the examinee with PDD procedures.

6. Question Types. In the ZCT format, there are six types of questions posed: (1) Primary relevant, (2) Secondary relevant, (3) Sacrifice relevant, (4) Irrelevant, (5) Symptomatic and (6) Comparison. In the You Phase ZCT format, there are only five types of questions posed; the secondary relevant question is not used. Refer to Appendix 5 for color codes used in ZCT formats.

6.1. Primary Relevant Question. Refer to Appendix 5 for information on relevant question target selection.

6.1.1. The primary relevant questions are R5 and R7. (See figure F6.)

6.1.2. The purpose of the primary relevant questions is to test for the possible direct involvement of the examinee.

6.1.3. R5 is formed by using an action verb to describe the act/issue.

6.1.4. R7 is formed by using an extension of R5 or by paraphrasing R5.

6.1.5. Both R5 and R7 are usually worded to elicit a no answer.

Figure F6. Examples of Primary Relevant Questions

R5	Did you steal that car?	No
R7	Did you steal that car from that parking lot? (Extension of R5)	No
R7	Are you the one who stole that car from that parking lot? (Paraphrasing of R5)	No

6.2. Secondary Relevant Question

6.2.1. The secondary relevant question is R10 in the ZCT format. (See figure F7.) A secondary relevant question is not used in the You Phase ZCT format.

6.2.2. The secondary relevant question tests the examinee's secondary involvement in or guilty knowledge of the offense under investigation, i.e., help, know, plan, participate, and alibi.

6.2.3. Under no circumstance, should question R10 be a primary relevant question.

6.2.4. The secondary relevant question is usually worded to elicit a no answer.

Figure F7. Examples of Secondary Relevant Questions

R10	Did you help anyone steal that car?	No
R10	Do you know where that stolen car is now?	No
R10	Do you know for sure who stole that car?	No
R10	Did you plan with anyone to steal that car?	No

6.3. Sacrifice Relevant Question

6.3.1. The sacrifice relevant question is SR2 in the ZCT formats and is the first question that refers to the relevant issue. The focus of the sacrifice relevant question may be narrower in the You Phase ZCT. (See figures F8 and F9.)

6.3.2. The purpose of the sacrifice relevant question is to absorb initial response to the relevant issue. The sacrifice relevant question is not numerically evaluated

6.3.3. The sacrifice relevant question should be worded to elicit a yes answer.

Figure F8. Example of a ZCT Sacrifice Relevant Question

SR2	Regarding the theft of that car, do you intend to answer each question truthfully?	Yes
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Figure F9. Example of a You-Phase ZCT Sacrifice Relevant Question

SR2	Regarding whether or not you stole that Mustang, do you intend to answer each question truthfully?	Yes
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6.4. Irrelevant/Neutral Question

6.4.1. An irrelevant question should be the first question asked on each chart and can be inserted after an artifact occurs or when there is continued response from previous stimuli. Several irrelevant questions may be reviewed and used as needed. Irrelevant questions are labeled I1, I1A, I1B, I1C, etc. (See figure F10.)

6.4.2. The purpose of irrelevant questions is to allow the orienting response to habituate before a scorable question is asked and to establish homeostasis when an artifact occurs on the chart. Irrelevant questions are not numerically evaluated.

6.4.3. Irrelevant questions should be unrelated to the issue being examined and are normally worded to elicit a yes answer.

Figure F10. Examples of Irrelevant Questions

I1	Is this the month of July?	Yes
I1A	Are you in South Carolina?	Yes

6.5. Symptomatic Questions

6.5.1. There are always two symptomatic questions on any ZCT, SYM3 and SYM8/9. In the ZCT, the symptomatic questions are in the third and eighth positions (SYM3 and SYM8). In the You Phase ZCT, the symptomatic questions are in the third and ninth positions (SYM3 and SYM9). (See figure F11.)

6.5.2. The purpose of the symptomatic questions is to test for an outside issue. Symptomatic questions are not numerically evaluated.

6.5.3. SYM3 is worded to elicit a yes answer; SYM8/9 is worded to elicit a no answer.

Figure F11. Examples of ZCT Symptomatic Questions

SYM3	Do you believe I will only ask you the questions we reviewed?	Yes
SYM8/9	Is there something else you are afraid I will ask you a question about?	No

6.6. Comparison Questions

6.6.1. In the ZCT format, the comparison questions are C4, C6, and C9. In the You Phase ZCT format, the comparison questions are C4, C6, and C8. (See figure F12.)

6.6.2. The purpose of comparison questions is to produce a physiological response. The physiological responses of the comparison questions are compared to the physiological responses of the relevant questions.

6.6.3. Probable-lie comparison (PLC) questions are used with ZCT formats. PLC questions should be designed to be a probable lie for the examinee. PLC questions should be similar in nature but unrelated to the specific crime or issue being examined and separated from the relevant issue by time, place, or category. Normally, the PLC should use the same action verb or similar in nature action verb as that of the relevant issue. A comparison question should be broad in scope and time so that it captures as many of the examinee's past life experiences as possible. PLC questions are worded to elicit a no answer.

Figure F12. Examples of PLC Questions

C4	Prior to your last birthday, did you ever lie about stealing anything?	No
C6	Before this year, did you ever steal anything?	No
C8/9	Prior to this year, did you ever steal from a close friend?	No

7. Test Data Analysis

7.1. Zone Comparison Test. Decision examples. (See figure F13.)

7.1.1. Deception Indicated (DI). To make a determination that the examinee is DI on the ZCT, the score must be a minus three (-3) or lower in any overall vertical spot total or a grand total of minus six (-6) or lower.

7.1.2. No Deception Indicated (NDI). To make a determination of NDI, there must be at least a plus one (+1) or greater in each overall vertical spot total and a combined spot total of plus six (+6) or greater.

7.1.3. No Opinion (NO). If it is not DI or NDI, it is NO.

Figure F13. Examples of Possible Decisions in the ZCT Format

Example Number	Vertical Total Spot I	Vertical Total Spot II	Vertical Total Spot III	Combined Spot Total	Opinion Rendered
1	+6	0	+6	+12	NO
2	+4	-1	-2	+1	NO
3	-1	+6	+6	+11	NO
4	+2	+2	+2	+6	NDI
5	-2	-2	-2	-6	DI
6	+3	+1	+2	+6	NDI
7	+3	+2	-3	+2	DI
8	+0	0	-3	-3	DI
9	+1	+1	+1	+3	NO

7.2. You Phase Zone Comparison Test. Decision examples. (See figure F14.)

7.2.1. Deception Indicated (DI). To make a determination that the examinee is DI on the You Phase ZCT, the score must be a minus three (-3) or lower in any overall vertical spot total or a grand total of minus four (-4) or lower.

7.2.3. No Deception Indicated (NDI). To make a determination of NDI, there must be at least a plus one (+1) or greater in each overall vertical spot total and a combined spot total of plus four (+4) or greater.

7.2.4. No Opinion (NO). If it is not DI or NDI, it is NO.

Figure F14. Examples of Possible Decisions in the You Phase ZCT

Example Number	Vertical Total Spot I	Vertical Total Spot II	Combined Spot Total	Opinion Rendered
1	+6	0	+6	NO
2	+4	-1	+3	NO
3	+2	+2	+4	NDI
4	-2	-2	-4	DI
5	+3	+1	+4	NDI
6	0	-3	-3	DI
7	+1	+2	+3	NO

APPENDIX 1. SUSPECT-KNOWLEDGE-YOU (SKY) FORMAT

1. Zone Comparison Test Suspect-Knowledge-You Format Requirements and Data Collection

1.1. Question Review. During the pretest, all examination questions are reviewed with the examinee in the following order: (1) Sacrifice Relevant, (2) Relevant, (3) SKY, (4) Comparison, (5) Irrelevant, and (6) Symptomatic questions. (See figure A1.1.) The examinee is told that the SKY questions will be asked in same order in which they were reviewed during the data collection phase.

Figure A1.1. Question Review Sequence for the ZCT format with SKY Questions

Sacrifice Relevant	SR2
Relevant	R5, R7, R10
SKY	S11, K12, Y13
Comparison	C4, C6, C9
Irrelevant	I1, I1A, I1B, etc.
Symptomatic	SYM8/9, SYM3

1.2. Question Sequence. With the possible exception of irrelevant questions, all questions reviewed during the pretest phase of the examination are asked during the data collection phase. (See figure A1.2.)

Figure A1.2. Example of the ZCT Question Sequence with SKY Questions

I1	Are you now in South Carolina?	Yes
SR2	Regarding the shooting of that man, do you intend to answer each question truthfully?	Yes
SYM3	Do you believe I will only ask you the questions we reviewed?	Yes
C4	Prior to 1999, did you ever hurt anyone who trusted you?	No
R5	Did you shoot that man?	No
C6	Before coming to South Carolina, did you ever hurt anyone?	No
R7	Did you shoot that man in that parking lot?	No
SYM8	Is there something else you are afraid I will ask you a question about?	No
C9	Prior to this year, did you ever desire to hurt anyone out of anger?	No
R10	Do you know for sure who shot that man?	No
S11	Do you suspect anyone in particular of shooting that man?	No
K12	Do you know for sure who shot that man?	No
Y13	Did you shoot that man?	No

1.3. Question Rotation. Same as for the ZCT.

1.4. Chart Requirements.

1.4.1. SKY questions are asked on charts 2 and 3 only.

1.4.2. Prior to collecting Chart I-2, the examinee is told again that questions S11, K12, and Y13 will be asked in that exact order somewhere in the chart.

2. Question Types.

2.1. Same as for the ZCT with the addition of the SKY questions.

2.2. Suspect-Know-You Questions

2.2.1. SKY questions are always S11, K12, and Y13

2.2.2. Y13 is always identical to question R5.

2.2.3. SKY questions are worded to elicit a no answer.

2.2.4. The action verb in the SKY questions should be the same as in R5.

2.2.5. SKY questions are not scored numerically in the same manner as other spots.

APPENDIX 2. CONFIRMATORY PDD EXAMINATION

A confirmatory examination is a type of examination that may be conducted using several types of PDD testing formats. Based on case facts and circumstances of the confirmatory examination, relevant questions may be constructed to elicit yes or no answers. (See figures A2.1. and A2.2.) A confirmatory examination is never used with the ZCT SKY questions.

Figure A2.1. Example of a Yes-Answered Relevant Question ZCT Confirmatory Examination

I1	Is today Monday?	Yes
SR2	Regarding that \$400.00 you reported stolen, do you intend to answer each question truthfully?	Yes
SYM3	Do you believe I will only ask the questions we reviewed?	Yes
C4	Prior to the year 2002, did you ever lie to anyone in a position of authority?	No
R5	Did you have \$400.00 stolen from your locker?	Yes
C6	Before age 20, did you ever lie about anything (important)?	No
R7	Did you have \$400.00 stolen from your locker last night?	Yes
SYM8	Is there something else you are afraid I will ask you a question about?	No
C9	Prior to this year, did you ever lie to cover up something significant?	No
R10	Did you secure that \$400.00 inside your locker?	Yes

Figure A2.2. Example of a No-Answered Relevant Question ZCT Confirmatory Examination

I1	Is today Monday?	Yes
SR2	Regarding that \$400.00 you reported stolen, do you intend to answer each question truthfully?	Yes
SYM3	Do you believe I will only ask the questions we reviewed?	Yes
C4	Prior to 1999, did you ever lie to anyone in a position of authority?	No
R5	Did you lie about that \$400.00 being stolen from your locker?	No
C6	Before age 20, did you ever lie about anything (important)?	No
R7	Did you lie about that \$400.00 being stolen from your locker last night?	No
SYM8	Is there something else you are afraid I will ask you a question about?	No
C9	Prior to this year, did you ever lie to cover up something significant?	No
R10	Did you lie about securing that \$400.00 in your locker?	No

APPENDIX 3. URINALYSIS PDD EXAMINATION

In PDD examinations conducted to verify the results of a urinalysis, the only issue may be whether or not the examinee used the illegal substance that tested positive. Because the You Phase ZCT format requires only one degree of involvement for relevant question construction, this format is frequently appropriate for urinalysis PDD examinations. Often, the most appropriate PLCs for urinalysis PDD examinations are lie comparison questions. (See figure A3.1.)

Figure A3.1. Example of a You Phase ZCT for a Urinalysis PDD Examination

I1	Is today Monday?	Yes
SR2	Regarding the use of cocaine, do you intend to answer each question truthfully?	Yes
SYM3	Do you believe I will only ask the questions we reviewed?	Yes
C4	Prior to 2002, did you ever lie to anyone in a position of authority?	No
R5	Within 30 days prior to that urinalysis test, did you (knowingly) use any form of cocaine?	No
C6	Before age 20, did you ever lie about anything (important)?	No
R7	Within 30 days prior to that urinalysis test, did you (knowingly) use any form of cocaine in any manner?	No
C8	Prior to this year, did you ever lie to cover up something significant?	No
SYM9	Is there something else you are afraid I will ask you a question about?	No

APPENDIX 4. TARGET SELECTION

1. Case Evaluation

- 1.1. Evaluate case information and identify targets.
- 1.2. Determine major issues and separate acts (targets).
- 1.3. Determine seriousness of each issue by legal sanctions.
- 1.4. Assess intensity to examinee.

2. Target Selection. Select the target that most closely connects the examinee to the crime in terms of case information and circumstantial evidence, and/or that deals with the motive of the perpetrator. In a housebreaking and larceny for example, the theft target would be the most appropriate since larceny was probably the motive.

- 2.1. Determine most serious (primary) issue/target.
 - 2.2. Assess intensity to examinee.
 - 2.3. Choose one issue/target per examination. Do not combine issues/targets in the ZCT.
 - 2.4. Formulate secondary issue questions that are within the primary target.
 - 2.5. Consider case information and circumstantial evidence when multiple targets are equal in seriousness and intensity.
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APPENDIX 5. COLOR CODES

Relevant	Red
Sacrifice relevant	Yellow/Red
Comparison	Green
Irrelevant	Yellow
Symptomatic	Black
Suspect	Green
Knowledge	Red/Yellow
You	Red

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