CM Research
Comprehensive CM Course

National Center *for* Credibility Assessment

1

• What does the academic world say about CM activity

• What has NCCA research discovered

• **What research would you like to see NCCA accomplish?**

    • **Purpose of this question – Generate a discussion**

        • **Explain why we need confirmed CM test data**
        • **Keep crowd focused on CM research**

• **Are we successful at identifying CM activity?**

    • **Purpose of this question – Generate a discussion**

        • **89% of guilty perform CM (many if not most spontaneous)**

        • **45% of innocent perform spontaneous CM**

        • **Most DoD screening programs have way too many NSR decisions without reportable information. What does this mean?**

            • **Screening method being used is overpowering the relevant issues; Continued testing until habituation causes them to go NSR; Under emphasizing the relevant issues and over emphasizing the comparison questions; or CM being performed; a combination of several of the above.**

2

CM Research
Comprehensive CM Course

- 1. Honts, Hodes, & Raskin, 1985; Honts, Raskin, & Kircher, 1987
- 2. Honts, 1987; Honts & Amato, 2002
- 3. Gudijonsson, 1988
- 4. Elaad & Ben-Shakhar, 1991
- 5. Honts & Perry, 1992
- 6. Honts, Raskin, & Kircher, 1994
- 7. Honts, Devitt, Winbush, & Kircher, 1996
- 8. Honts & Amato, 2002
- 9. Elaad & Ben-Shakhar, 2009

3

• 1. **Highly motivated using physical or mental CM can beat examiners**

• 2. **Drugs not an effective CM if the drug influences entire Neuro-physiological sys**

• 3. **No evidence that hypnosis is effective as a CM**

• 4. **Continuous mental dissociation will decrease CIT detection efficiency**

• 5. **Alcohol is not effective as a CM**

• 6. **Tongue bite & Toe press effective CM + Mental CM (counting backwards by 7) is an effective CM. Spontaneous CM not effective. CM Question is not effective. Suggest that CM activity may be one reason for high rate of false-negative errors in some national security studies.**

• 7. **Toe press & counting backwards by 7s effective CM for CIT**

• 8. **Spontaneous CM ineffective**

• 9. **Toe press and mental CM can generate high false negatives in CIT**

CM Research
Comprehensive CM Course

- **Spontaneous Countermeasures**
- 1. Honts, Raskin, Kircher, Hodes, 1988
- 2. Otter-Henderson, Honts, Amato, 2001
- 3. Honts, Amato, & Gordon, 2001

4

• 1. **Spontaneous CM did not change results of test for the those programmed innocent.**

- 77% of guilty used CM
- 30% of innocent used CM
- Altered breathing; mental dissociation; tongue bite; pressure to foot
- R/I format

• 3 **Spontaneous CM did cause a significant number of innocent to show deceptive.**

- 47.7% of innocent used CM
  - 24 altered breathing
  - 49 mental dissociation
  - 10 physical (biting tongue, flexing muscles)
- 55.4% of guilty used CM
  - 37 altered breathing
  - 97 mental dissociation
  - 10 physical

• **PLC format – Charts reviewed at DoDPI – Intentional CM performed under controlled conditions. Instructors did not catch most CM**
  - 141 CM attempts
  - 44 caught by instructors

CM Research
Comprehensive CM Course

- **What does all the research we've discussed suggest?**
  - CM use is prevalent among guilty and innocent
    - Probably more innocent attempting CM
    - Only <u>one study</u> reveals innocent that perform CM will appear guilty
  - Tongue bites, toe presses, & mental arithmetic are the CM of choice
  - Multiple CM used by examinees

5

• **What does all the research we've discussed suggest?**

   • **CM use is prevalent among guilty and innocent**
      • **These studies are 10 years old**
      • **The internet has most likely exacerbated this problem**
      • **A key here is that only one study suggested that spontaneous CM activity may cause an innocent to appear guilty**

   • **Tongue bites, toe presses and mental arithmetic are the CM of choice**
      • **Most anti-polygraph sites suggest these choices**

   • **Multiple CM used by examinees**
      • **Spontaneous CM usually more than one type**
      • **Even in research where asked to do one type often attempted more than one**

• **What might this suggest? If you catch examinees using CM and tell them to stop…more than likely they will continue and try a different CM**
      • **May continue with the same CM, but will learn from your biofeedback and not do the CM as hard**

• Dr. Barland's research on CM began around 1980. The CM course was Dr. Barland's innovation.

• Barland, 1994 – This unpublished project is the eye opener for the Federal Gov when it comes to polygraph CM detection.

   • The following slides will provide a summary of the study and the impact

Dr. Barland's 1995 Study
Relevant Questions

- **TESA**
  - Did you commit an act of espionage?
 - Did you commit an act of sabotage?
- **TESB**
  - Did you take a secret document from the safe in Bill Jackson's office?
  - Did you erase a tape in Bill Jackson's office?

FOR OFFICIAL USE ONLY   7

- Gordon Barland conducted a massive CM study in 1995. The study used the TES format. Examiners came from those agencies using TES.

- 120 examinees were trained in mental CMs by field examiners. The training lasted an hour with repeated training and feedback. Those trained in CMs participated in a mock scenario involving espionage and sabotage.

- 50 examinees participated in the crime but did not receive CM training.

- 50 examinees were innocent of any wrongdoing regarding the scenarios.

- All of the CM training involved "mental CM". Picking a number above 600 and counting backward by 3's.

- TESA - contained no compound questions
- TESB - the questions were specific to the incident in the mock crime
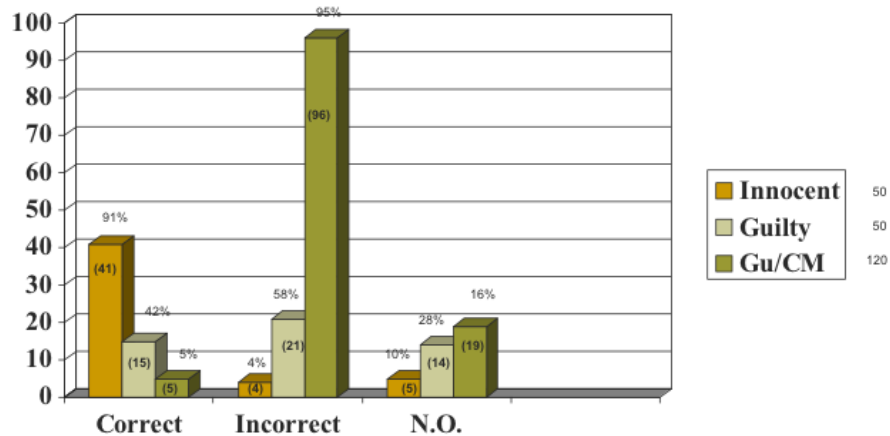
1995 Study TES A

• Numeric evaluations – CM decision could be made anytime

• **5%** correct decisions for those programmed guilty and trained in countermeasures (GU/CM).

• **42%** correct decisions for those programmed guilty.

• **91%** correct decisions for those innocent.

• The above numbers made after subtracting the No Opinion decisions.
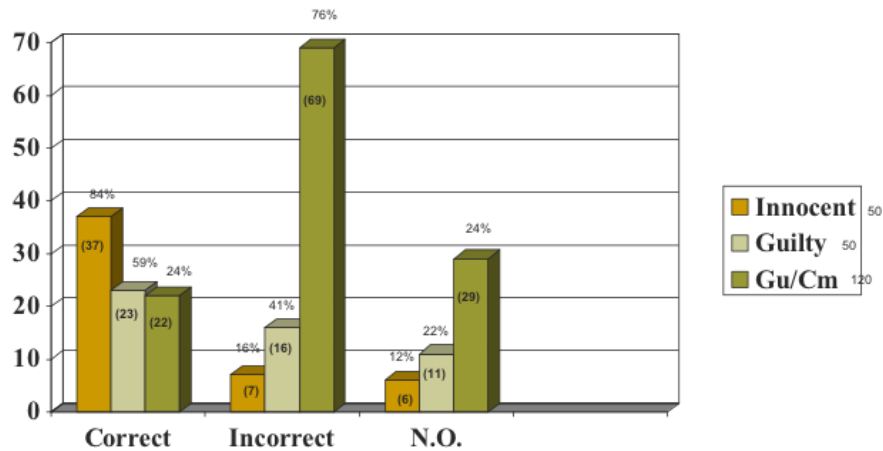
1995 Study TES B

The B-Series questions were more specific

- **24%** correct decisions for those programmed GU/CM.

- **59%** correct decisions for those programmed GU.

- **84%** correct decisions for those innocent.

- Above numbers after N.O. exams subtracted.

Conclusions drawn from 1995 study

- One hour of mental CM training will defeat a TES exam most of the time.
- Barland discovered that the Pneumograph channel appeared to produce a signature that could be observed with proper training.

• **One hour of training:**

•Dr. Barland's study – Examinees performing mental CM were given one hour of training with biofeedback.

• **Dr. Barland observed some strange Pneumograph signatures (he wrote in his notes: "Eureka! I've found a signature that may indicate mental CM taking place).**

• Little effort to train – **Examiner's from the various agencies that came down to train examinee's were concerned about how easily one could be taught a high level CM.**

• The good news! We have identified signatures that are consistent with CM activity.

• The bad news! We have not been able to teach computer software to identify what we see.

■ Weatherman and Menges, 2001

• Dan Weatherman and Paul Menges knew Dr. Barland had conducted a CM research project. They heard the results were not favorable.

  • Menges had been a participant (examiner) in the research project.

  • A proposal was made and Barland allowed Weatherman & Menges to conduct a blind review of the test data and provide results to him.

• Specific Research Questions written by Weatherman

  • Can a global analysis that incorporates numeric analysis identify deceptive and non-deceptive examinees significantly better than numeric analysis alone in the TES format?

  • Can a global analysis that incorporates numeric analysis in the TES format identify those deceptive individuals trained in and performing CM?

  •If research results can answer questions 1 and 2 in the affirmative, are their specific global criteria that led to the affirmative answer

11

2001 Study - Research Questions

- Can global analysis incorporating numeric analysis identify deceptive and non- deceptive examinees significantly better than numeric analysis alone in a mock crime TES format?

- Can global analysis incorporating numeric analysis identify those deceptive individuals trained in and performing CMs?

- If questions 1 & 2 affirmative, are there specific global criteria that led to the affirmative answer?

12

Dan Weatherman & Paul Menges

2001 Study

• The above questions written after Dan & Paul compared notes on their experience with global evaluation in the screening environment (CSP's & TES).

• Both Dan & Paul were convinced they would identify most of the mental countermeasures, as well as most of those programmed guilty through global analysis alone.

• The premise is that the examiner not worry about CM activity, but rather look for consistent, significant, and timely responses at the relevant questions – by doing so, most of the individuals programmed guilty with CM training would be caught.

• Dan designed an evaluation sheet with 23 criteria that he and Paul suspected might be present if CM activity were to take place.

   • Some of the 23 criteria they considered typical of a deceptive response that guilty might display.

Innocent 50
Guilty 50
Gu/CM 119
Gu+Gu/Cm 169

Correct   Incorrect   N.O.
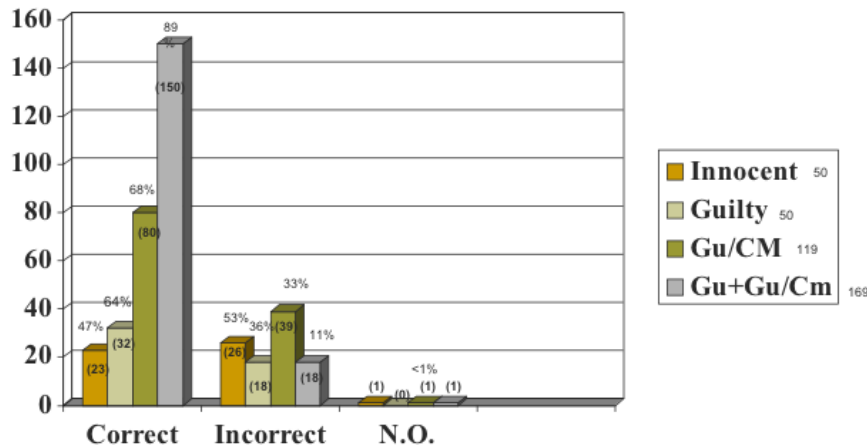
FOR OFFICIAL USE ONLY   13

Dan Weatherman's Decision Results
2001 Study

• Global analysis after a numeric analysis. If the numeric analysis had "significant response" numbers the examinee was always called SR.

•If the numeric analysis contained "no significant response" a global analysis was conducted and the decision (SR or NSR) came from the global analysis.

• **47%** of the innocent correctly identified. (**Will discuss this later**)

• **64%** of the guilty correctly identified.

• **68%** of the guilty trained in countermeasures correctly identified.

• **89%** of the guilty & guilty trained in CM correctly identified. This occurred when a global analysis was used looking for significant, consistent, timely responses.
•One Exam dropped because it was absolute garbage – this the only NO decision.
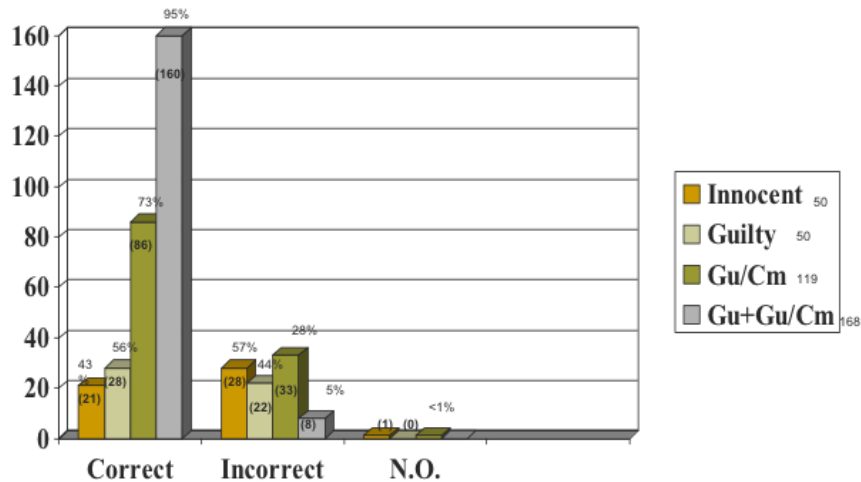
Paul Menges' Global Decisions
2001 Study

- **43%** innocent examinee's correctly identified. (Will discuss later)

- **56%** guilty examinee's correctly identified.

- **73%** guilty trained in CM correctly identified.

- **95%** guilty & guilty trained in CM correctly identified.

- The positive side is that most of the GU + GU/CM caught.

- The negative side is the low number of innocent examinee's correctly identified.

Global Criteria used in the 2001 Study

- 23 global criteria considered in the evaluation.

- 9 global criteria used significantly more than others.

- Some criteria for mental CM & other criteria to ID deceptive people.

15

• Weatherman & Menges developed an evaluation sheet containing 23 criteria that they suspected might show up either because of a CM or because of a deceptive response.

• The only criteria that we will discuss in the next few slides are those criteria used to identify mental CM activity.

•The evaluation sheet developed by Weatherman contained the following:

• PN channel had: 6 criteria

• EDA channel had: 4 criteria

• CV channel had: 4 criteria

• Other global criteria: 9 criteria

• Common Denominators found by Weatherman & Menges in the CM study (by frequency):

    • Any exaggerated breathing at DLC questions

    • Diverging or converging PN channels at DLCQ

    • Permanent change of baseline at DLCQ

    • Apneas at DLCQ

    • Hyperventilation at DLCQ

• Gordon Barland was the first to identify the diverging Pneumograph tracing as a mental CM signature.

• Answer-like distortions not at logical location – occasionally present, but not a significant criteria

Common Denominator EDA

- **None**

- **Occasionally observed the following:**
  - EDA latency
  - Exaggerated EDA at DLCQ
  - Exaggerated EDA at DLCQ with consistent, significant responses at relevant questions in the cardiograph channel

• **Occasionally, there were EDA criteria, but it varied and was not considered significant.**

• **For instance:**

   • **EDA latency – Consistent at all but the DLCQs**

   • **Exaggerated EDA at DLCQ – EDA 5 times larger at DLCs than any other Q**

   • **Exaggerated EDA at DLCQ with Con/Sig/Timely responses at cardio channel at relevant questions**

• **Labile EDA – A possible signature based on field exams of confirmed CM cases (predominantly specific issue exams) – Labile means GNT**

   • **We suspected that those performing CM were more nervous than others so the EDA channel might show nervous tension.**

   • **The problem – there were a few examiners that obviously had PPP because every exam they conducted contained labile EDA.**

• **Common Denominators (Cardiograph)**

   •**Exaggerated Cardio tracings that are too good to be true.**

      • **This usually consisted of a DLCQ CV that had a double rise**

   • **Cardio tracings that jump (sharp rise) at DLCQ – Paul called it "Dan's jumping cardio"**

• **Less common denominators:**

   • **Movement in the cardio at the DLCQ**
   • **Latency in cardio tracings at DLCQ**

• **The key is a global review of the chart. If it is too good to be true - then it is too good to be true. [Dr. Barland's Rule of Inequality – If it looks too good to be true at a comparison question, it probably is. If it looks too good to be true at a relevant, the examinee is probably DI"]**

• **One interesting aspect - if the PN channels wandered off the base line and the cardiograph had a sharp rise at the same time it was almost always due to a mental CM.**

Common Denominators Other Global Criteria

- Suspiciously large DLC's.
- Massive Sac/Relevant responses.
- Large variance between RQ's.
- Excessive GNT, plus rapid cardio rate.
- Consistent, significant, timely responses at a RQ regardless of the numeric score?

19

• **Suspiciously large DLCs:** If the DLC's were consistently large at each asking (compared against all other questions) then it was considered a atypical criteria.

- • Speaking of any channel

• If the **Sac/Relevant** was massive, we (Dan & Paul) considered the possibility that the examinee was programmed guilty or guilty with CM.

- • Speaking of EDA and Cardiograph channels

• If there was a **large variance** between Relevant Questions (e.g. +8 at one spot and a +1 at the other) we (Dan & Paul) opined that the +1 due to differential salience, thus we considered the individual to have been programmed guilty or gu/CM.

• If there was **excessive GNT** throughout the exam + rapid cardio this was considered suspicion criteria possibly because of CM or programmed GU or GU/CM

• Menges results better because cardio was over 100 BPM called GU or GU/CM

• If the numeric score was NSR, but the relevant questions contained significant, consistent, timely responses in any of the components on at least two askings the test was considered SR.

2001 Study Problems

- Study population skewed.
- We chose not to make N.O. decisions.
- 50 programmed innocent
  - 9 admitted to changing breathing to "help" the test.
  - 9 had friends who took part in the project prior to volunteering.
  - 6 numerically SR to espionage, both exams.

- **When we began the study we made the assumption that the innocent, guilty, and guilty with countermeasures were each one third of the total population. We were wrong.**

  - **120 programmed GU/CM**
  - **50 programmed GU**
  - **50 were innocent**

- **Problems with those who were innocent in the study.**

  - **9 admitted in the out brief that they deliberately changed their breathing to "help" the test. Breathing is a major criteria used to identify mental CM.**

  - **9 admitted they lied in the pre-brief when asked if they had friends that participated in the study (*This would have precluded them from participating and getting paid).* One participant admitted that 4 of her coworkers had already participated. All 4 had been programmed GU or GU/CM.**

  - **6 were numerically SR on both TESA & TESB although innocent. They, along with the woman above may have had friends programmed GU or GU/CM.**

Mental Countermeasure Signatures

■ **The following are charts taken from Dr. Barland's 1995 CM study using mental math (picking a number above 600 & counting backwards by threes)**

21

• **What you will learn by the end of the week is the same signatures will appear when physical CM are attempted.**

• **We believe that mental CM create a cognitive load that forces physiological changes that the examinee is unaware that they are producing.**

• **We also believe that all physical CM require a mental process creating a cognitive load causing some of the same CM signatures.**

• **We discourage BI or accusing examinee of manipulating breathing, because as you will see mental CM will cause breathing changes that examinee is unaware of producing.**
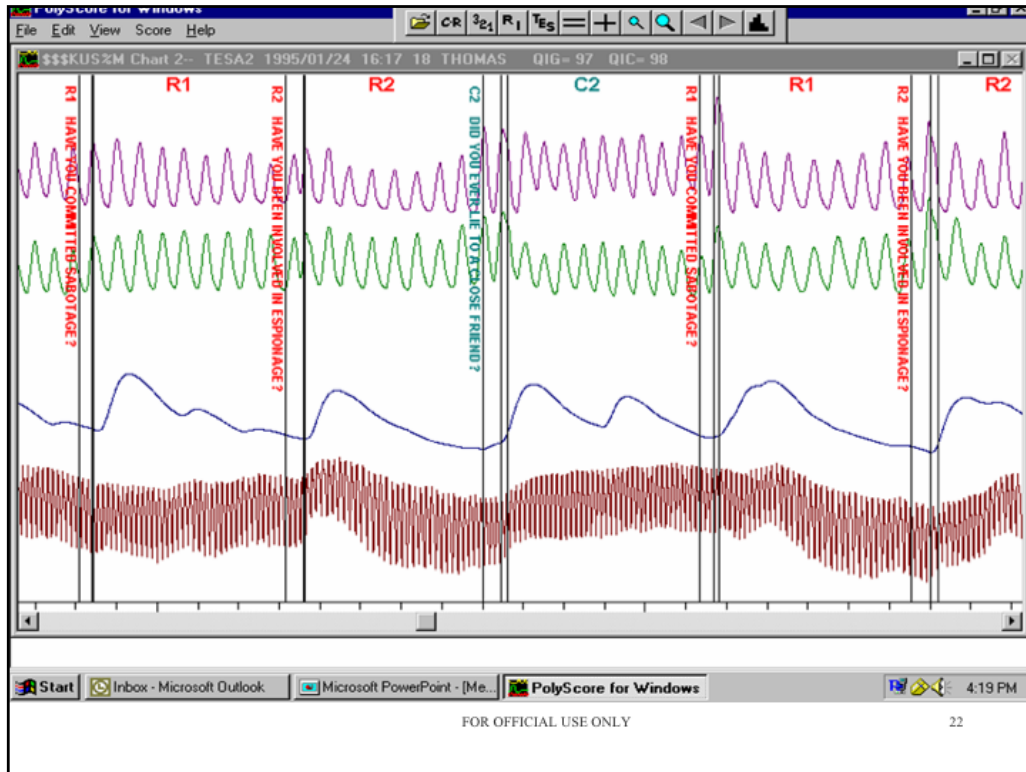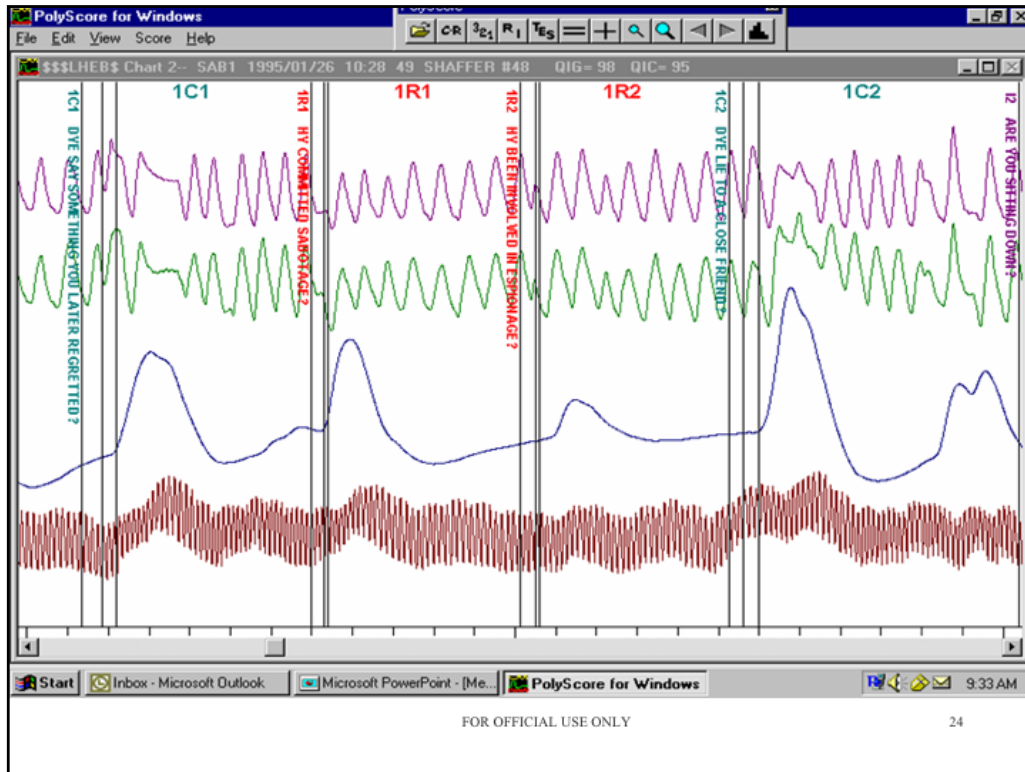
- **What does a global view of the test data tell you?**

- **Question C2**

  - **What do you see in the PN channels?**
  - **Does the EDA look different from the other EDAs?**
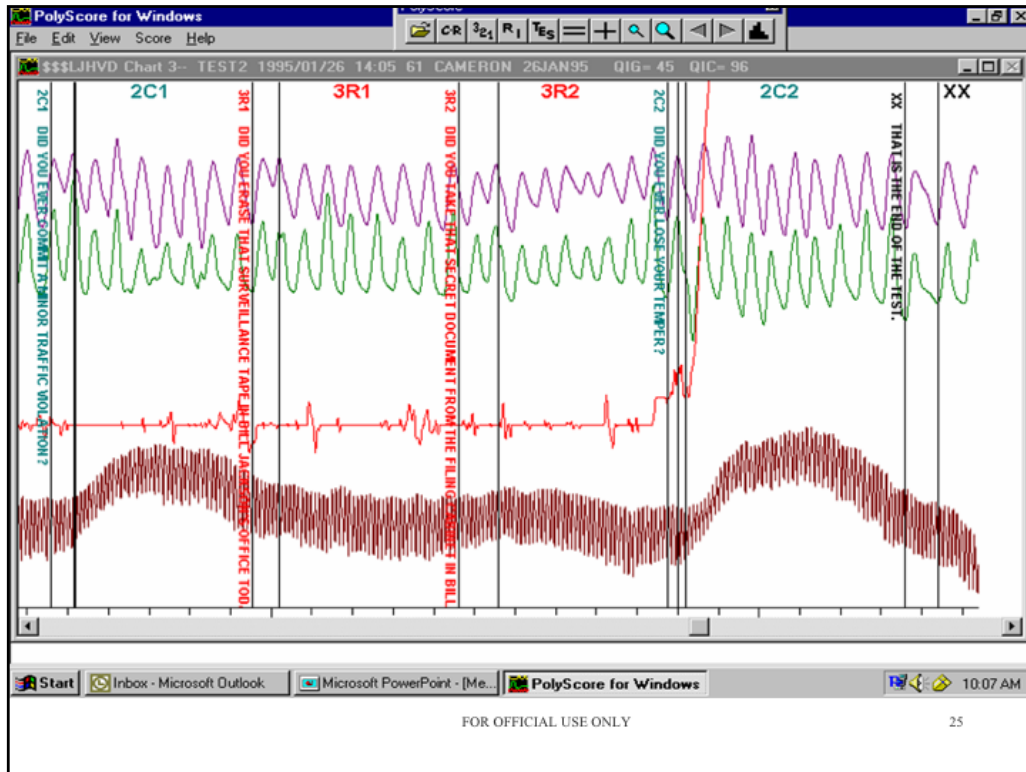 - **What is different about the CV channel? (108 BPM)**
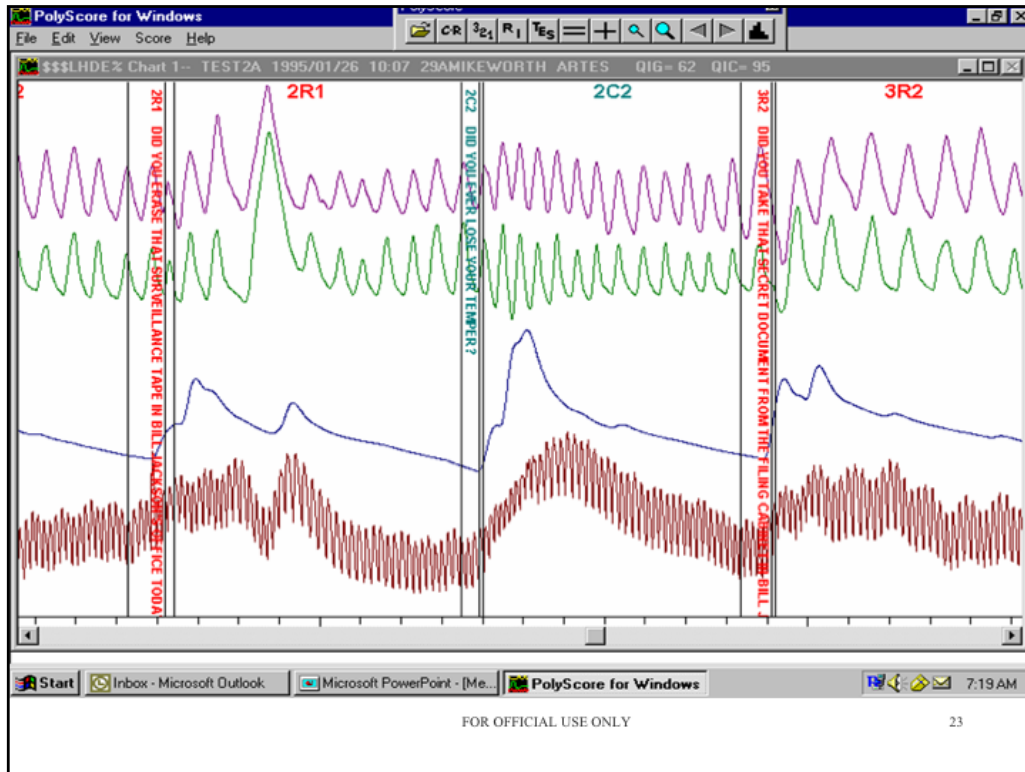
- **What do you see that might appear atypical?**
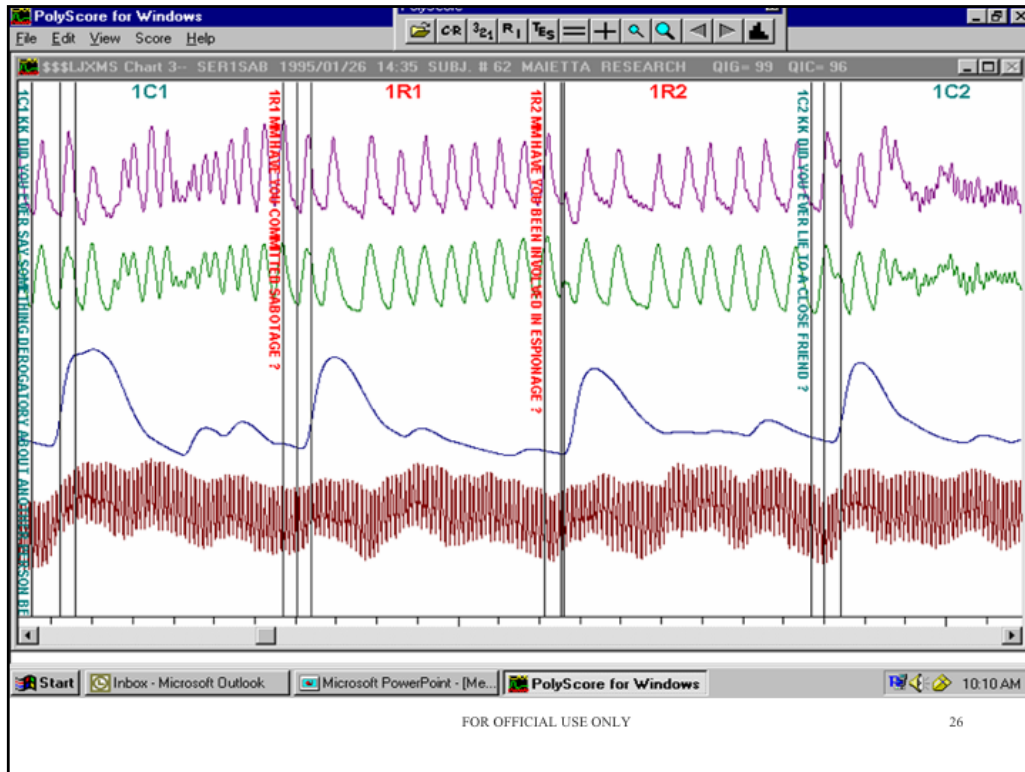
  - **Look at question 2C2**

    - **PN channels**
    - **EDA**
    - **CV**

• **What do you see that appears atypical?**

    • **Look at both DLCQs – what do you see?**

        • **PN channels**

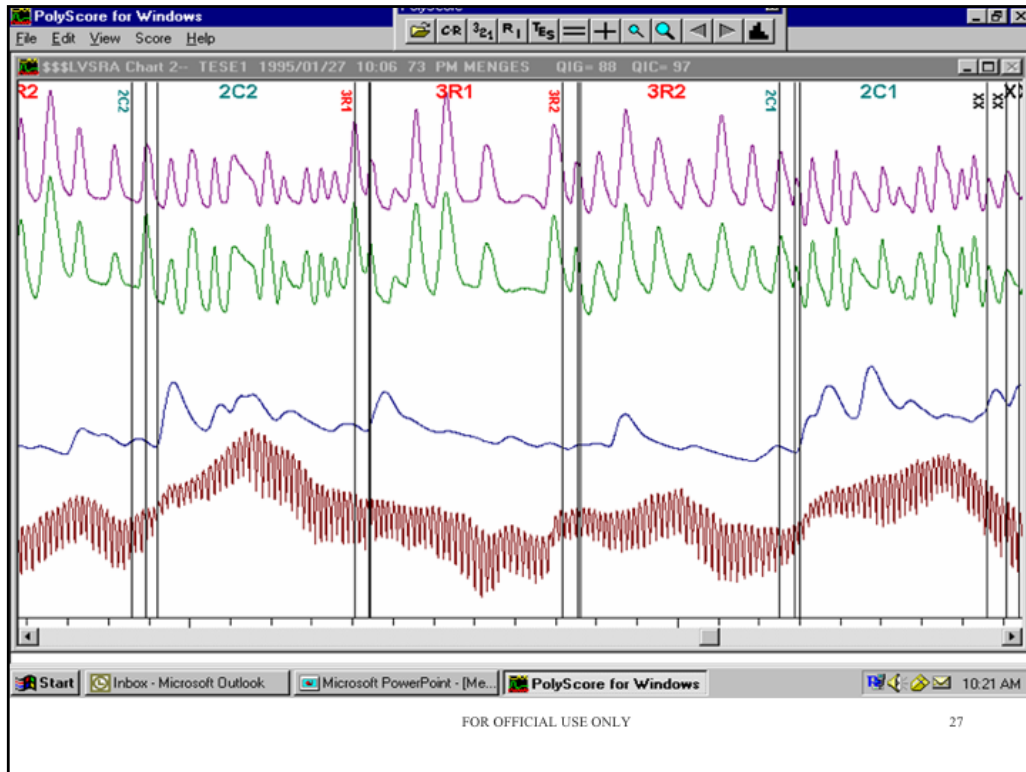   • **EDA**

        • **CV**

• **Do you see suspected CM activity?**
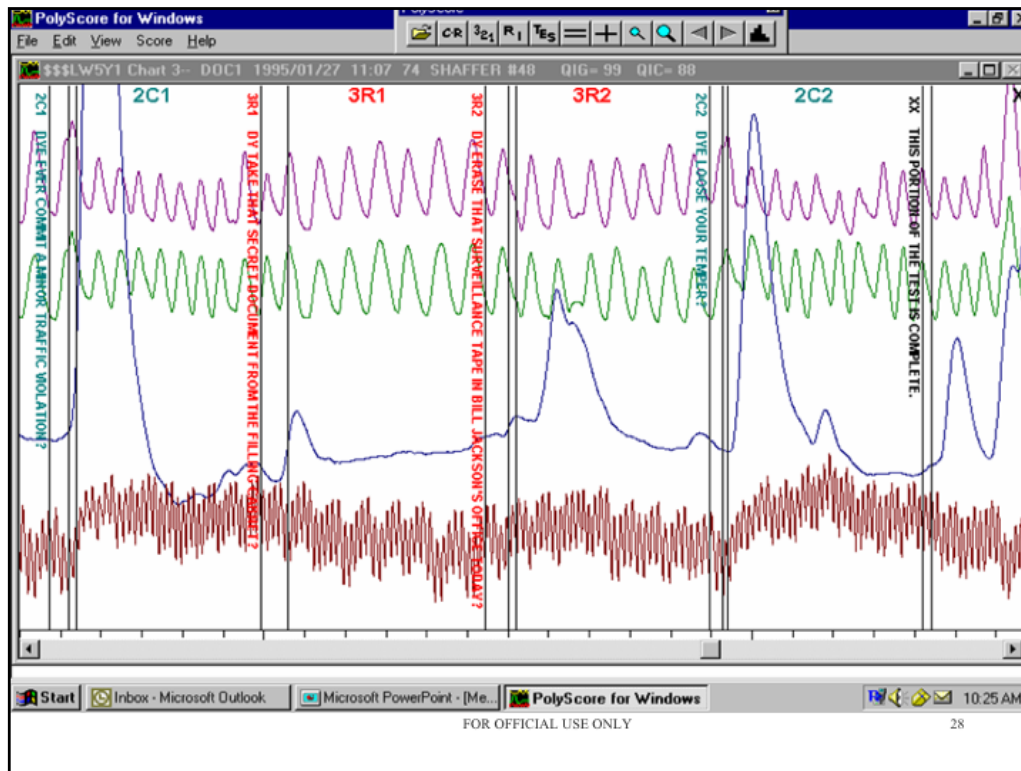
      • **PN channels**

   • **EDA**

      • **CV channels**

• **Reminder – each slide contains physiology produced by a "mental" CM**

     • **What do you think is going through the examinee's mind if he or she is given a BI?**

     • **Do you think they are aware that their breathing is atypical?**

- **Discussion:**

    - **You notice that both PN channels are erratic although the baseline appears fairly stable.**

    - **Do you think it is possible that when some examinee's perform a CM at the comparisons for 20 seconds then a relevant is asked – the recovery (in this case, rate & amplitude change) makes the whole chart appear erratic?**

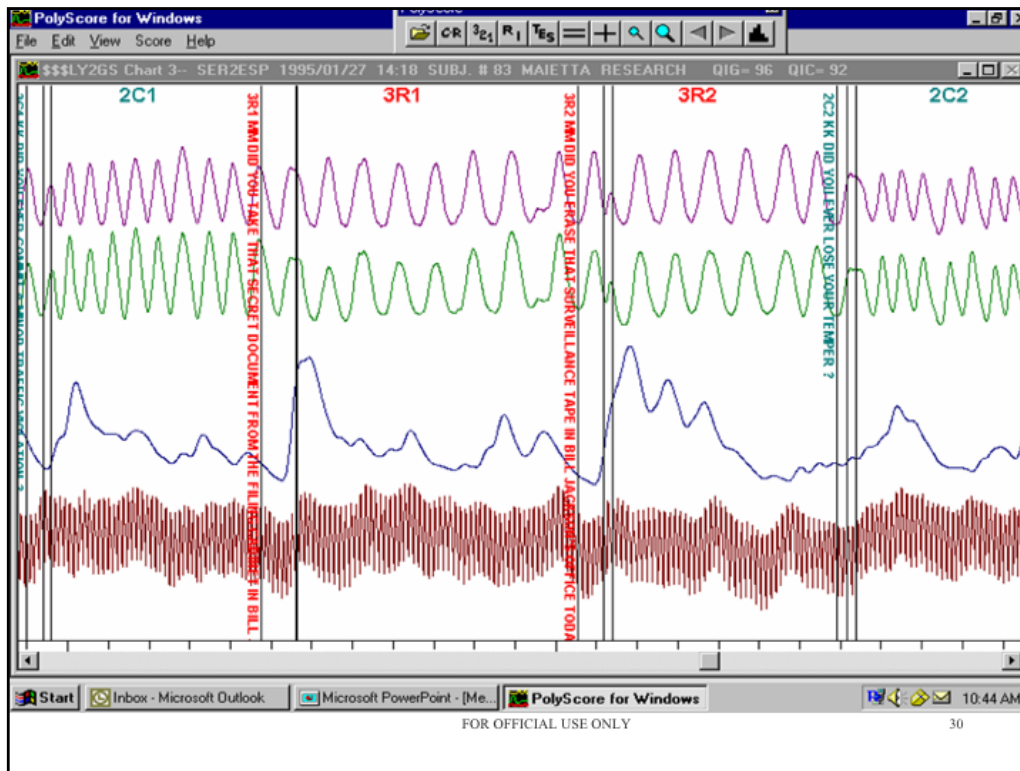- **What do you see that is atypical and indicative of CM activity?**

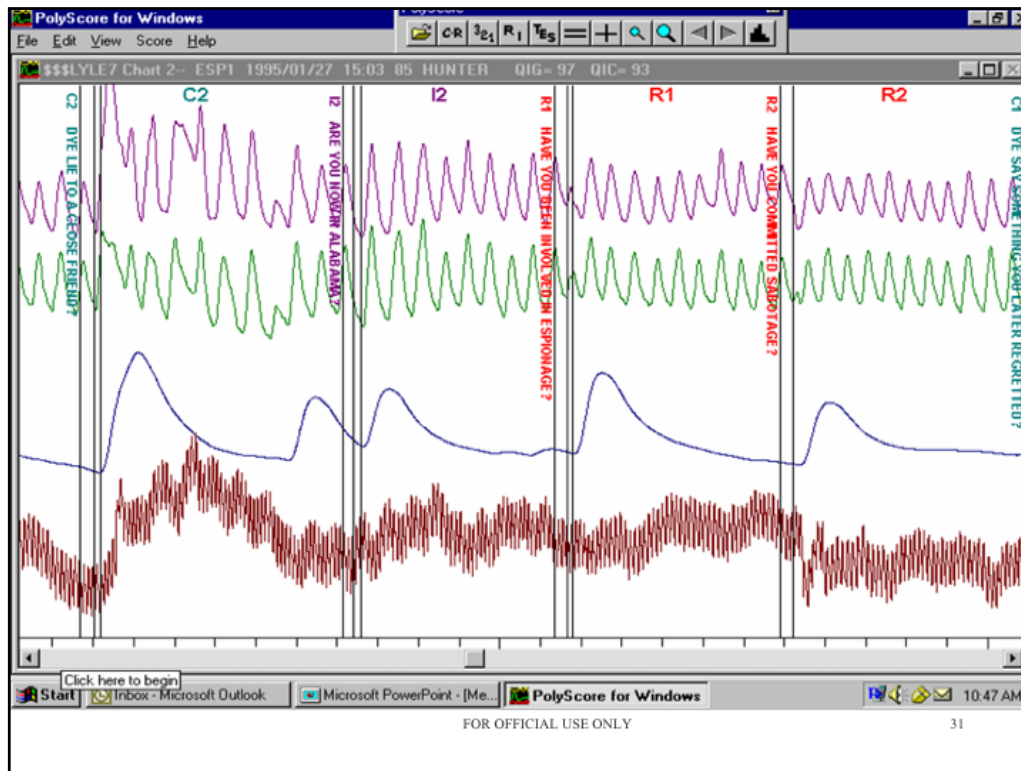- **Do you think the EDA channel at the DLCQs is significant?**

- **How about the CV channel?**
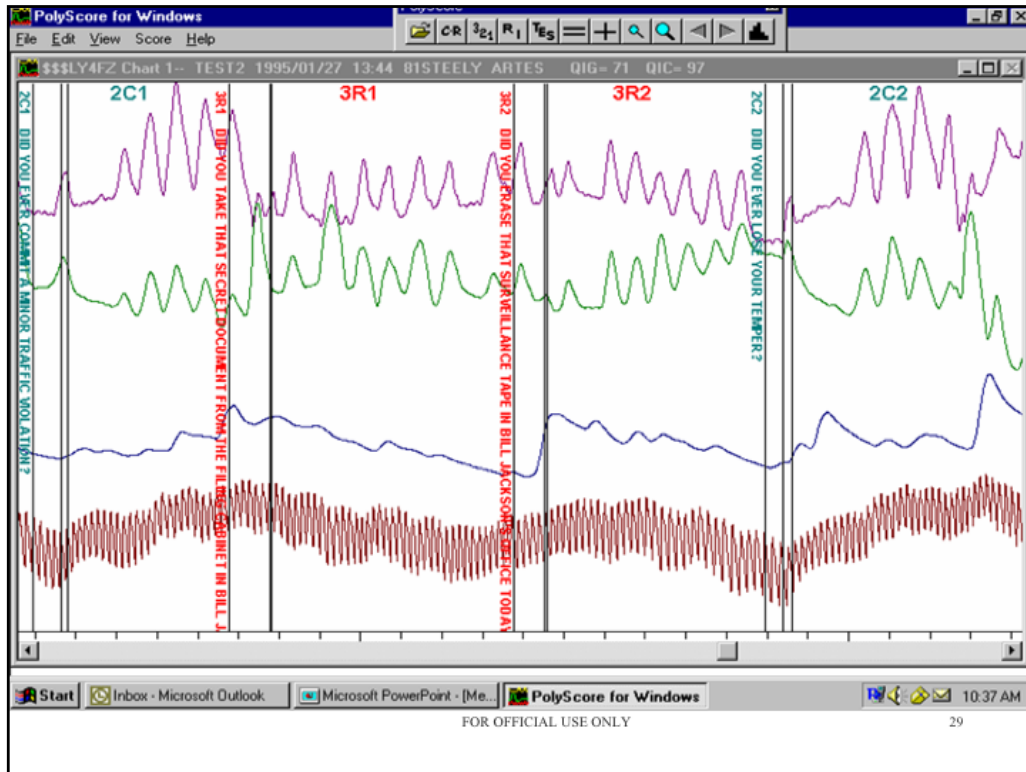
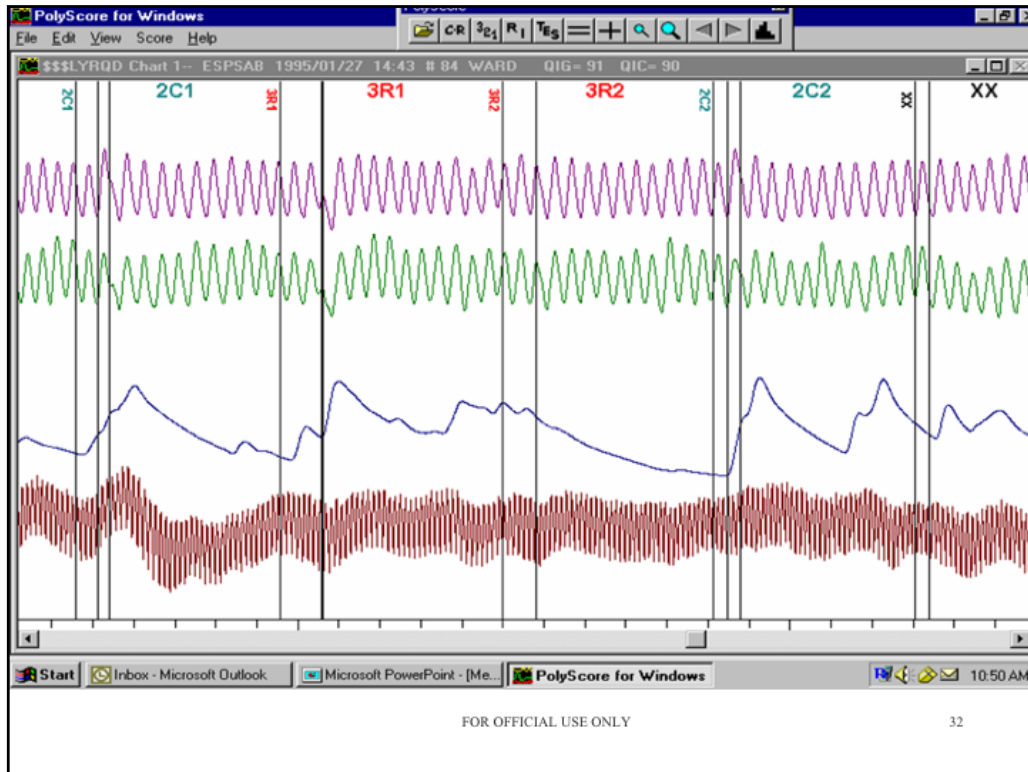• **What does the test data tell you?**

• **Point it out**

• **Are you beginning to see that mental CM activity affects the various polygraph channels?**

• **Do you see which channel has the most significant change?**

• **What looks atypical on this chart?**

• **What do you see that is atypical?**

      • **Nothing – this is an NSR exam**

      • **No CM activity**

• **Don't get paranoid!!**

• **Features Identification Project** – Dollins, Austin, & Kircher – Entering final phases

  • **Use software to validate CM signatures**

  • **Reason we need confirmed CM cases from you**

  • **Final product to the field will be a software package to detect CM**

  • **Difficulty training the software to see what we see**

• **CM Replication Study using TES Format**

Apnea — **Features Identification Project**

An ROI must fall ... between ⦿ outside of ○   0.00 (lower limit) and 0.80 (upper limit) proportion mean amplitude of adjacent cycles

for at least 3.00 seconds

Respiration
⦿ Apnea
○ Line Length
○ Amplitude Consistency
○ Rate Consistency
○ Exhalation Cycle
○ Parallelism
○ Baseline
○ Hyperventilation
○ Bradypnea
○ Answer Latency

Electrodermal
○ Lability
○ Response Latency
○ Response Amplitude
○ Connectivity Loss

Cardiograph
○ Tachycardia
○ Bradycardia
○ Response Angle
○ Response Duration

Movement
○ Amplitude

Any Channel
○ Running Line Length
○ Running Angle

		Serial Position	Event Type	Chart Position	Onset	Window Length
✓	1	ALL	ALL	ALL		
	2	ANY	ANY	ANY	0.00	20.00
	3	ANY	ANY	ANY	0.00	20.00
	4	ANY	ANY	ANY	0.00	20.00
	5	ANY	ANY	ANY	0.00	20.00
	6	ANY	ANY	ANY	0.00	20.00
	7	ANY	ANY	ANY	0.00	20.00
	8	ANY	ANY	ANY	0.00	20.00
	9	ANY	ANY	ANY	0.00	20.00
	10	ANY	ANY	ANY	0.00	20.00
	11	ANY	ANY	ANY	0.00	20.00
	12	ANY	ANY	ANY	0.00	20.00
	13	ANY	ANY	ANY	0.00	20.00
	14	ANY	ANY	ANY	0.00	20.00
	15	ANY	ANY	ANY	0.00	20.00
	16	ANY	ANY	ANY	0.00	20.00
	17	ANY	ANY	ANY	0.00	20.00
	18	ANY	ANY	ANY	0.00	20.00
	19	ANY	ANY	ANY	0.00	20.00

FOR OFFICIAL USE ONLY/LAW ENFORCEMENT SENSITIVE

☑ Enable   Reset Grid   OK   Cancel

**Identification module: Features on the left.**

• **Heart of PDDXTRACT.**

Each feature include parameters or settings that are selected by the user that tell PDDXTRACT the details of each feature it should be looking for. For example, in this case, we may only be interested in instances of Apnea that are at least 3 seconds in duration. All features have user-defined parameters such as this.

One of the challenges we face is to define the parameters so that the desired features are identified, while excluding those instances that are not of interest.

The interface requires you to click the circle next to the feature that you wish to work on. Currently 'Apnea' is selected.

The highlighted features are those that PDDXTRACT will attempt to identify in the coming analysis.

Serial position and chart position allow you to dictate where the stimuli you are interested in will fall. Event type, refers to question category, such as CQ, RQ, etc. Onset and window length allow the user to define when the event starts and how long PDDXTRACT should be looking for it. You can define these parameters for each individual feature.
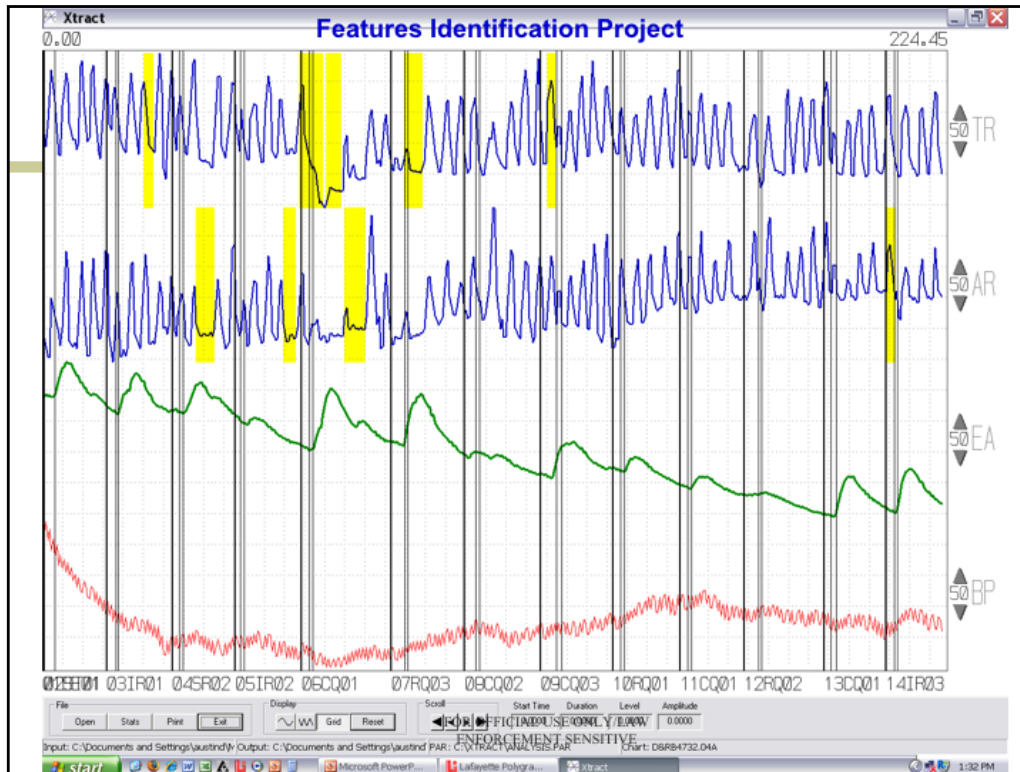
Here is typical output from a single chart evaluation using PDDXTRACT. The highlighted portions indicate that a defined feature has been identified. You can click on the highlighted region to determine what has been found, how long it lasts, etc.

Note that PDDXTRACT is not perfect, there are instances that have not been identified (note instances of apnea that have not been highlighted in the pneumos).

In batch mode, the outpoint file is simply a text data file that includes all of the features selected, and all the instances that were discovered, both in collective or aggregate form, and individually. This is the aspect of PDDXTRACT that will allow for the greatest contribution through a variety of research studies.

CM Research Block Summary

- Non-government research suggest CM affect physiology causing false-negatives
- Government research came to the same conclusion
- Government research - Manipulated physiology leaves signatures unique to CM
- Training can assist examiners in identifying CM signatures
- Software unable to identify CM

36

• **Non-government research suggests CM affect physiology and can cause false-negative results**

  • **Research also concluded that almost half of those programmed innocent in CM studies perform spontaneous CM.**

• **Government research came to the same conclusions as non-gov studies**

  • **Barland's 1995 study found the same results**

• **Government research – Manipulated physiology leaves CM signatures**

  • **Barland first observed atypical features in the PN channel**

  • **Weatherman & Menges verified PN channel signatures as well as atypical features in other channels**

  • **Software unable to identify signatures**

  • **QAP says there are no signatures – just patterns**

• **Training can assist examiners in identifying CM signatures**

  • **This can be verified by the number of confirmed CM cases being forwarded to NCCA**

  • **We also know that some Federal examiners either are still not identifying CM or are deliberately ignoring CM activity (Explain)**