Atypical Tracings

Threat Analysis & Strategic Support Branch

National Center for Credibility Assessment

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TASS Branch

- Background
  - Defense Authorization Act 1987
  - Public Law 108-136, DAA 2004
  - NAS report on polygraph, 2003
  - Battelle Report
  - DoD IG Report 05-Intel-18 (Montes)

Battelle Report: Pg needs more training on Cms.

IG Report: Refresher training, Foreign Use.

TASS Branch

- Mission
  - Training
  - Collect, maintain, analyze, disseminate
  - Conduct pilot research
  - Standardize counter-CM procedures
  - Policy issues
  - CI & HUMINT program issues
  - QAP sensitive case reviews

TASS Branch Pilot Research

- Chapter 5, 2003 NAS Report
  - CM training & detection
  - CM signatures
  - Detection of mental CM
  - CM – Screening vs. SIP
- What are we doing now?
  - XTRACT Project
  - Advanced TES/Screening
  - Managing Conversation

The Key

- What is the key to CM identification?
  - Atypical Physiology
  - Specificity
  - Frequency
  - Clusters

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- What is the key to CM features?

1. Frequency – How often does the activity happen.
2. Specificity – Where is it happening?
3. Clusters – Do you see multiple features during the examination process.

TDA Review

"Typical" Physiology

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Link to "TDA April 2007.ppt"

Disclaimer

The following information is yet to be scientifically validated. It has, however, seen significant confirmation through hundreds, perhaps thousands, of verified Cm charts.

Not all of the following atypical physiology is deliberately produced. Some are side effects of otherwise unrelated activity.

Pneumograph

False Apnea

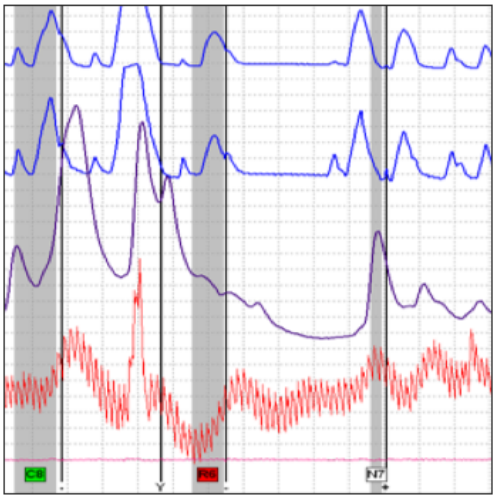
- ***True apnea*** (blocking) is rare and occurs more often at RQs than at CQs.
- High frequency of blocking at CQs may indicate CM activity.
- ***False apnea*** (holding) occurs at other than the bottom of the tracing.
- False apnea often has immediate recovery.

Definition:

•An apnea is the ultimate manifestation of respiratory suppression and appears almost exclusively at the bottom of the respiratory cycle.

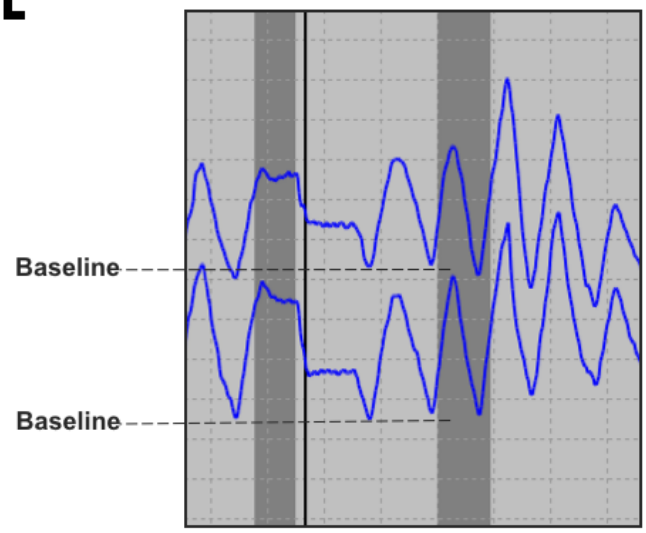
- •When the apnea occurs at the top or middle of the inhalation, it may be indicative of deliberate manipulation of respiration.
- •If apnea appears at the bottom of the exhalation tracing on several comparison questions, consider CM activity.
- •Apneas sometimes have sudden onsets, but instant recoveries should be viewed with caution.
- •True apneas are frequently observed at the relevant questions, but are elicited far less often for comparison questions.
- •One way to discern true from false apneas is whether the trailing respiratory recovery is gradual or immediate.

True Apnea

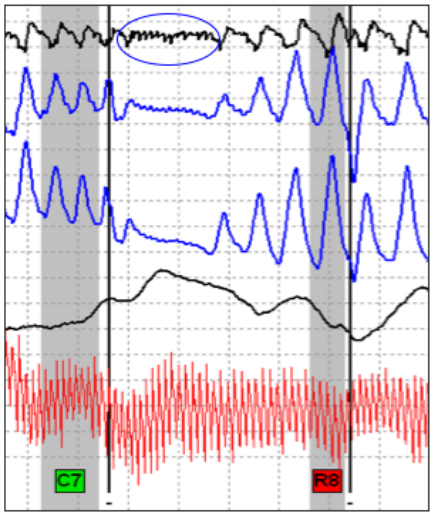


- True apnea is infrequent.
- More often seen at RQs than at CQs.
- High frequency at CQs may indicate Cms.

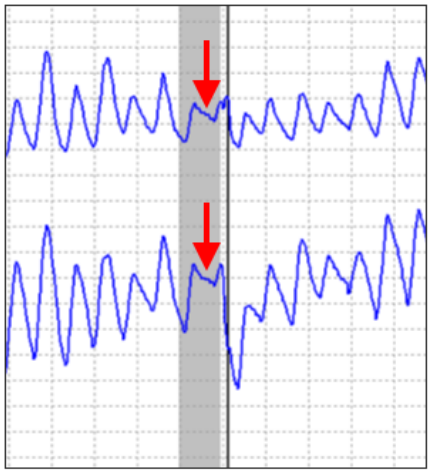
False Apnea



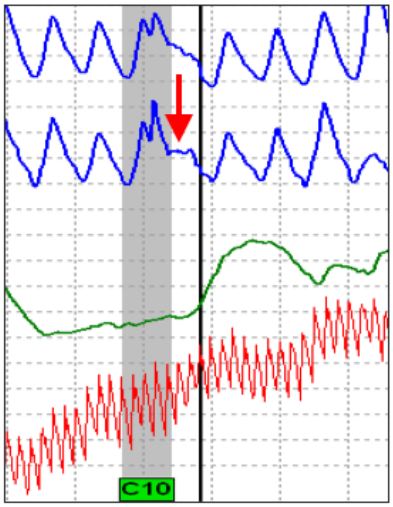
False Apnea



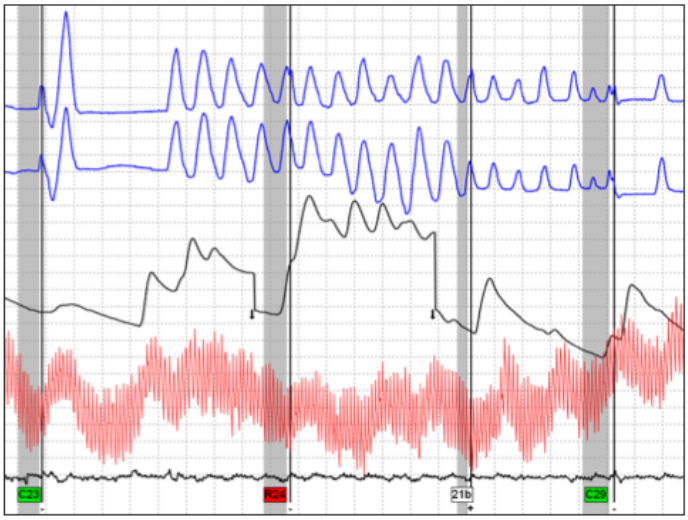
False Apnea



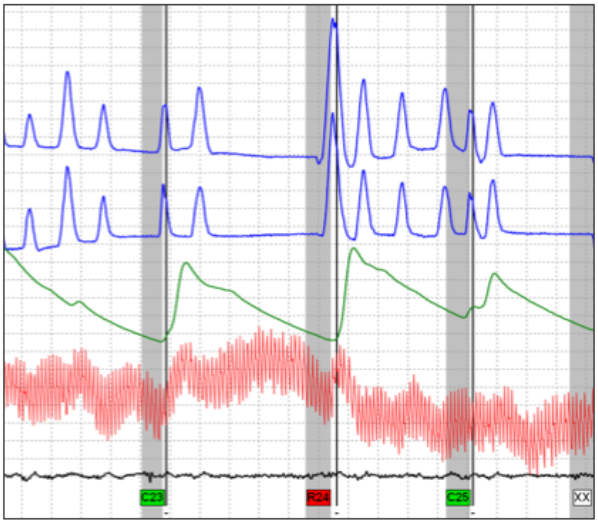
False Apnea



False Apnea



False Apnea



Exaggerated Exhalation Cycle

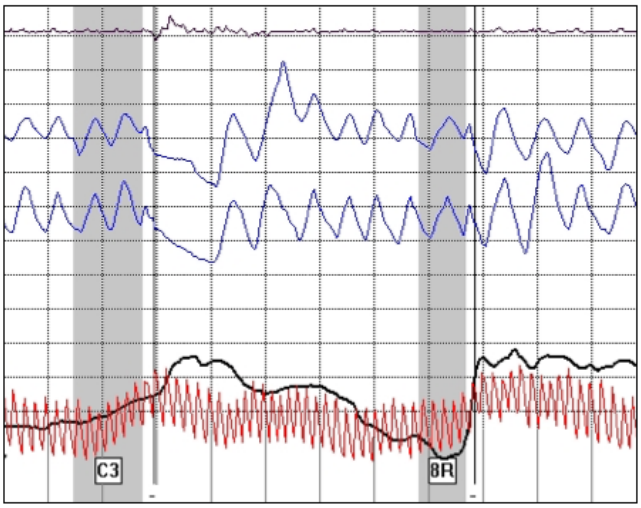
- Similar to false apnea
- One cycle of drawn-out exhalation
- Often falling below the baseline
- Immediately followed by a single deep breath

•Some of the previous slides contained at least one channel of “exaggerated exhalation.”

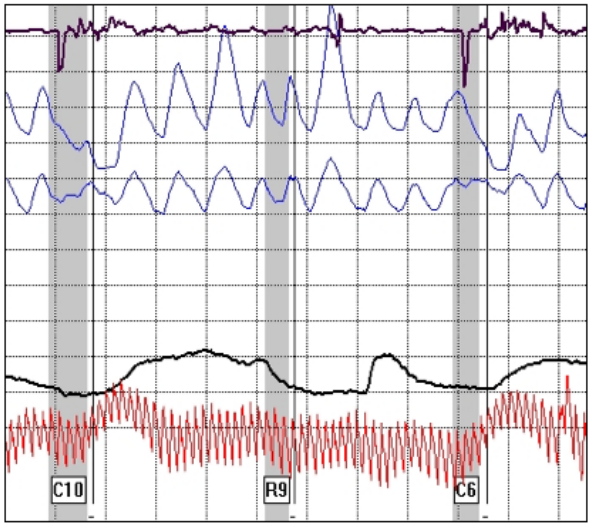
•We will sometimes see in a true response a rate change where after the answer breathing slows for several cycles.

•Exaggerated exhalation is considered false apnea because after the answer there is a sharp or drawn out exhalation followed by an immediate return to a deep breath and/or normal breathing.

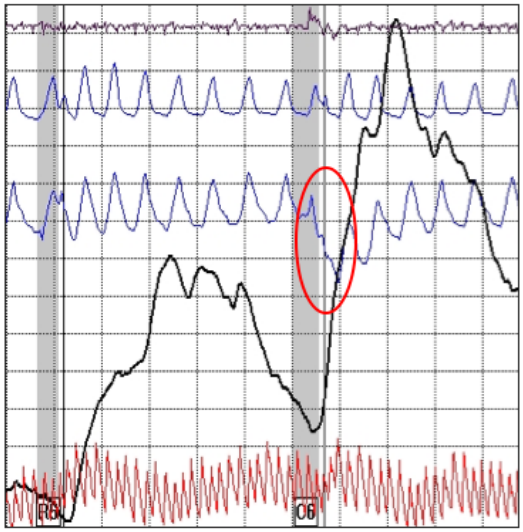
Exaggerated Exhalation Cycle



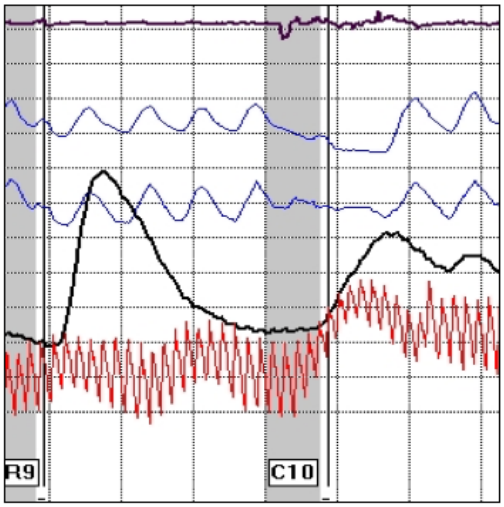
Exaggerated Exhalation Cycle



Exaggerated Exhalation Cycle



Exaggerated Exhalation Cycle



Hyperventilation

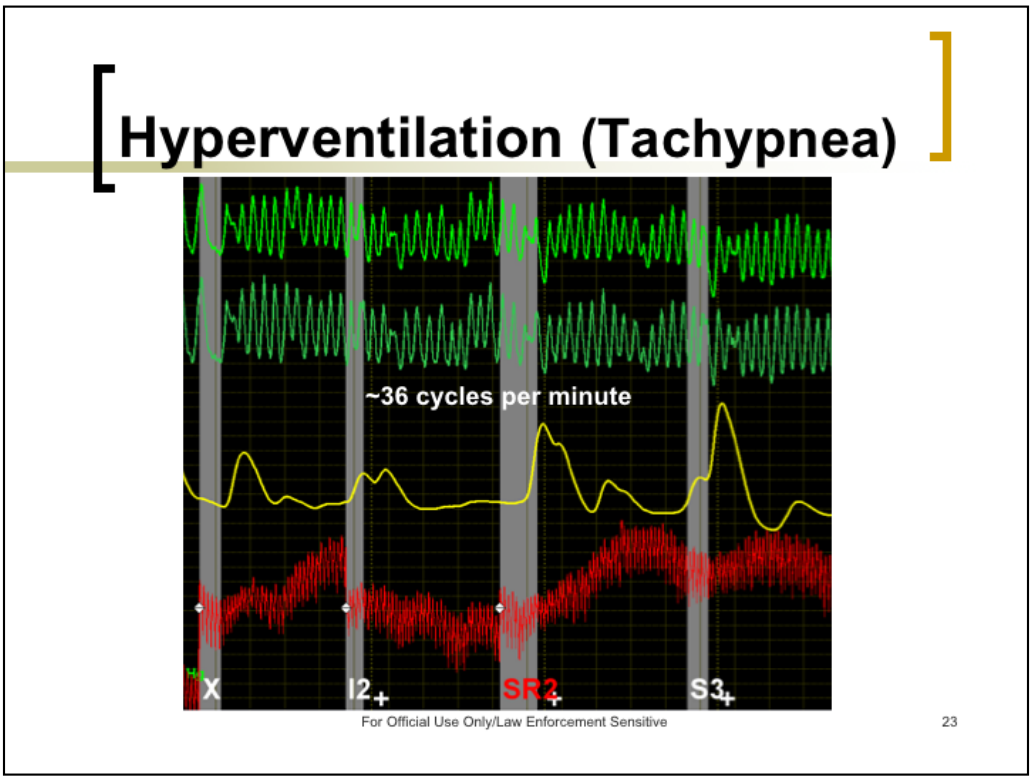
- 90% breathe 10 to 23 cycles/minute.
- Gauge normal breathing from…?
- 20% faster is an indication.
- Significant *amplitude increase* indicative of hyperventilation.

•A global analysis is required to determine why hyperventilation is occurring.

•On a DLC exam hyperventilation in the form of increased amplitude may be the result of DLC breathing; however, it could also be the result of CM activity.

•If it occurs only at the comparison questions in a PLC format it is CM activity.

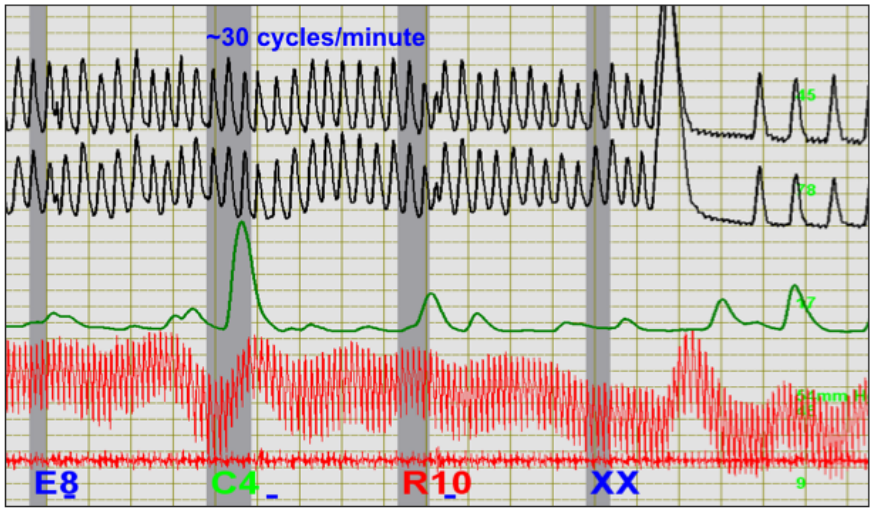
•If it appears throughout an exam it might be CM activity, but it might also be that examinee is hiding a relevant or comparison question issue.



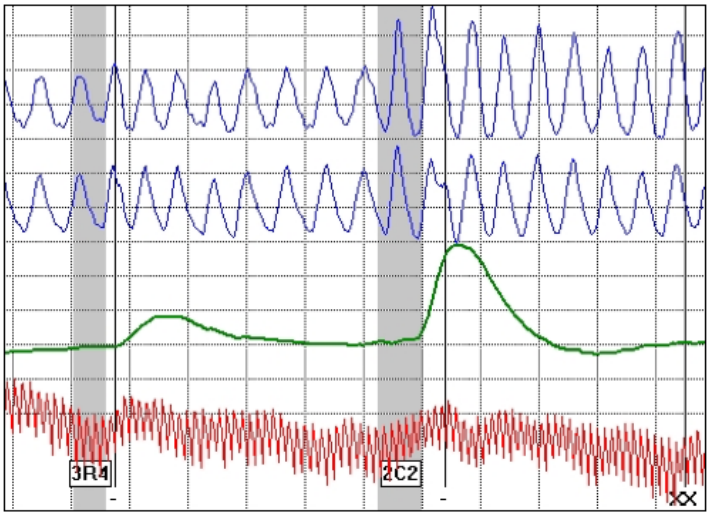
Tachypnea: (tak-ip-**nee**-uh)

Unusually rapid respiration.

Hyperventilation



Hyperventilation

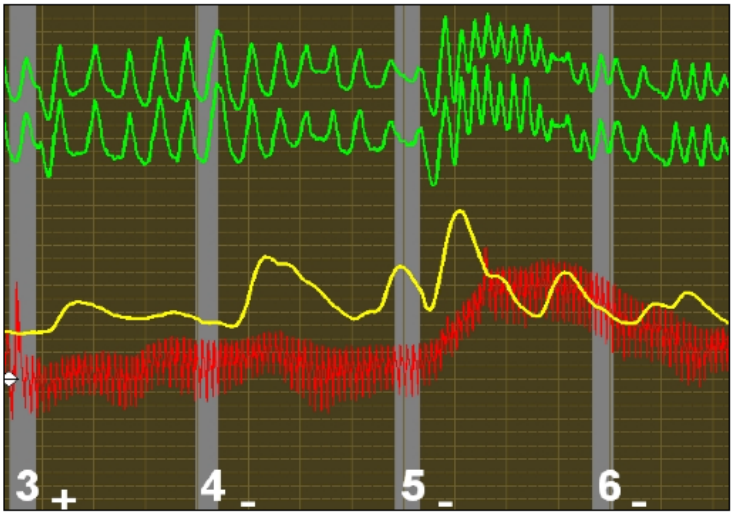


•This is an example of increased amplitude at the comparison question.

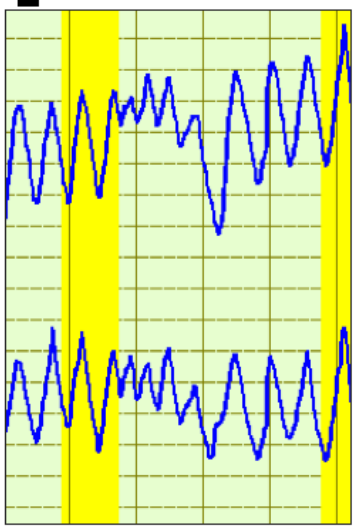
•If occurring at all of the comparison questions in a Directed Lie test this could be DLC breathing or CM activity. (Discuss).

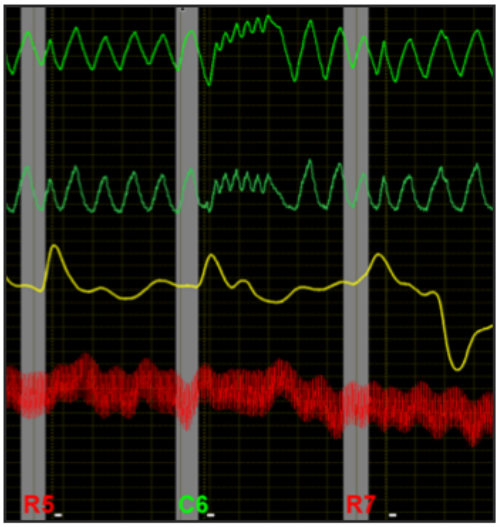
•If this activity only occurred at the comparison questions during a PLC exam consider CM activity.

Hyperventilation



Hyperventilation





•Left Slide: Hyperventilation in the pneumos. Change of baseline in the pneumos.

•Right Slide: Hyperventilation in the pneumo with baseline change. Tachycardia, prolonged response, and late secondary cardio.

Misplaced or Multiple Answer-Like Distortions

- On what side of the respiratory cycle do we typically see answers?
- How long does it take to say 'yes' or 'no'?
- Accurate markings are critical!
- Look for answer delays
- Look for sharp increases in the cardio

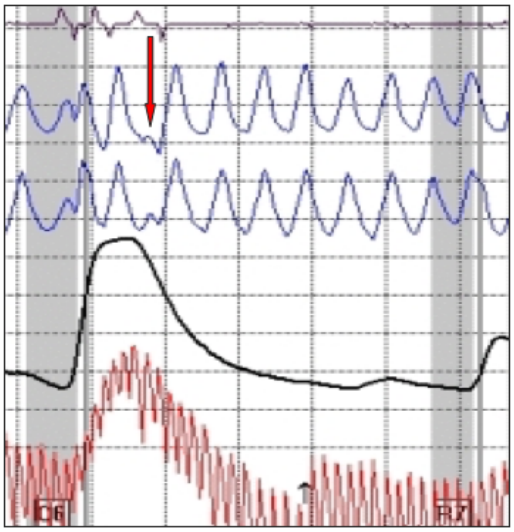
•The answer distortion is normally located anywhere on the exhalation stroke from the top of the cycle to the bottom of the cycle.

•The answer distortion should line up with the answer mark on the polygraph chart. The answer should be timely with all the other answers throughout the exam.

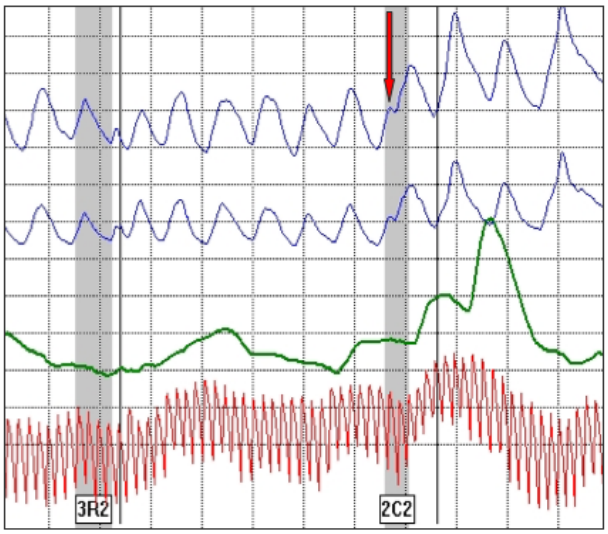
•The depiction of the crown or horns may be an indicator of CM activity. Once again must look globally. If occurring at all or most of the questions (Irrelevant, relevant & comparison) it may be normal activity. If only occurring at the comparison questions or irrelevant questions if identified as comparisons then suspect. Additionally, if the crown appears more than once across the asking it is suspect.

•If the pneumo activity is accompanied by a sharp increase in cardio activity particularly with a secondary rise in the cardiograph – suspect.

Misplaced or Multiple Answer-Like Distortions

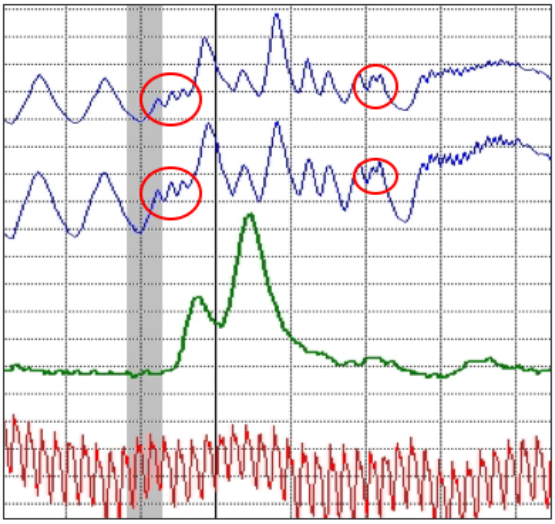


Misplaced or Multiple Answer-Like Distortions

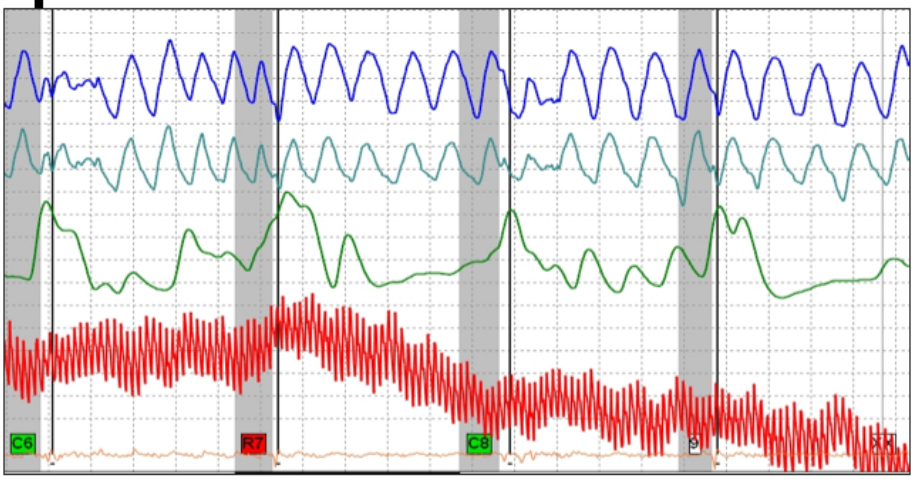


Answers rarely come on the inhalation side of the respiratory cycle.

Misplaced or Multiple Answer-Like Distortions



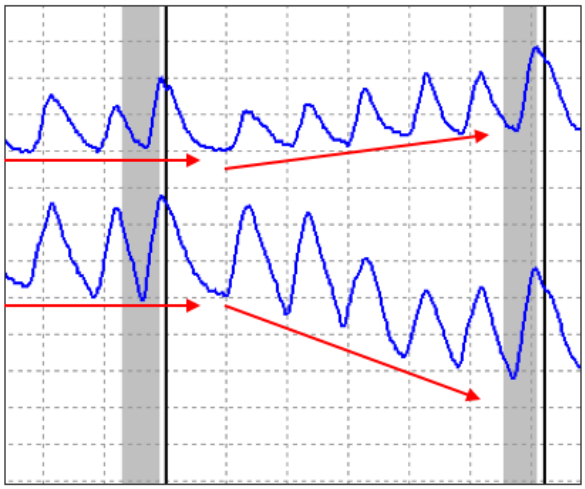
Misplaced or Multiple Answer-Like Distortions



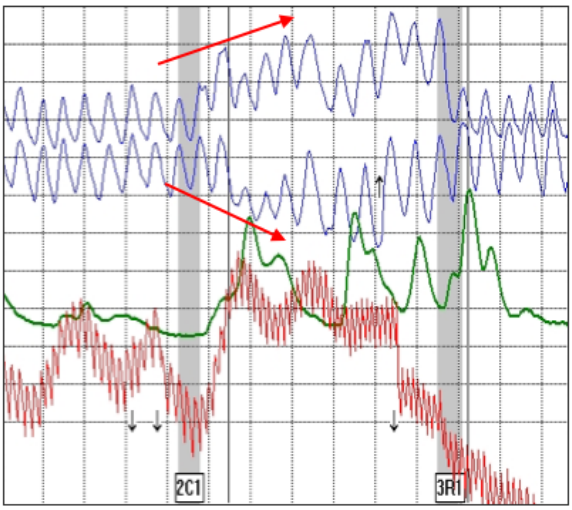
Loss of Parallelism

- Diverging or converging
- Slight or exaggerated
- Usually accompanied by other signatures

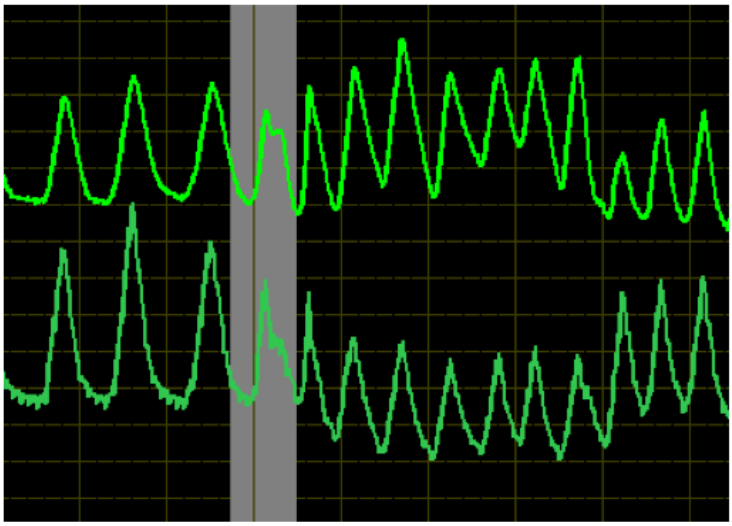
Loss of Parallelism



Loss of Parallelism



Loss of Parallelism



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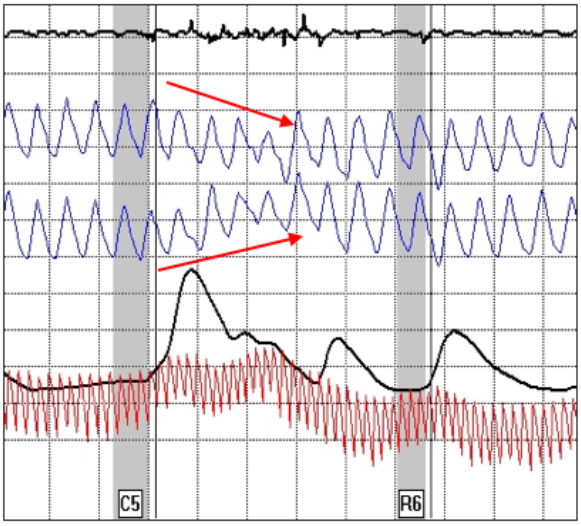
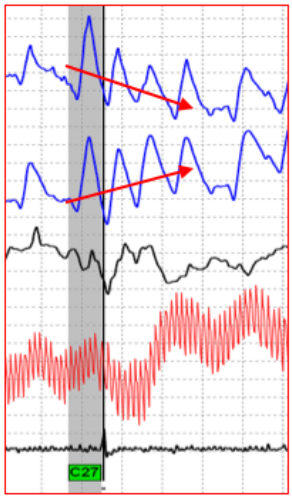


Loss of Parallelism



New Permanent Baseline

- The baseline can be up or down
- Normally at comparison questions
- Can be dramatic or subtle

•"Permanent" does not necessarily mean from point of occurrence all the way to the XX. It may just be through the particular question, then return to the original baseline.

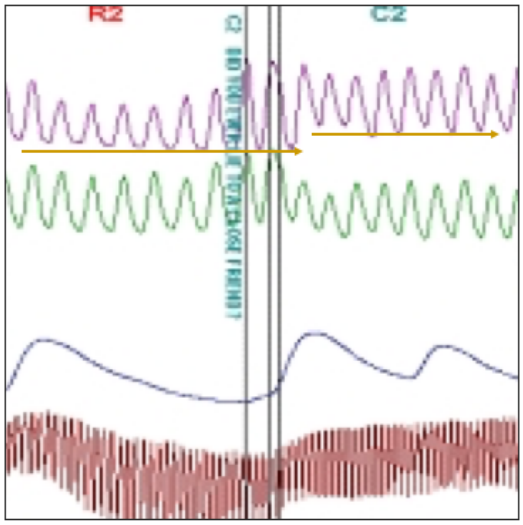
•The change need not be dramatic. A subtle change can be suspect, particularly if it occurs on more than one comparison question.

•It is important that the pneumograph tubes be properly placed on the examinee. A baseline change can result if the tubes slip.

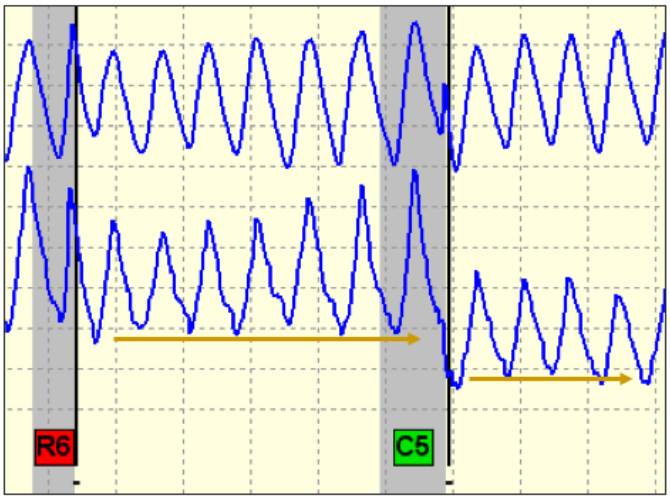
•In a PLC format, will normally occur at the comparison questions. Sometimes the examinee will be confused and it will occur at relevant questions.

•Sometimes will occur at Irrelevant questions if they have been pretested as control questions.

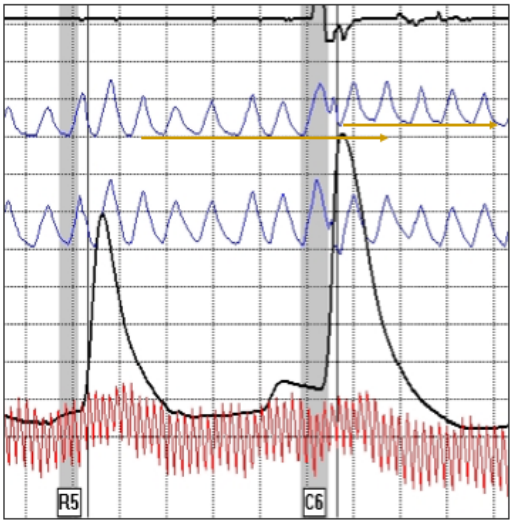
New Permanent Baseline



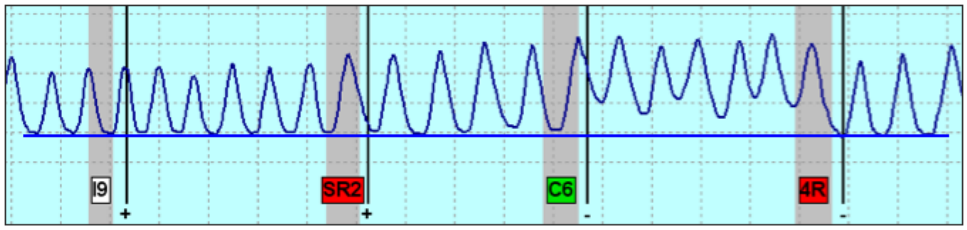
New Permanent Baseline



New Permanent Baseline



New Permanent Baseline



Bradypnea

- Resting respiration seldom below 10 breaths per minute
- Rare exceptions
- Observations

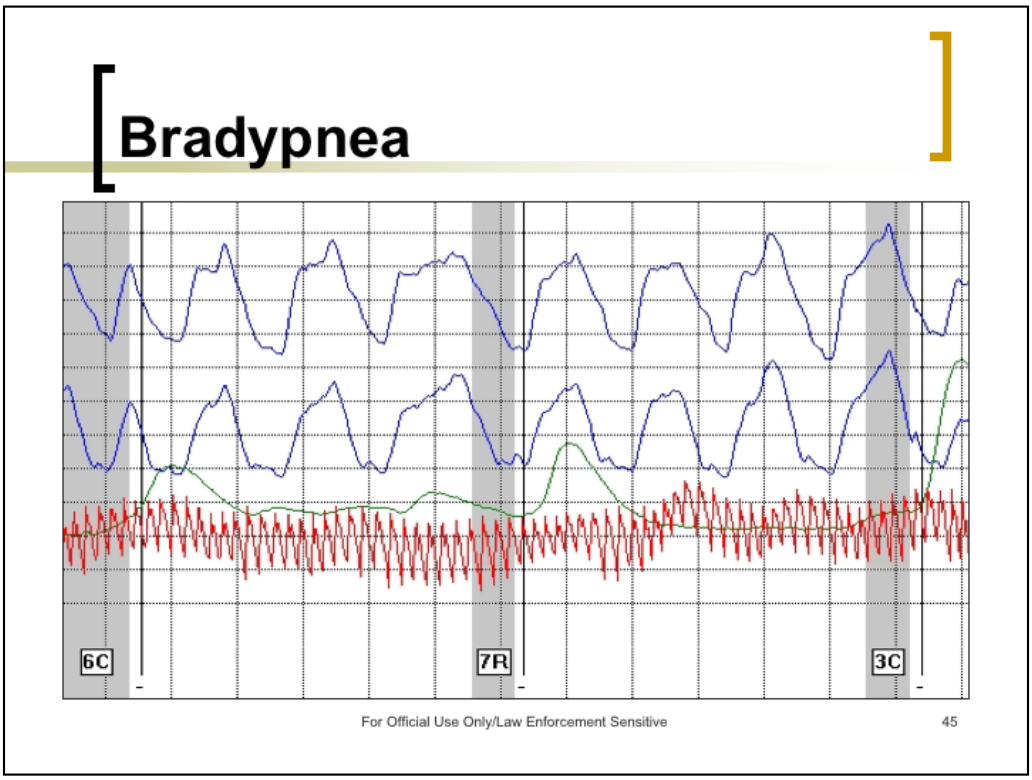
•Resting respiration rates seldom drop below 10 cycles per minute.

•The rare exceptions are those with medical conditions, and a very small group of athletes.

•Suspect respiration rates should be investigated with surreptitious observation of recording.

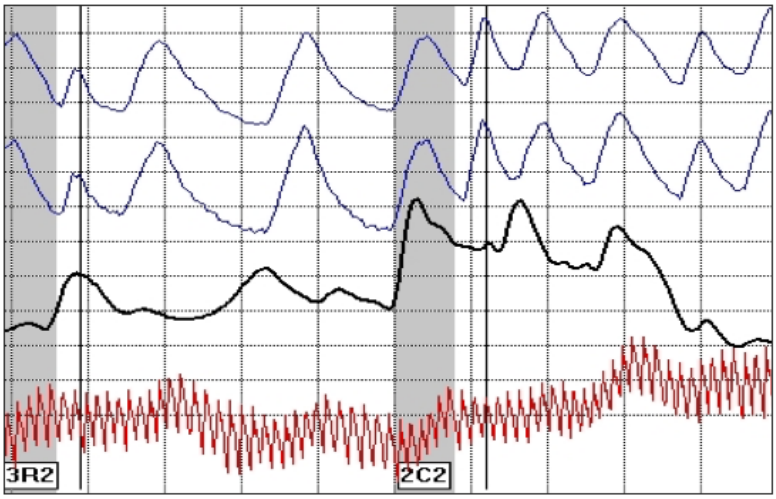
•Slow respiration is not, in itself, a strong indication of CM. However, it should be discouraged due to the influence of respiration on the other physiological data channels.

•Should we give BI to slow breathers? (No!)



•As can be seen by the slide, the breathing is very slow, but there is still good response in the cardio at the relevant issue.

Bradypnea



•Note the difference between this slide and the last slide.

•Look how slow the pneumo tracing is at the relevant question.

•At the comparison question the breathing picks up and also lifts off the baseline for 25 seconds. The corresponding cardio tracing continues up for almost 20 seconds. This is unusual considering that 2C2 is the last asking. Also, there is a latency issue with the EDA tracing. All suggest the possibility of CM activity.

Review - Pneumos

- How many Pneumo criteria?
  - *Seven*
- What are they?

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The seven criteria were:

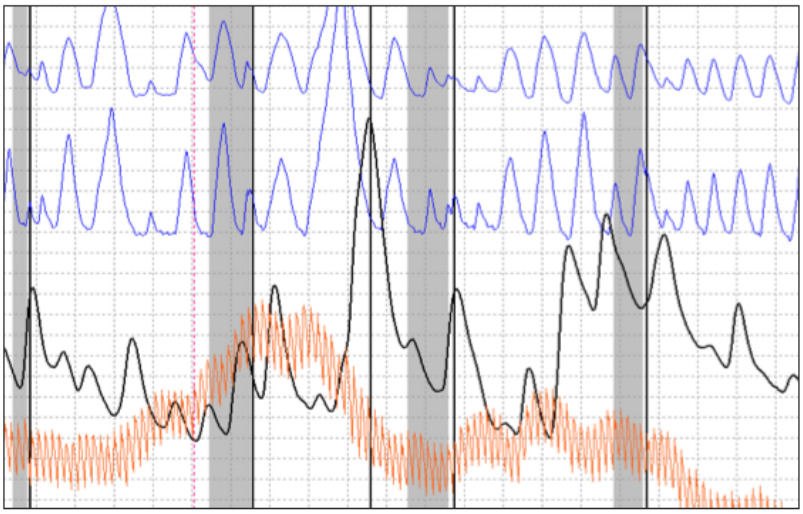
False Apnea, Exaggerated Exhalation, Hyperventilation, Misplaced/Multiple Answer-Like Distortions, Loss of Parallelism, New Permanent Baseline, Bradypnea.

Electrodermal

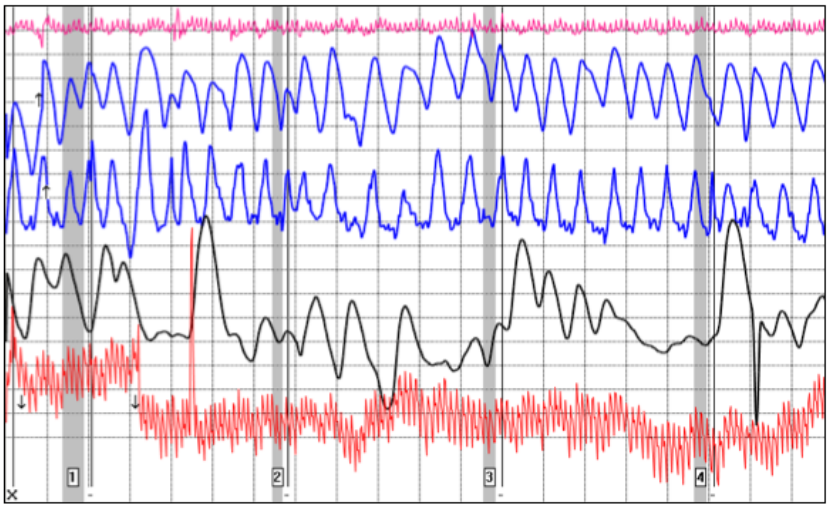
Labile EDR

- Excessive electro-dermal activity
- EDR often in constant motion
- Responses frequently seen well after points of answer

Labile EDR



Labile EDR



Inconsistent EDR Latency

- Stimulus onset to Response onset
- What is atypical?

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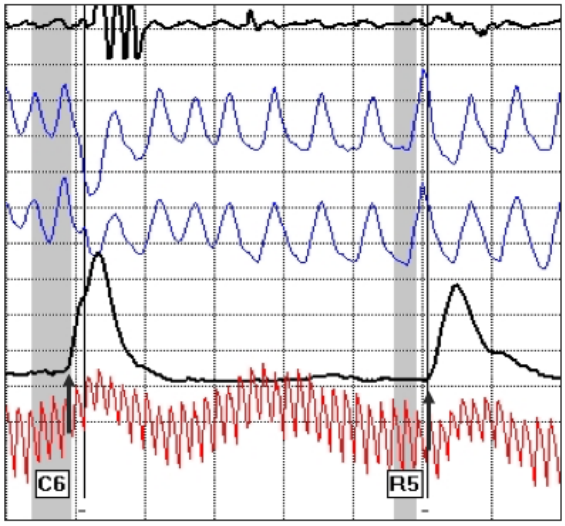
•Latency refers to the period between stimulus onset and response onset.

•The EDR may be observed rising from 0.5 seconds after stimulus onset up to 5 seconds after the examinee's answer.

•High within subject variability of latency is atypical of genuine phasic EDRs.

Inconsistent EDR Latency



Exaggerated EDRs

- Globally out of proportion
- Frequency

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•Exaggerated EDRs are defined as those that globally are well out of proportion with the remaining EDRs, either in terms of amplitude or complexity.

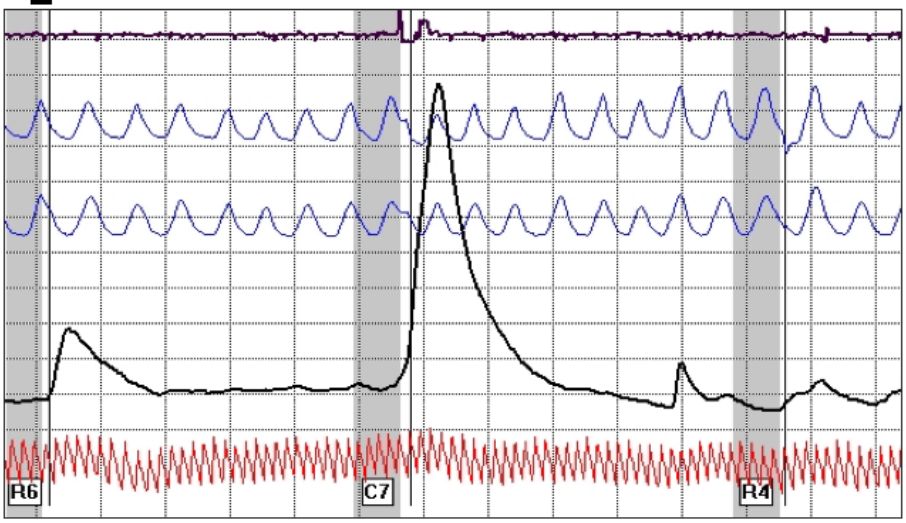
•Among truthful examinees, EDRs for comparison questions that have 5 times the amplitude of those adjoining relevant questions occur only about 4% of the time.

•More than one of these rare EDRs per exam should be considered suspect.

•Similarly, strong EDRs on irrelevant questions are atypical.

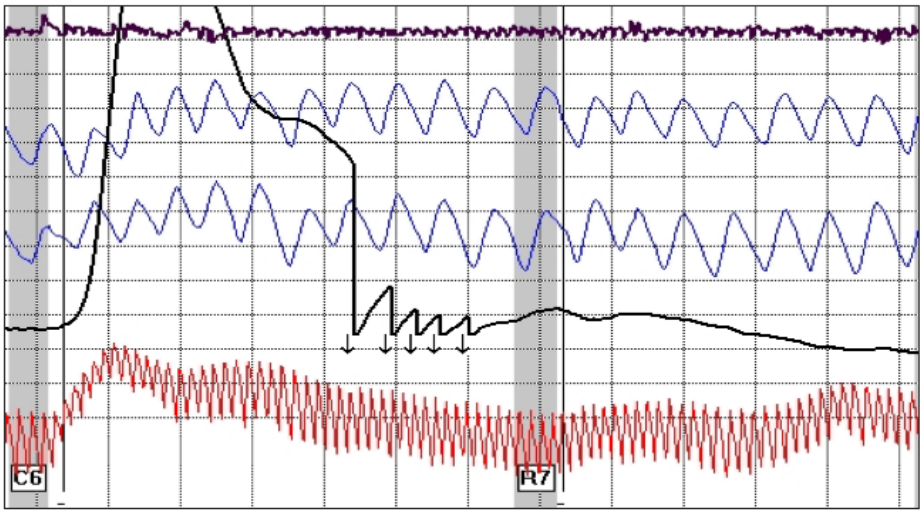
•While complex responses in themselves are not uncommon, three or more rises are rare.

Exaggerated EDRs



•C7 is a little smaller than 5 times the rise of R6. However, if the EDR rise continues to be large at other comparison questions it might be suspect.

Exaggerated EDRs

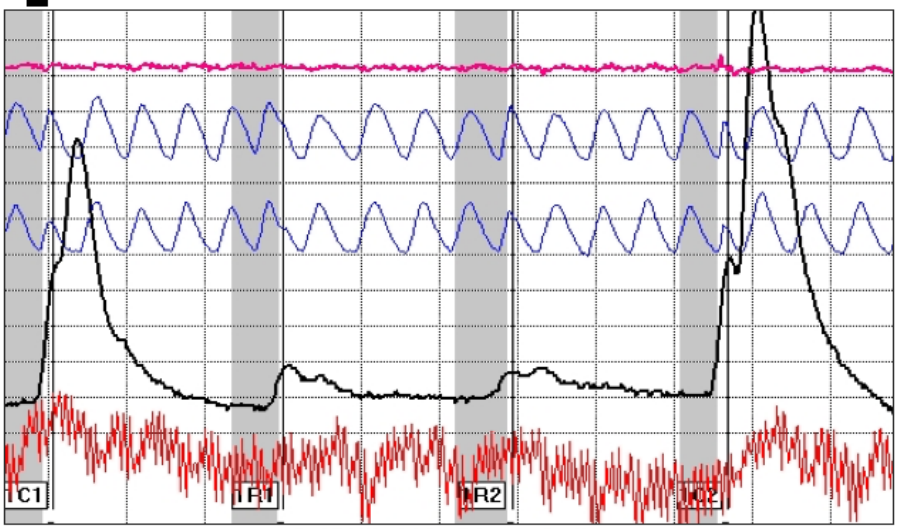


•Note the rising pneumos.

•Not only is the EDR extremely large, the examiner re-centered five times.

•Note the sharp rise of the cardio that is too good to be true.

Exaggerated EDRs



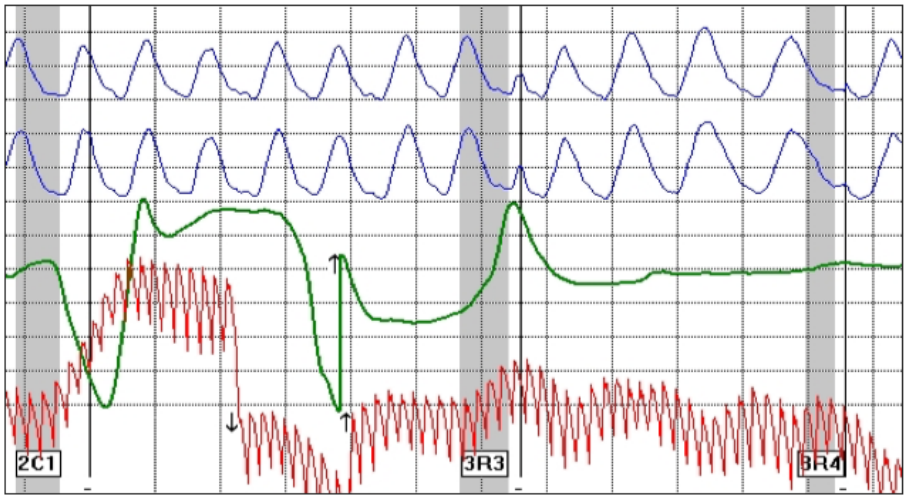
•If the EDRs are cookie-cutter across the chart consider it suspect.

•Note the matching cardio tracings.

Downward Spike of the EDR

- EDR does not have parasympathetic innervations
- Look for patterns

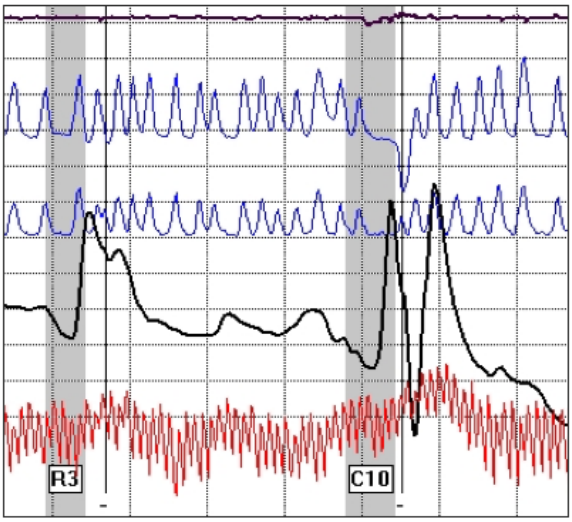
Downward Spike of the EDR



•Downward spike occurs only at the comparison question.

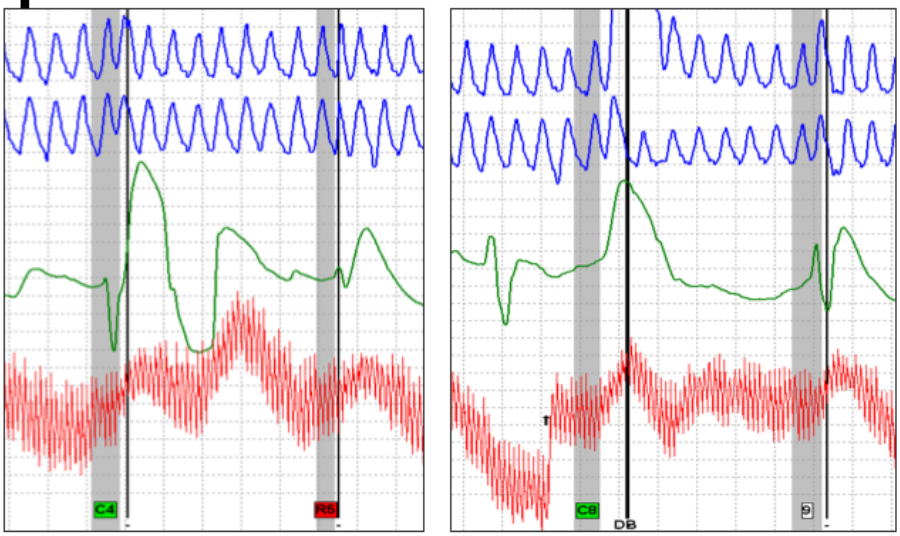
•Corresponding sharp cardio too good to be true.

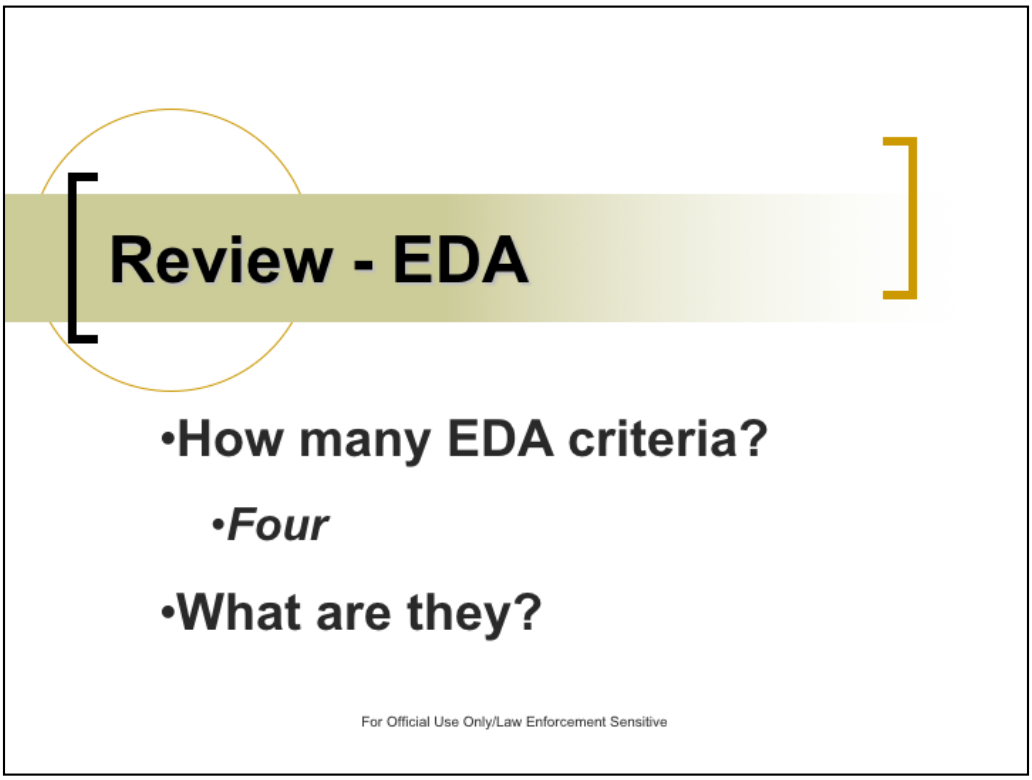
Downward Spike of the EDR



•Note the apnea and strong cardio response at C10, as well as a downward spike in the EDA.

Downward Spike of the EDR





The four were:

Lability, Inconsistent Latency, Exaggerated Responses, Downward Spikes

Cardiovascular

Exaggerated Blood Volume Increase

- Rapid rise and/or prolonged response duration
- Common at RQs for DI examinees
- Not common at comparison questions
- Virtually non-existent at irrelevant questions

•Rapid rises and prolonged duration of phasic blood volume (slow wave) responses are commonplace on relevant questions for deceptive examinees.

•They are far less frequent on comparison questions regardless of examinee veracity.

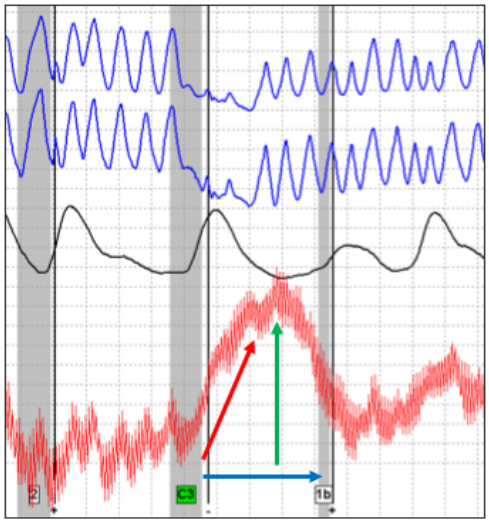
•They virtually never appear on other types of questions.

•Dramatic blood volume reactions, except to relevant questions should be considered suspicious, and more so when they co-occur with respiratory and electrodermal manipulations.

•They are often triggered by covert muscular contractions.

•However, they have been observed during the use of mental CM activity.

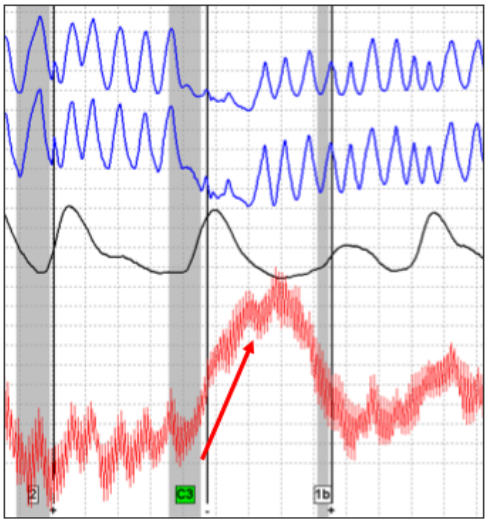
Exaggerated Blood Volume Increase



Three prong test for Exaggerated

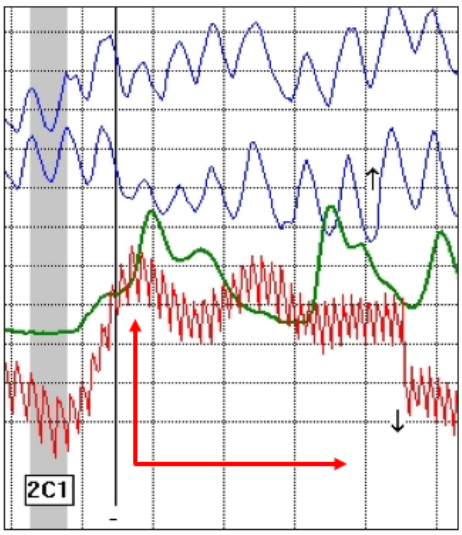
1. Slope
2. Amplitude
3. Duration

Exaggerated Blood Volume Increase

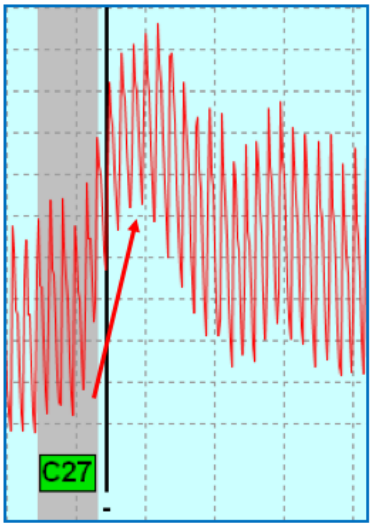


•Also note pneumo activity.

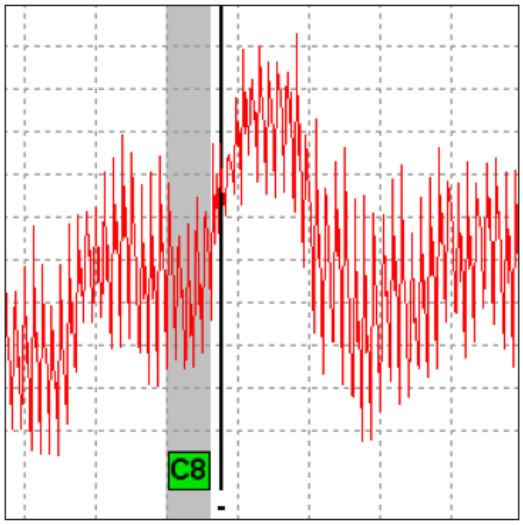
Exaggerated Blood Volume Increase



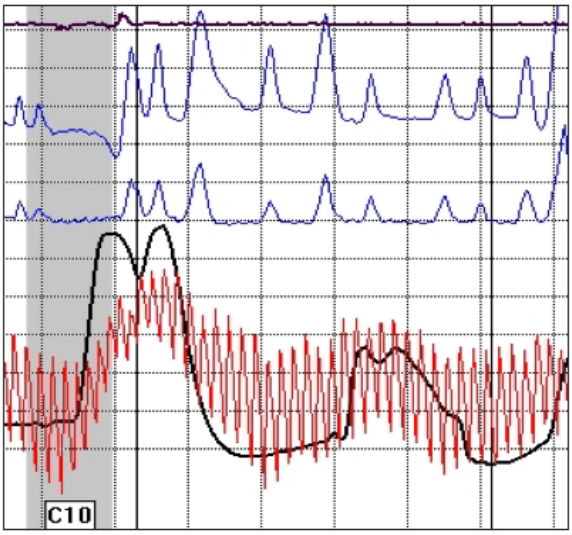
Exaggerated Blood Volume Increase



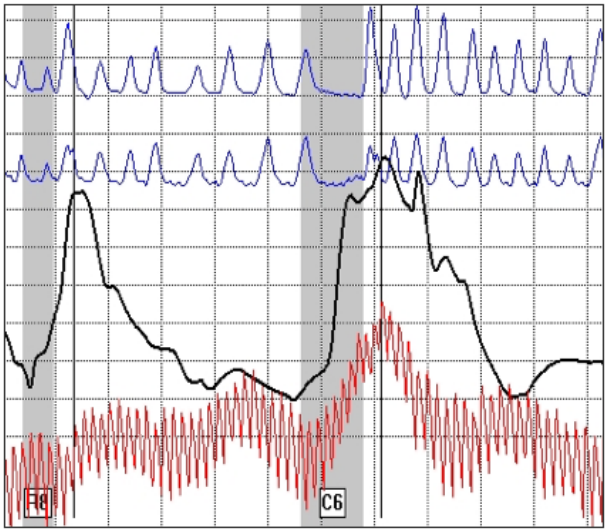
Exaggerated Blood Volume Increase



Exaggerated Blood Volume Increase



Exaggerated Blood Volume Increase



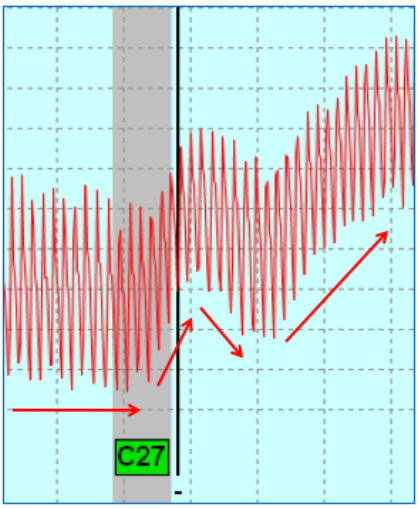
Secondary Blood Volume Response

- Sharp rise in cardio followed by a secondary rise
- "Compound Cardio"

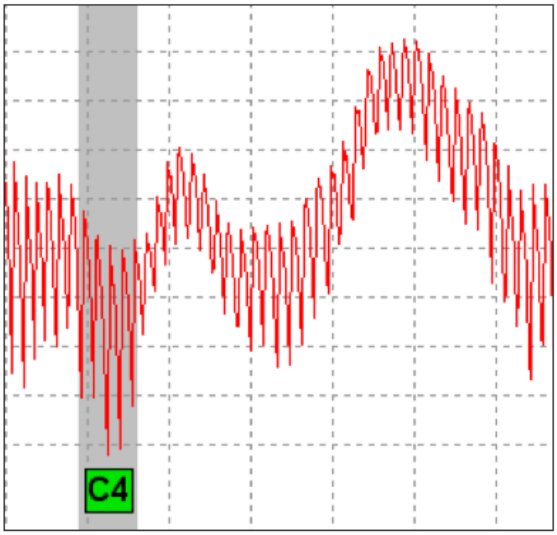
•When CM activity is being performed (toe press) the covert muscular contractions can cause a sharp rise in amplitude in the slow wave component of the cardiovascular tracing followed by a secondary rise.

•This is suspect at comparison questions, but particularly so when it occurs at more than one comparison question during the same series.

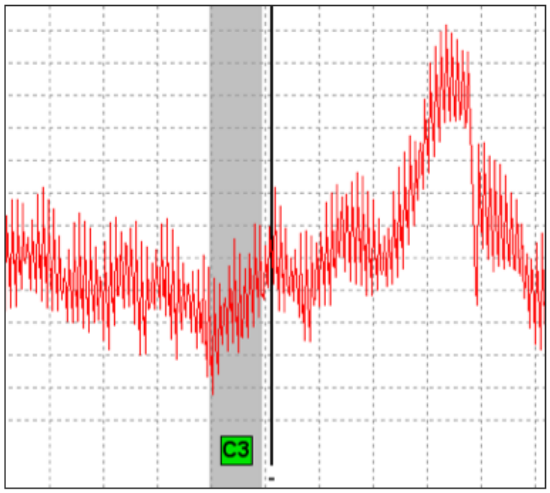
Secondary Blood Volume Response



Secondary Blood Volume Response



Secondary Blood Volume Response



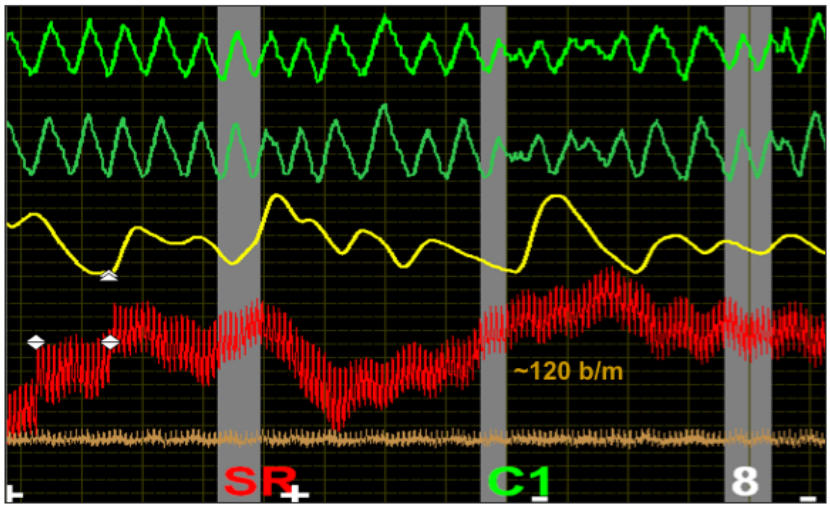
Secondary cardio can sometimes be very late.

Tachycardia or Bradycardia

- Tonic pulse rates in excess of 100 BPM, or less than 60 BPM

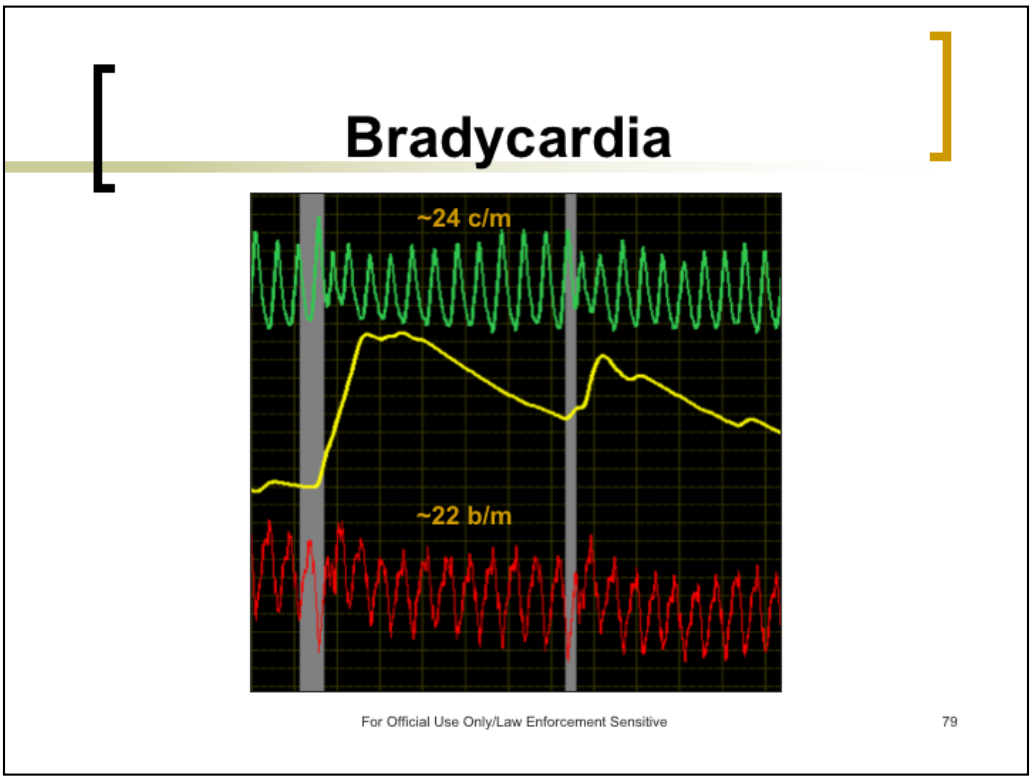
•On many occasions, CM activity is accompanied by tachycardia.
•Must review the entire exam. Also, any medications or illnesses.
•Bradycardia (less than 60 BPM) often seen in long distance runners.
•Must also consider medications, illnesses, drugs.
•The key is to look for other CM signatures.

Tachycardia



Tachycardia

Explain the Lafayette caliper function.



Extremely rare instance of respiratory rate out pacing the heart rate!

Few people—if any—can slow their heart to a rate such as this. Most likely pharmacologically induced (and not necessarily nefarious).

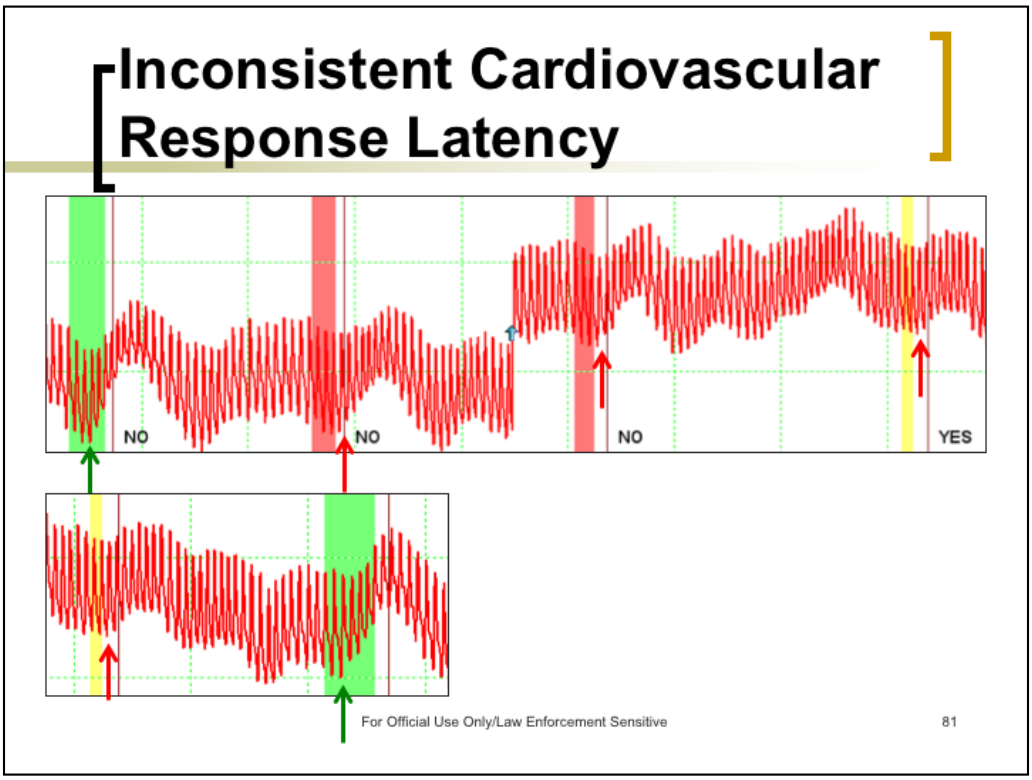
Inconsistent Cardiovascular Response Latency

- Consistent with EDR latency
- Contrast points of response onset of all CQs with all other question types
- Look for inconsistency unique to the CQs

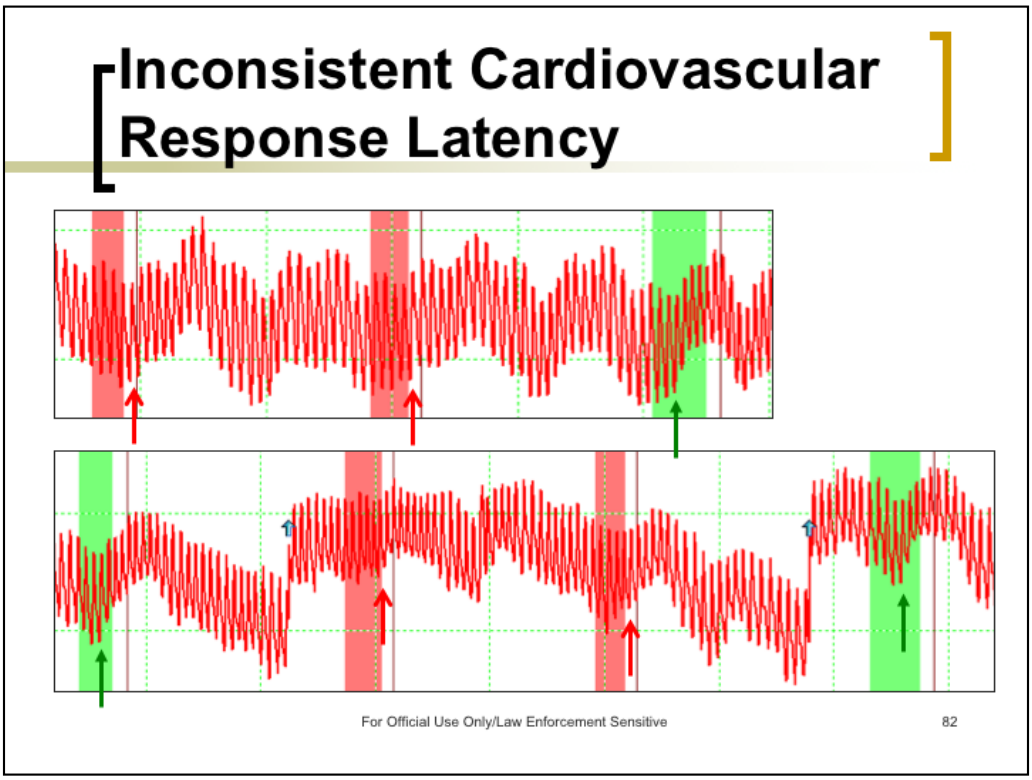
•As with EDR, latency refers to the period between stimulus onset and response onset.

•Globally, an examinee's response time is fairly consistent at each question asking.

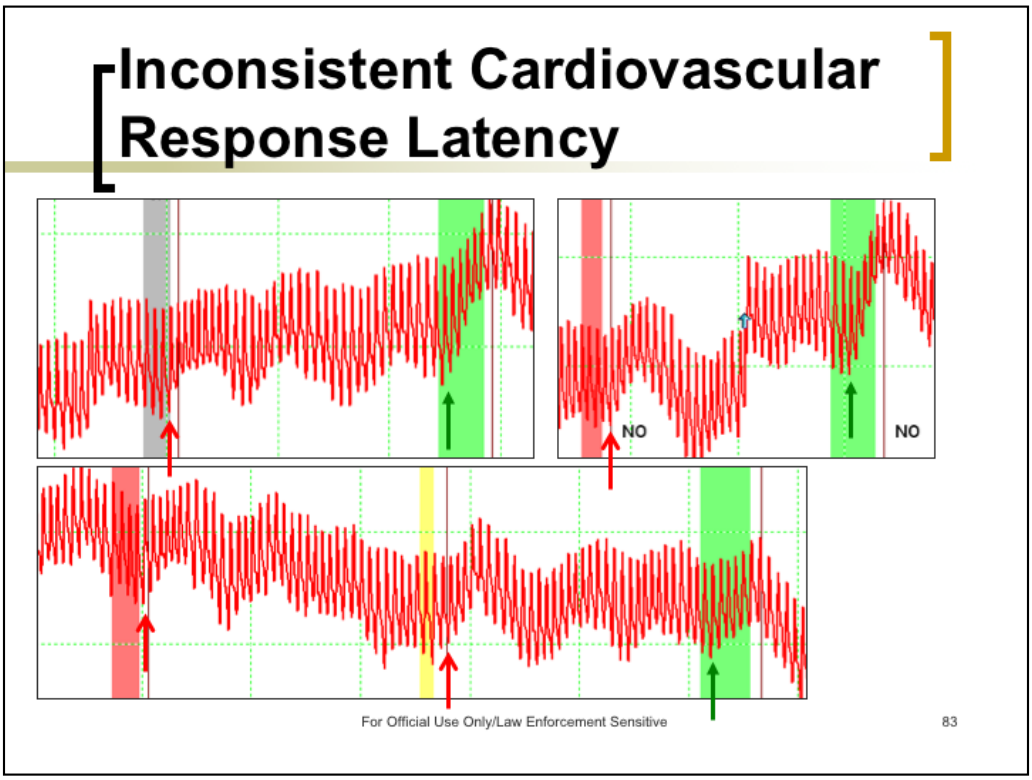
•If the rise time changes, particularly from one comparison question to another this is suspect.



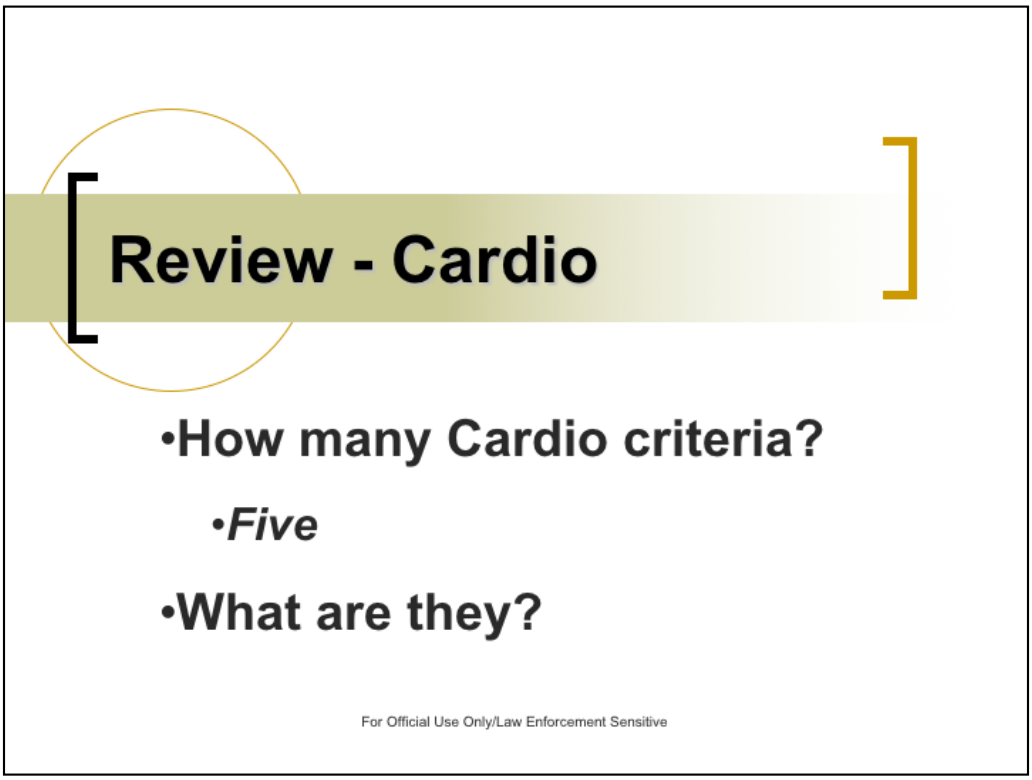
•Note the points of response onset in the green questions (mid question onset), then compare with response onsets at the red questions (post question onset).



•More of the same.



•And even more…



The five were:

Exaggerated Responses, Compound Cardios (secondary responses), Tachycardia, Bradycardia, Inconsistent Respiratory Responses.

Other CM Signature Considerations

- "Messy" test data containing erratic breathing, erratic EDA tracings, erratic "jumping" cardiograph tracings with a pulse rate over 100 BPM

•Obviously there are many reasons for messy tracings.

•They can be the result of a poor pretest interview.

•Messy tracings can be caused by an examinee that is guilty of the issue under investigation.

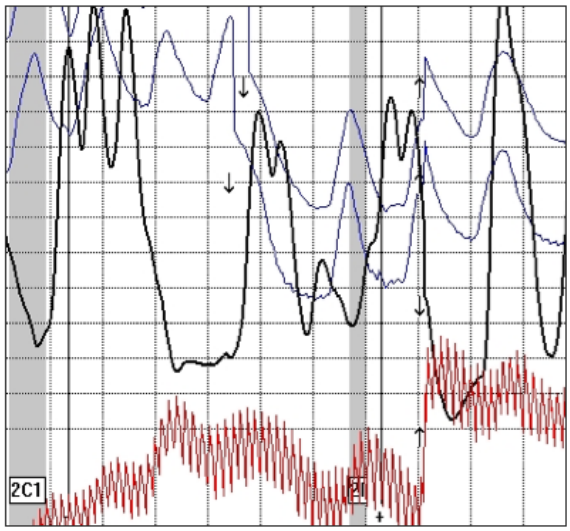
•Messy tracings can be caused by someone who is ill and on certain cold medications.

•Messy tracings can also be caused by examinee's attempting CM activity.

•If you have eliminated the possibility of a Poor pretest interview & whether examinee is ill that leaves two issues. Either examinee is guilty **or** performing CM activity or guilty **and** performing CM activity.

•There is no reason to continue with collecting test data when such activity is taking place. A good post test interview is required.

Other CM Signature Considerations



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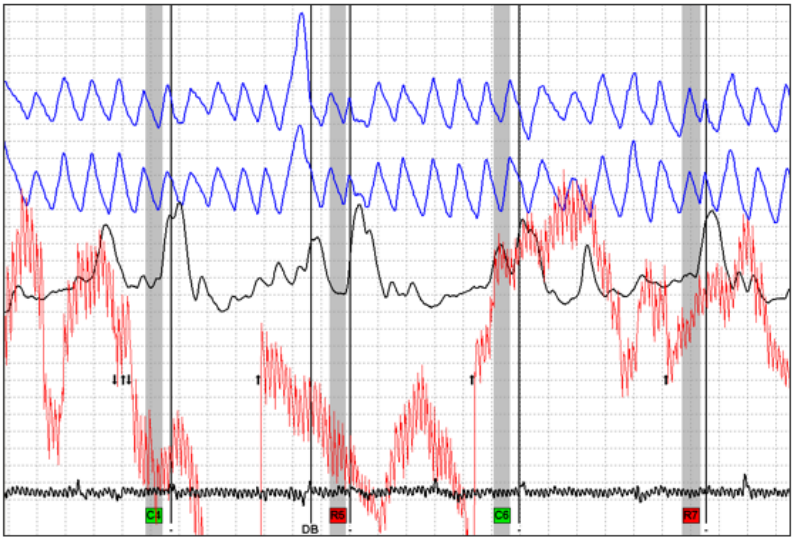
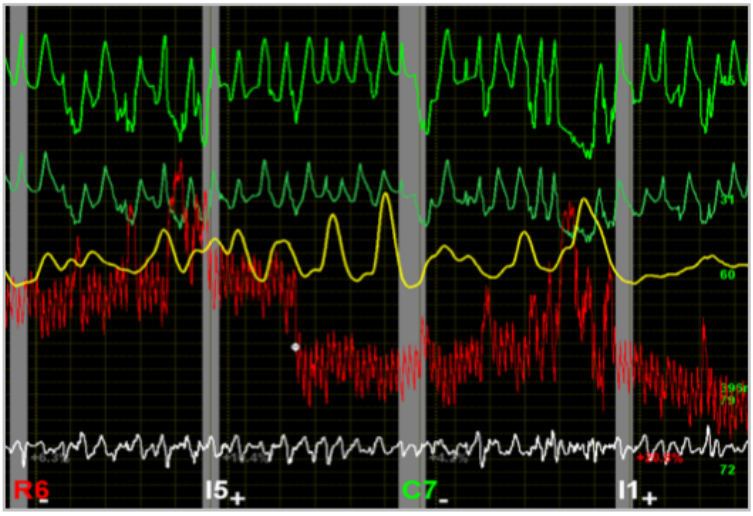
•Garbage in…

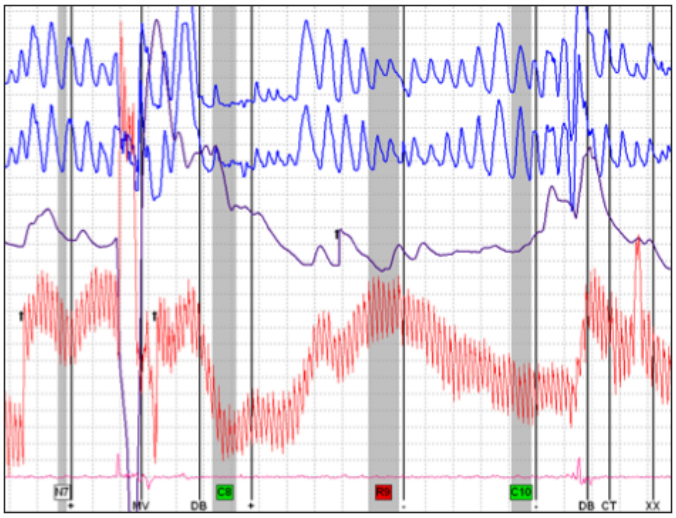
Other CM Signature Considerations



Other CM Signature Considerations



Other CM Signature Considerations

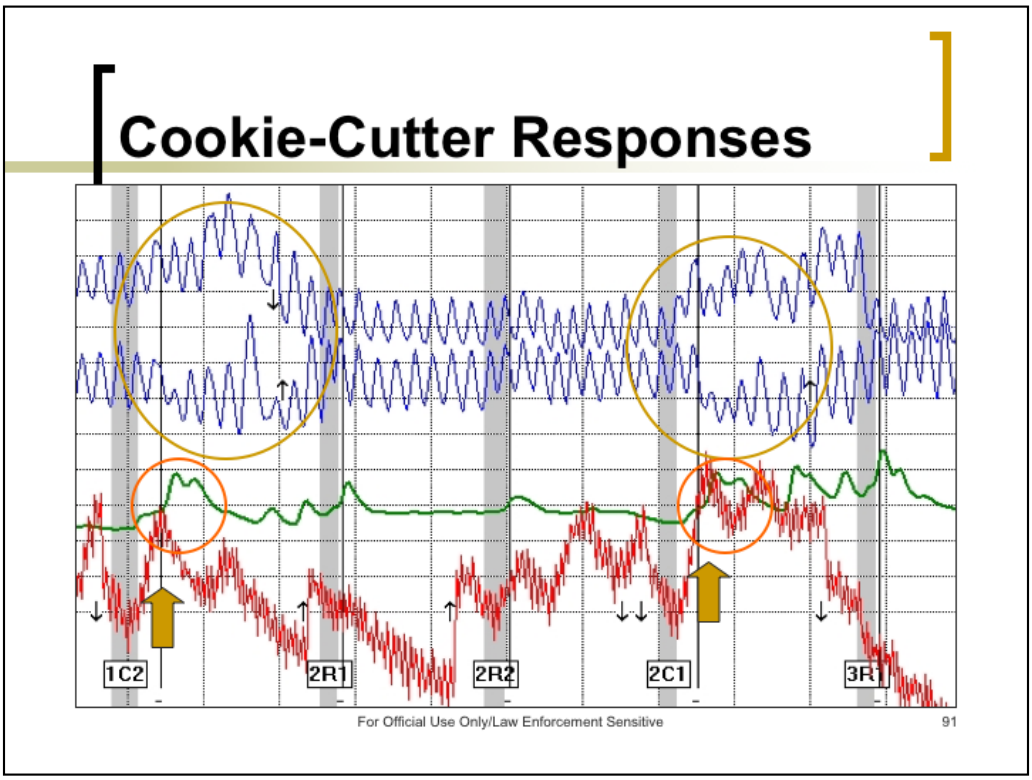


Cookie-Cutter Responses

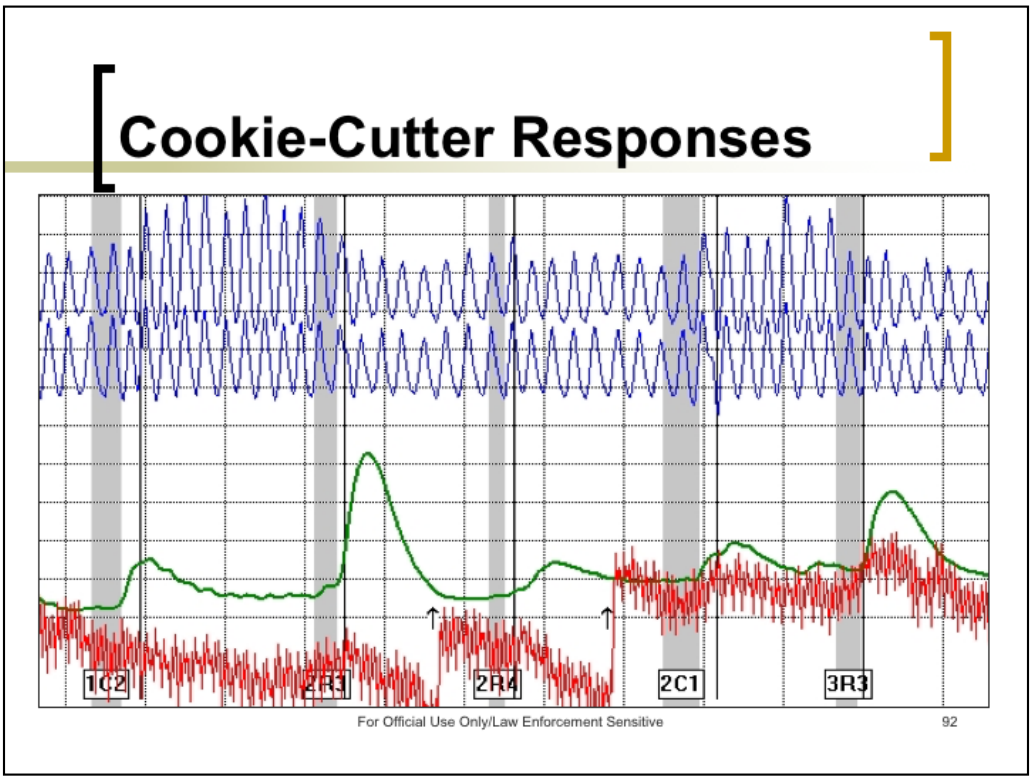
- Lack of variability
- Can occur in any channel, or combinations of channels

•These are responses that show little of the variability that normally occurs among genuine phasic responses.

•These signatures often occur in the pneumograph channels, but can occur in any or all comparison question channel.



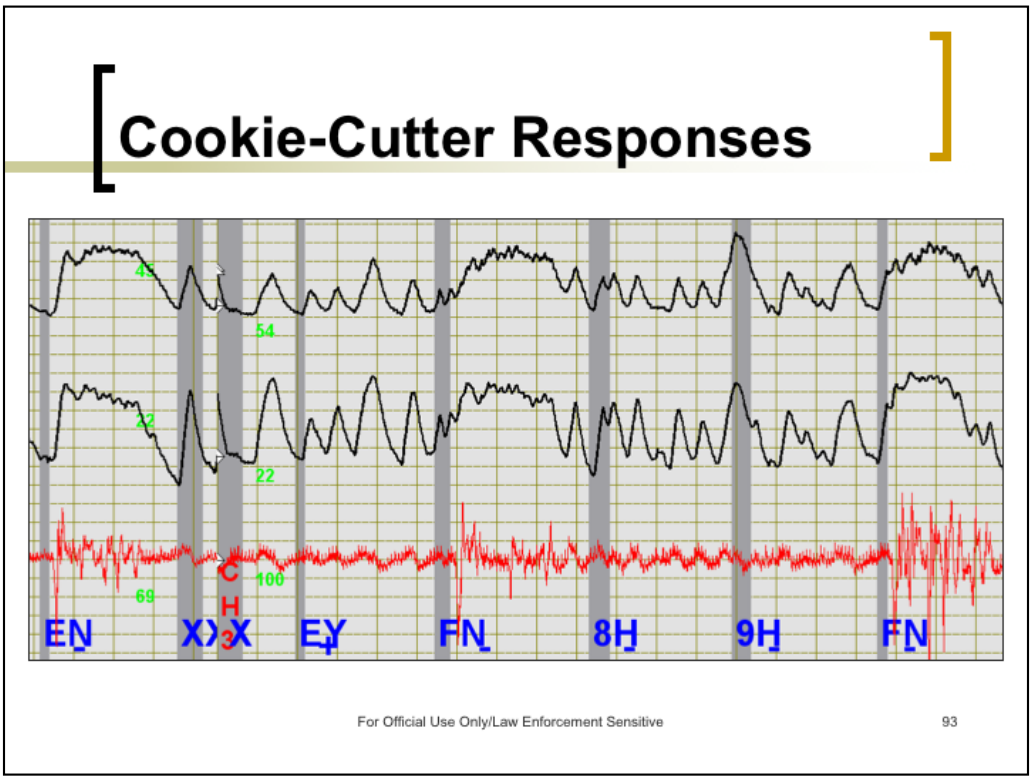
•The pneumos at all of the comparison question askings diverged in the same manner. Note the same cookie-cutter EDA and the sharp cardio.



•In a DLC format these cookie-cutter responses may be the result of DLC breathing. This may or may not be the result of deliberate manipulation.

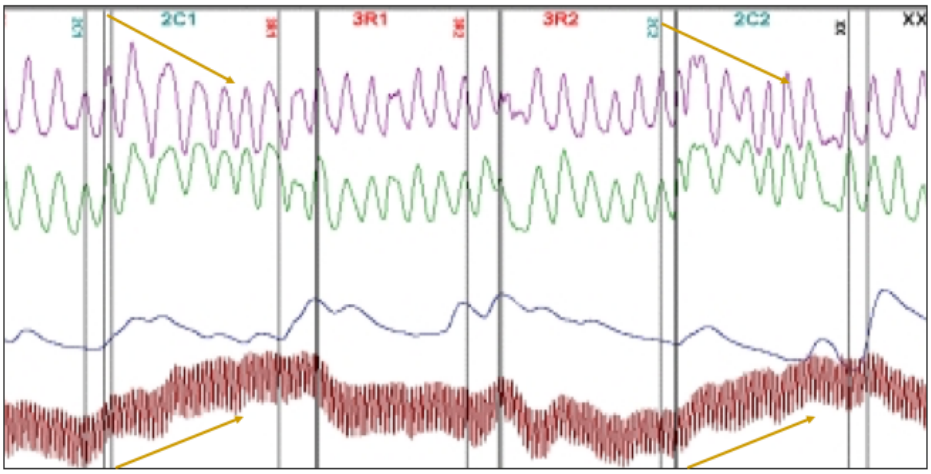
•Whatever the reason, the tracings should not be evaluated because of the distorted pneumos.

•Is the strong response at the R3 question the result of trying to recover from the DLC breathing or is it the result of deception?



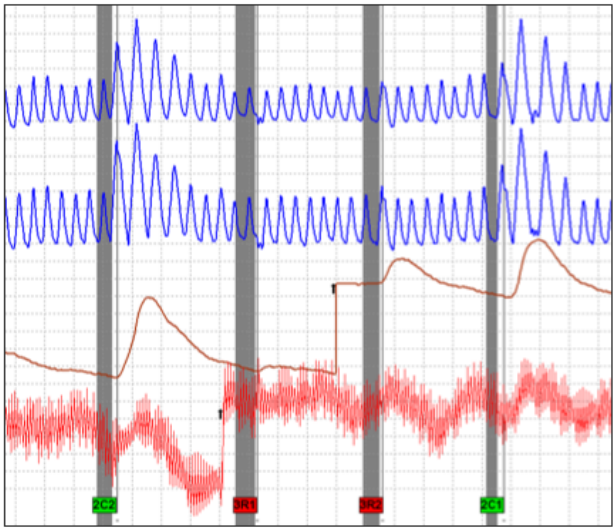
•Questions “EN” and “FN” are Identities (IRQs). 8H and 9H are RQs.

Cookie-Cutter Responses

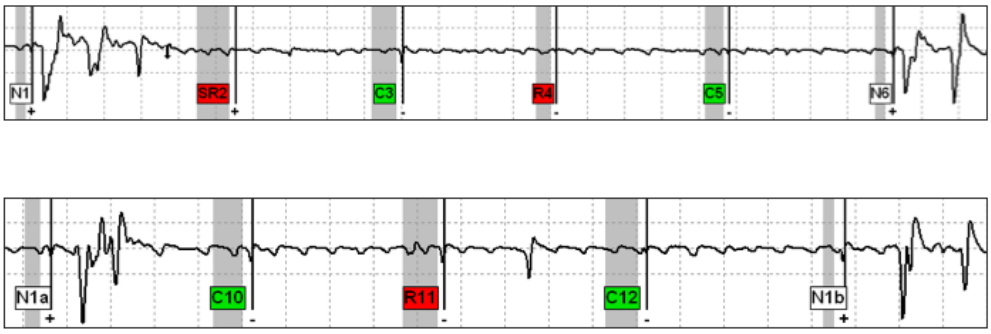


•Would you consider the cardios too good to be true?

Cookie-Cutter Responses



Cookie-Cutter Responses



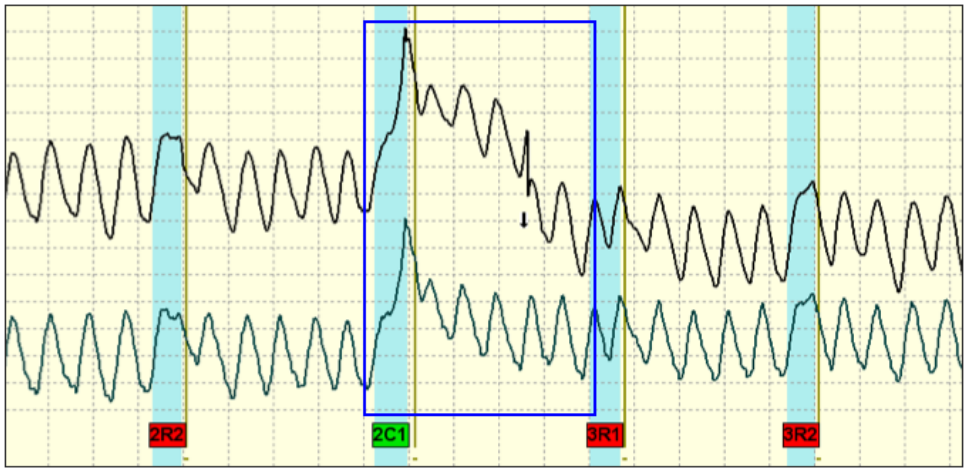
•Tracing from MSD. Note all activity is only at the norms (IRQs).

Dramatic Tonic Change in Rate or Morphology

- Significant changes in waveforms
- Within or between charts

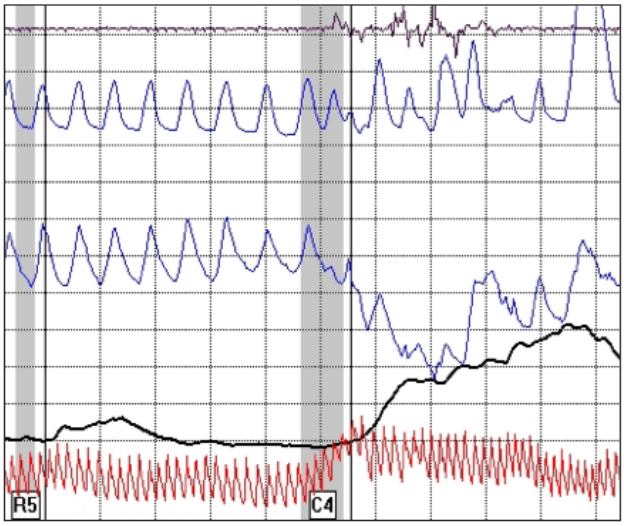
•Significant changes in tonic rate, or the shape of the waveforms, which occurs within or between charts should be considered suspect.

Dramatic Tonic Change in Rate or Morphology

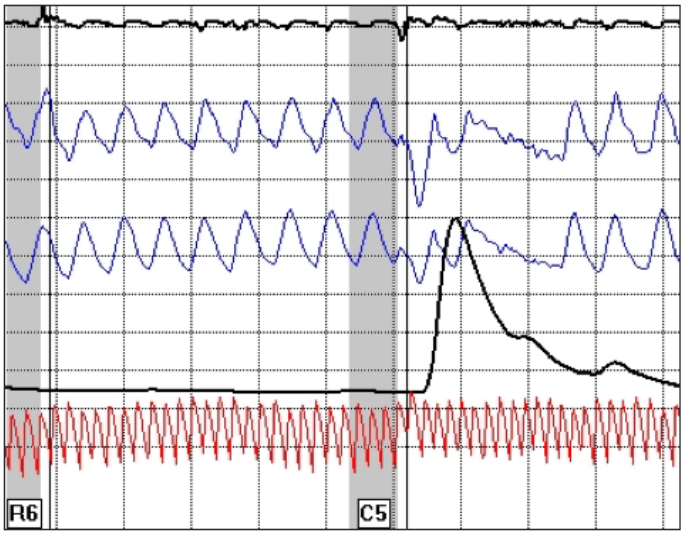


•Note instantaneous change from 2R2 to 2C1.

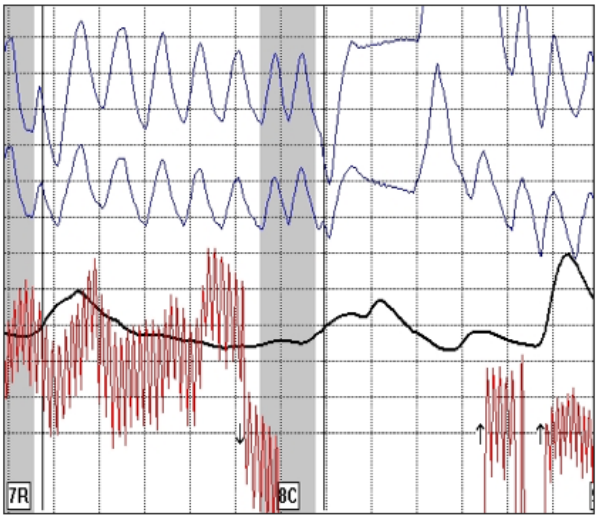
Dramatic Tonic Change in Rate or Morphology



Dramatic Tonic Change in Rate or Morphology



Dramatic Tonic Change in Rate or Morphology

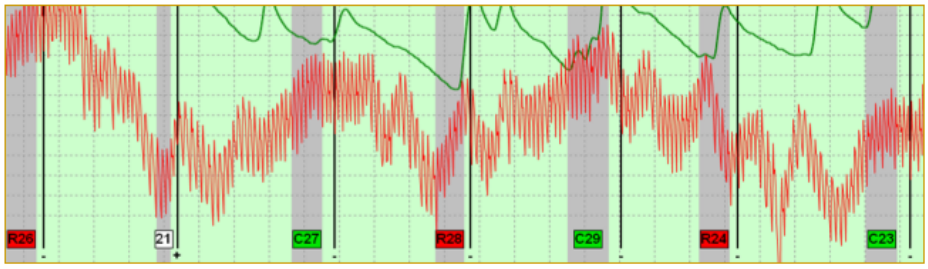


Answer Delays

- Late answers to CQs.
- Delays may be a fraction of a second or several seconds.

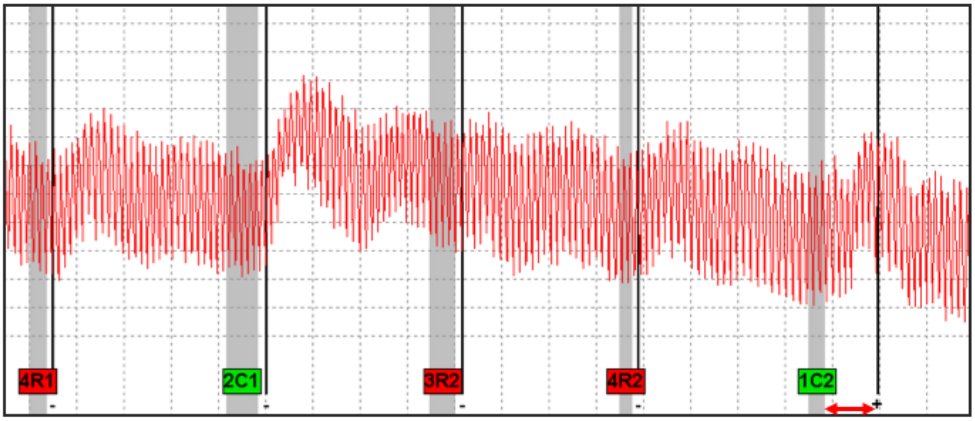
Answer Delay

CQs=1.8 seconds. Non-CQs=1.0 second.



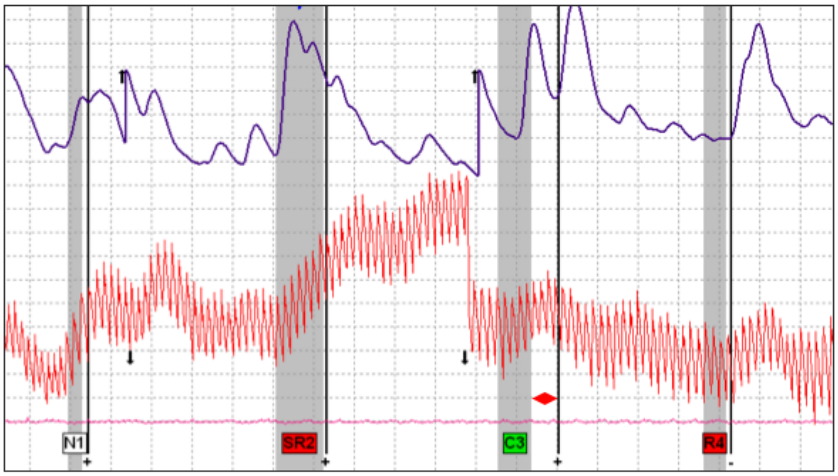
Delay at Comparison Questions is 1.8 seconds. Delay at other question types is just one second. Coincidence???

Answer Delays



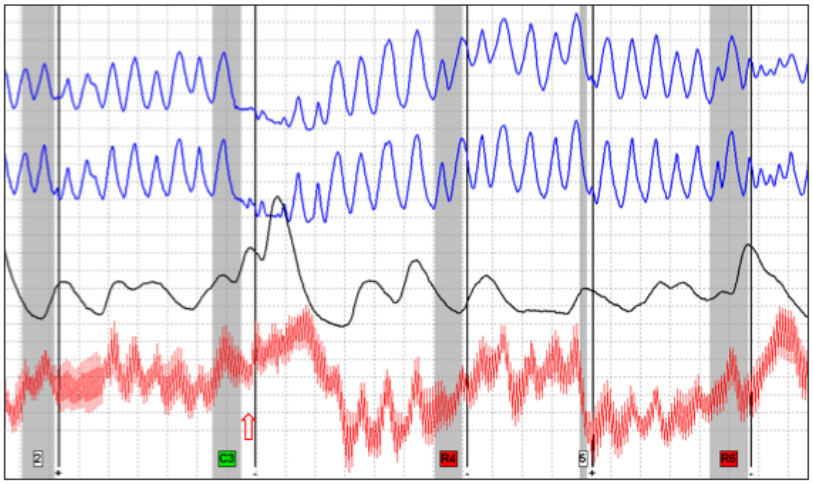
1C2.

Answer Delays



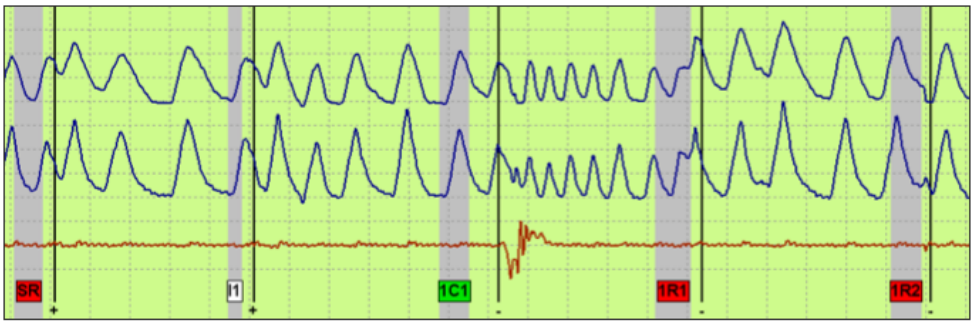
C3.

Answer Delays



C3.

Any Criteria?



Delays may be accompanied by other clues.

Conclusion

- What is the key to CM identification?
  - Atypical Physiology
  - Specificity
  - Frequency
  - Clusters

What is the key to CM identification?

1. Frequency – How often does the activity happen.
2. Specificity – Where is it happening (at what question type)?
3. Clusters – Do you see multiple features during the examination process.