

Caveon Webinar Series


Unlocking the Mystery of the Validity Triangle

Is Test Security Required for Test Score Validity?

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Agenda for Today



- Psychometrician's Dilemma
- Cheater's Philosophy
- What can Statistics Show?
- "The Validity Triangle"
 - Old Paradigm
 - New Paradigm
- Important Conclusions



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What do you think?

Can statistics be used to address security concerns?



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Psychometrician's Dilemma




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1977

It would never be feasible to **prove** that cheating occurred based only on [a statistic].


- Frary, Tideman, Watts
- Journal of Educational and Behavioral Statistics 1977 2(235)



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Offering a Retest – Frary, et. al.

- When individuals produce test results that are not believed to be reliable indicators of their abilities, they should retake the test.
- The modest, undeserved burden that would occasionally fall on entirely innocent persons is a small price to pay for the reduction in ill-gotten gains.



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2012

The proposed [statistical analysis] should **never be** used blindly or **relied on as the only evidence of cheating**. Although it has the full rigor of a statistical [analysis], **it does make Type I and II errors**.

- -van der Linden & Jeon
- Journal of Educational and Behavioral Statistics 2012 37(1)



Use of Statistics—van der Linden & Jeon

A statistical test of cheating should always:

- be used as part of a larger suite of procedures
- use independent sources of information, for instance:
 - the responses on the test items,
 - the response times,
 - external evidence,
 - as well as the source addressed in this research.



2014

We are trying to estimate **the probability of being a cheater** given that the detection method singles us out as one.

- Wainer, Test Fraud, eds. Kingston & Clark



2013

"In my opinion, most conversations about cheating **lack clarity regarding the kind of cheating** we are talking about..."

"As a professional testing specialist, it is simply **not incumbent upon me to prove that cheating has occurred for me to express my psychometric concerns or cautions about score validity.**"

- Greg Cizek, NCSA Presentation



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Cizek, con't

"Whereas I used to think that it was nearly always important to have more than one source of evidence, I now lean more toward **accepting a single strong piece of evidence as reasonable for pursuing further investigation** of suspected testing impropriety."

"Sometimes, a highly improbable finding simply demands further scrutiny."

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Summary

- You can't prove cheating using statistics
- Statistical decisions are not perfect
 - Some cheaters will go unpunished
 - Some innocents will be wrongly accuse
- Statistical propositions have not been explicitly stated
 - This has led to talking "around" test security issues instead of directly "addressing" them



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Cheater's Philosophy



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January 2011: Dr. Phil Show

Episode: "Whatever it Takes"

Jolie Fitch - Steinmetz Academic Decathlon Scandal





- "Is there any question that you cheated?" Dr. Phil asks Jolie.
- "No," she replies.
- "You knew you were cheating when you cheated."
- "Yes," Jolie answers. "We got a copy of the test questions."



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Jolie justifies herself

- Dr. Phil: "You got caught. ... Are you sorry about this?"
- Jolie: "No, not really. Other than getting caught."
- Dr. Phil: "What do you tell your kids about cheating?"
- Jolie:
 - "I tell them that life is a gray area."
 - "I would do it again."
 - "There is always someone who can give you the answers."
 - "It wasn't unfair because others are doing it."



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Cheater's Philosophy

- I do not accept your moral code, therefore your argument is without merit.
 - Amoral vs Immoral
- If you think I cheated, prove it!
- If you can't prove it, you can't call me a cheater.
- It works to the advantage of the cheater when you use the label "Cheater."



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What Can Statistics Show?



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Statistical Propositions #1

- The tests were not taken independently
- The test was completed inhumanly fast
- The test was completed using stolen answer keys
- The test performance was inconsistent
 - With respect to scores
 - With respect to response time



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Statistical Propositions #2

- The wrong-to-right answer changes were atypical and inexplicable.
- The observed pattern of test taking through time was inconsistent with normal test taking.



Inferences about Cheating

- Must demonstrate means, motive & opportunity
- Must demonstrate intent
- Must demonstrate culpability or responsibility
- Must discard other viable explanations




Proper Inferences

- Explicitly list propositions
- Use relevant data & statistics
 - To make inferences about scores use statistics that provide information about scores
 - To make inferences about behavior use statistics that provide information about behavior
- Findings are conditioned upon the propositions




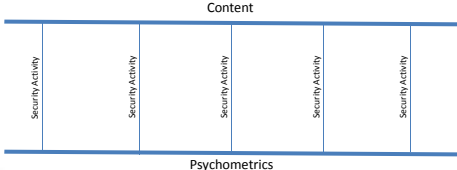
Dr. Phil Dickison
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Security - The Validity Paradigm


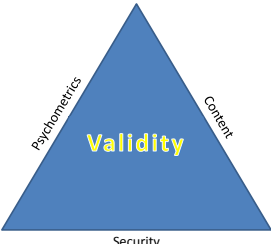
The Traditional Paradigm



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Security - The Validity Paradigm

The New Paradigm



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Challenges of the New Paradigm

- Awareness of securities role in the validity argument
- Switching the focus from catching cheaters to releasing valid results
- Meaningful and visible standards
- Better use of Data Forensics
- Lack of a robust specialized professional field related to test security



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Conclusions

"I would urge us to reframe our concerns about test data integrity not as cheating concerns, but as a **validity issue.**"

"It is important to treat each similarly situated case the same way, and a **coherent, comprehensive set of policies and procedures, uniformly applied,** is essential."

– Greg Cizek, NCSA, 2013



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Thank you!

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