Preface

Avital Ginton, Ph.D.

From a rigid to an elastic cover via a blanket too short

Estimating and affecting accuracy of CQT

FAQ about Polygraph accuracy

In using polygraph testing methods for inspecting veracity, how much the polygraph umbrella manages to cover correctly?

Or in a simpler language

How accurate is the Polygraph?

What do we have more, FP or FN errors?

What are the estimated rates of them?

Three Different Approaches in Answering these Questions

A Rigid Cover

Assumptions:

- ✓ Accuracy rate of Polygraph tests is a real figure and not just a statistical manipulation, that represents a real quality of the test. Our task is to find proper ways to expose this existing figure (or figures in case we differentiate between various techniques or formats of tests.)
- ✓ A certain percentage of the test's outcomes are not clear enough to make a call and deems Inconclusive.
- ✓ Accuracy of detection and rate of Inc outcomes might be different for Deceptive and Truth-teller examinees. Our task is to expose these existing differences.

A "Competition" Between Several Fixed Numbers Suggested by Different Studies, Ended Up In Some Sort Of Averaging Them, With The Highest Methodological Achievement Of Using Meta-Analysis As A Means For Estimating The Final Figure (be it 90%, 85%, 70% etc.)

A Blanket Too Short

- ✓ Assumptions:
  - ✓ The actual figures of the detection and inconclusive rates are subject to our manipulations in the way we conduct the tests or analyze the outcomes. Mostly it is a trade off manipulation that change the Inconclusive and error rates (FP vs FN).
  - ✓ We are acting within a pay-off matrix in which it is possible to increase one sort of detection and accuracy rate at the expense of lowering the other.
  - ✓ The philosophy or policy held by the examiners or their organizations with regards to the preferred pay-off matrix, affects these rates.

An Elastic Cover

Assumptions:

- ✓ Personal and situational individual differences are more than just variance or deviations in central tendencies based distributions, and adaptive care can and should be taken to deal with them.
- ✓ It is possible to act at the level of individual exam in such a way that increases the chance to get correct outcome while keeping the probability of automatically paying in errors in other exams, at a low level, and by that the overall detection or accuracy rate improves.
- ✓ Testing procedures and TDA can and should be flexible within acceptable frameworks based on theoretical and empirical considerations.

From Rigid to Elastic Cover
via a Blanket too short,
Is not only a metaphor it is
also
A call for scientifically based
Adaptive Polygraphy

THE FUTURE LIES IN ADAPTIVE POLYGRAPHY

By Avital Ginton, Ph.D.

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It’s been four years since the last time I was standing on the speakers’ podium in the annual APA seminar and lots have happened in the field since then.

Since modern polygraphy has started we have witnessed a variety of techniques, methods and tactics, always with some kind of presumed rationale, or justification and the unarguable face validity statement “it works for me all right”. We should assume that examiners want to succeed in their work, thus, if they encountered feedback that tells them they were doing very poor work they would probably incorporate this feedback and make some changes in the way they were functioning. In the same vein, if they stick to their technique one may assume that it really works for them. Alas, this is not enough if we want to adopt some scientific claims or values in our profession. “It works for me” is but the very first step in the path that establishes scientific quality in the polygraph profession.

The essence of science is to move from subjective point of view to objective. The method or the technique should work for every qualified person, and as long as this couldn't be established and proved we are not dealing with scientific based method rather this is an art skill in the best case and a "mambo-jumbo" business in many others.

Several important steps have been taken in the last few years under the leadership of Don Krapohl to make the polygraph a more scientific based profession. To name a few:

Validation of techniques
Models of Best Practices
Models of TDA
ASTM stuff
etc.

The leading common theme in all these pieces of work is that we need to establish research supported rules to guide our practice and introduce standardization to the examinations which is a basic brick in the psychometrics testing theory.

Due to the complexity and the multi-factorial issues dealt by the behavioral and biological sciences It is customary to use research methods that target the central tendencies of phenomena which are formalized in general principles and rules that concern most of the existing variance while treating sometimes the individual differences or the variation between existing situations as irrelevant noise.

When it comes to applications, some standards are developed and implemented to ensure that the applications are conducted within the framework posed by those rules. Practically, this is a must for avoiding chaos.

However, because the standards are based on central tendencies and the variance around them they are inefficient or even harmful to people or situations that are off these main centers.

An extreme strive for rigid standardization in the name of science tends to ignore the complexity of the field and it is based in a way on a simplistic and limited concept of what science is. Let alone that there is more than just science in practicing polygraphy

Along the efforts in laying scientific foundations to the Psychophsiological detection of deception, we should remember that a lot of art is also involved

We should adopt the scientific methods not only in favor of standardizing our profession but also to improve our understanding of the “art” quality found in our work rather than suppress it in the name of science and standardization.

Over standardization, in its extreme form, adversely affects creativity, open mindedness, flexibility and humane touch, which are very important for further developments in our area. We should not ignore the meaningfulness of personal and situational differences for the understanding and practicing polygraph testing even when it seems to be at odds with the developed rigid standardizations of the tests

we should not, in the name of science, throw away, the tailor made approach in conducting polygraph examinations that for years has characterized the work of the best polygraph examiners, and shift into the standardized “scientific” mediocre kind of work.

Within a wider and a more sophisticated approach, those important and necessary moves that took place in the last few years are only the first steps, and probably, I dare to say, the easiest ones. The next steps must deal with the individual’s and specific situational variance not as a noise, but as part of the phenomenon that needs to be systematically addressed and explained.

An example to that can be found nowadays in the field of medicine in which a clear trend to shift from the simple standardization of diagnoses and treatments to individualized or personalized medicine is taking place. It is based on pursuing individual differences between the patients in biological, psychological and environmental aspects, and applies a tailor made diagnostic yardsticks and treatments compatible with the specific variations found in that specific patient at the time.

This medical philosophy and practice which is highly affected by the new developments in the field of the humane genome, says that modern medicine should be Personalized Medicine, meaning

"Different Things to Different People"

(The Personalized *Medicine Coalition Organization, Mission and Principles chapter (2010)*

Polygraph or the Psychophysiological Detection of Deception, is a short blanket that can not cover everything without paying in errors, a clever polygraph examiner and a wise usage of polygraph must make a choice whether to cover the feet or the head with this short blanket and conduct the examination accordingly.

But a wiser approach should look to turn the short blanket into an elastic cover that can deal differently with different people and different situations.

Contrary to the existing trend in the field that adores the strict standardization
I call to drive modern polygraphy towards developing scientifically based approach that follows the motto of understanding and conducting

“Different Things to Different People and Different Situations”.

In other words I call for developing an adaptive approach
or
Adaptive Polygraphy.

That might be the only way that can improve our performance beyond the glass ceiling of 85-90% accuracy and 10-20% INC

“There is nothing more unequal than the equal treatment of unequal people.”

— **Thomas Jefferson**

WELL,

HOW??

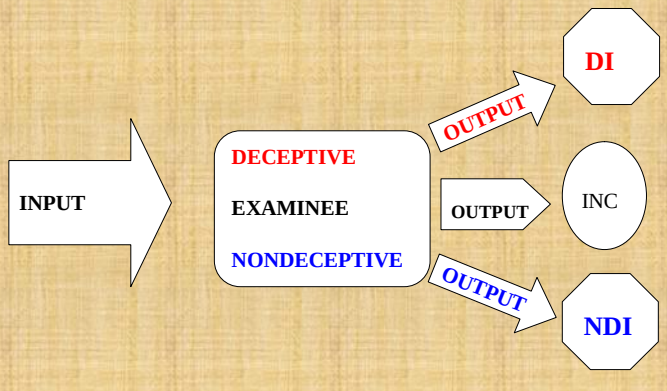
Turn to the basic

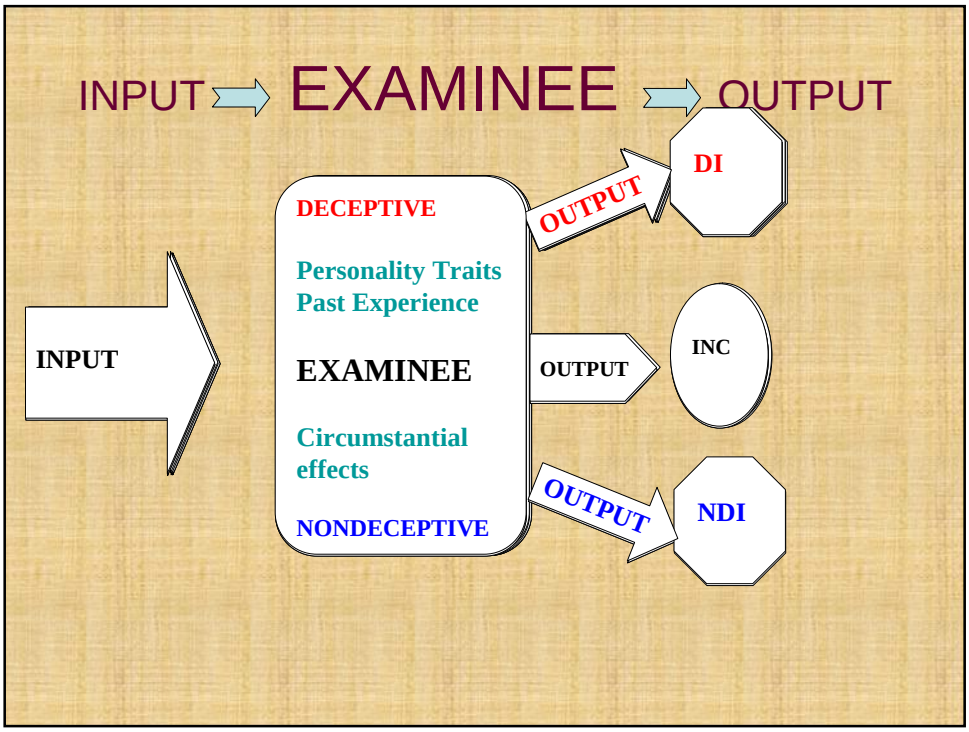
R/IR- Practically all liars react stronger to R
But
Also a majority of the truth-tellers do so

We needed to develop a technique that pulls the truth-tellers out

Basically that is what the CQT does

INPUT ⇨ EXAMINEE ⇨ OUTPUT





These extra factors (other than the deception one) are not for making the model more complicated, they really affect the way the input is processed by the examinee and the kind of output that is generated

This is the justification for doing
"Different Things to Different People and Different Situations".

or going for
Adaptive Polygraphy.

Principles of Adaptive polygraphy implementation

Identifying relevant aspects in the assumed internal state of the examinee, other than being deceptive or non-deceptive, that might influence the outcomes
and deal with them by

1.Manipulating the input
and/or
2.Adapting the analysis of the output (TDA) to fit the case

WELL,

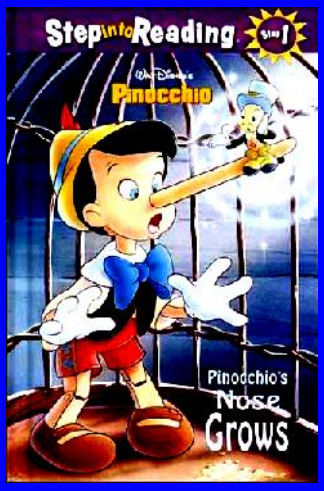
HOW??

(2nd time)

Relevant Issue Gravity (RIG) Theory

a Carrier of Adaptive Polygraphy.

The Ultimate Detection!



100% accuracy in detecting deception

Neither the enlarging of a nose nor any other unique physiological characteristics can tell unequivocally a Liar from a Truth-teller or the act of Lying from Telling the Truth

Hence, We Have to Settle for a Less Direct and Distinct Method in Detecting Deception

As Long As the "Pinocchio Effect" Which Might Differentiate With No Reservations Between Liars and Truth-tellers, Exist Only in Fairy Tales, the Strategy That We Must Adopt Is a Probabilistic Approach.

Facing a Problem That Can Only Be Solved in Probabilistic Terms

A Two Populations Approach

Our Task Is to Identify Whether an Examinee Belongs to the Truth-tellers' Population or to the Population of the Liars.

(Not As a Personality Trait but With Regard to the Relevant Issues That Are Under Inquiry)

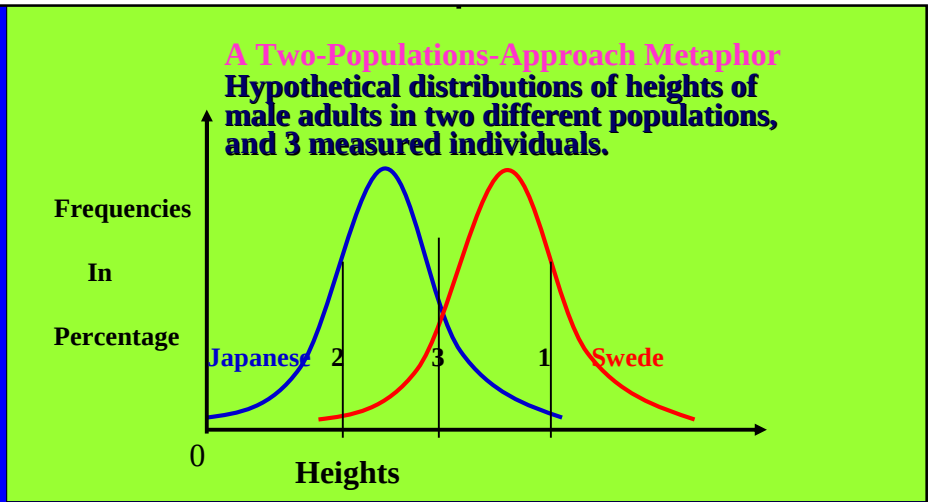


Figure 1 : The above figure demonstrates the possibility to make probabilistic inferences about each individual's belonging to one population or the other by measuring his height. Roughly speaking, there is a 90% chance that person number 1 belongs to the RED population and number 2 belongs to the BLUE one, while number 3 has 50% chances to belong to either one of them.

Adopting This Strategy for the Polygraph Means That We Should

Concentrate on identifying characteristics that might distributed differently in these two populations, even though the two separate distributions are expected to overlap to a certain degree

Could we rely on any physiological characteristic that is distributed differently between these 2 populations in a significantly non-overlapping manner, we would have had a pseudo-semi Pinocchio effect. But this is not the case so we should look in other direction, probably the psychological one.

A Reasonable Candidate to This Role, Might Be the

“Attention”

As a Mental Process or a State of Mind, and in Particular

The Strength by Which the Suspect’s Attention Is **Directed, Focused** and **Bound** to the Relevant Issue, at the Expense of Other Issues or Stimuli.

The Higher the Intensity of This On-going Preoccupation of the Mind, (Cognitively & Emotionally), With the Relevant Issue, the Stronger the Attention Processes and State, Which in Turn Affect the Preoccupation of the Mind in a Positive Feedback Loop.

It is a trap for attention caused by what I've termed

"Relevant Issue's Gravity"

("RIG")

Relevant Issue Gravity – (RIG)

The force induced by aggregation of qualities that the relevant issue possesses which attracts and binds the examinee's attention to it.

Upon Arrival, Both the Guilty and the Innocent Are Busy Consciously and Pre-consciously in Cognitive and Emotional Mental Processes Related to the Relevant Issue.

This Mental and Emotional Preoccupation With the Forthcoming Examination, Regarding the Relevant Issues, Involves Much More Than Just the Fear of the Test's Possible Consequences. It Contains Also Memories, images, a Stream of Associations, Elevated Motivations, Etc.

The More Vital This On-going Preoccupation, the Higher the Strength of the "RIG" (Relevant Issue's Gravity)

The RIG's Strength Indicates the Degree to Which the Suspect's Attention Is Attracted to and Stuck in the Relevant Issues.

and

It Is a Product of Many Circumstantial and Personal Factors

There Are Good Reasons to Believe That on the Average the "Relevant Issue's Gravity" for the Liars Is Stronger Than for the Truth-tellers.

A Main Reason for This, Relates to the Existence or Absence of Relevant Memories

In a Regular Case

Truth-tellers, Have No Memory of the Investigated Event, Since They Were Not Involved With It. Contrary to that Liars Carry With Them Traces of Memories and Genuine Emotions From Their Involvement in the Actual Occurrences.

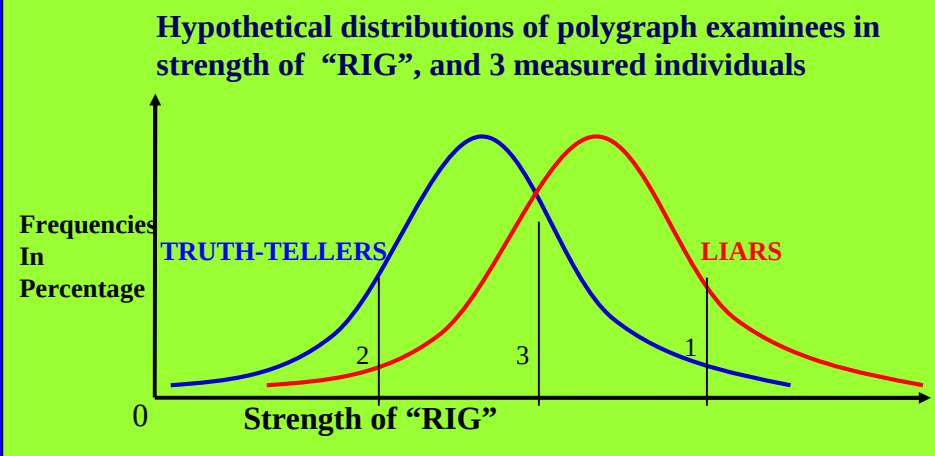


FIGURE 2: Hypothetical distributions of strength of "Relevant Issue's Gravity" ("RIG") in Truth-tellers and Liars, with values of 3 individuals. It is assumed that the RIG's strength is higher for the population of liars and roughly speaking there is 90% chances that #1 is a Liar and #2 is a Truth-teller while #3 has equal chances to belong to either one of the populations.

Assuming the Different Distributions in Strength of RIG Between the Liars and the Truth-tellers, We Are Still Facing the Need to Find a Way to Measure the Exact RIG's Strength Value for Each Examinee.

One Way to Measure the Strength of the RIG for a Certain Suspect Is to Find How Much It Takes to Distract the Examinee's Attention Away From the Relevant Issue.
The harder it is, the stronger the RIG that the examinee holds

This Can Be Achieved by Introducing Baits to Attract the Attention of the Examinee.

In Principle the Baits Can Take Various Forms With Different Levels of Attractions.

Within the Set of Polygraph Examination the Baits Are Introduced by the Examiner in the Form of What Is Known to Be the Comparison Questions and the Pretest Interview That Leads to Their Formulation

Whether the Baits Were Successful in Attracting the Examinee's Attention and Divert It From the Relevant Issues to the Issues Covered by the Comparison Questions, Is Something to Be Found by Comparing between the psychophysiological Reactions to the Relevant and The Comparison Questions

The Higher the Success of These Baits to Attract the Attention, the Stronger Will Be the Impact of the Comparison Questions and the psychophysiological Reactions to Them.

Notice That If the Baits Are Big Enough they Might Attract Almost Any Person's Attention in Almost Any Circumstances. It Is Just a Matter of Dosage That a Professional Examiner Must Take Into Account!!

As Mentioned Above, a Naïve Examinee Whether Guilty or Innocent, in Specific Issue Examinations, Arrives at the Test Knowing That the Examination to Be Conducted on Him/her, Aimed to Test His/her Involvement in the Specific Case, Which Is Under Investigation.

At That Point the Examinee is Focused on the Relevant Issue and Both the Guilty and the Innocent Are Busy in Cognitive and Emotional Mental Processes Related to This Issue and the Possible Consequences of the Examination. Both of Them Identify the Relevant Issue and the Questioning About It As Posing the Greatest Threat for Their Well-being.

It Is Frightening for Both of Them and Probably Resulting in Mental Preoccupation With It.

In Order to Realize That the Comparison Questions Pose a Threat As Well, They Must First Be Able to Detach Themselves From the Relevant Issue.

At That Point the "Relevant Issue's Gravity" Approach Is Taking Its Place.

DIVERTING ATTENTION FROM THE RELEVANT TO THE COMPARISON SPHERE

Assuming the above mentioned different distributions of RIG strength in the two populations (Deceptive and Non-Deceptive), it will be more difficult to detach deceptive examinees from the relevant issue and divert their attention to the comparison questions due to their stronger RIG effect.

According to the RIG strength theory, stronger reactions to the comparison questions indicates a lower level of RIG strength and therefore a higher probability that the examinee is a truth-teller, and vice versa.

However we should remember that aside from the Deception Factor, the strength of the RIG is affected by a variety of personal and situational factors. Thus we should be aware of the existence of such factors in each case and when we encountered a heavy loaded factor in a certain case we must not ignore it in the name of objectivity and standardization, rather we should relate to it and adapt the pretest interview to suit that specific situation.

In particular we should maneuver the level or the size of the bait that we are presenting in our effort to divert the examinee's attention from the relevant to the comparison sphere. Namely we should play with the amount of emphasis we put on the comparison vs. the relevant questions to counter the assumed effect of the detected extra factor on the RIG.

While doing it, we should keep in mind that if the baits presented by the examiner to attract the examinee's attention and divert It from the relevant to the comparison spheres are big enough they might attract almost any person's attention in almost any circumstances and if it is too weak it would hardly attract and divert the attention of anyone. As said before, It Is a Matter of Dosage That a Professional Examiner Must Take Into Account!!

Examples of Factors other than Deception, That might affect the RIG strength

- Issue's Factors
  -Severity in terms of formal consequences (e.g. expected punishment)
  -Differences in expected typical emotional loads (e.g. minor sexual offence Vs. minor theft)
- Personal Factors
  -Personality type or traits (e.g. Obsessive Vs. Scatterbrained).
  The traits affect the way and the intensity the RIG and its sources or generators are processed in the brain.
  -Previous criminal experience
  -Previous polygraph experience
  -Social status (e.g. a teacher Vs. a mechanic; celebrity Vs. no-body)
- Circumstantial Factors
  -Existing evidence
  -Depth and length of interrogation
  -Public profile of the case (e.g. no one heard about Vs. daily headlines)

Concrete examples

- Alleged victim case
- Recidivist criminal
- High profile case
- Reexamination
- ADHD – Attention Deficit Hyperactive Disorder

Adjusting the baits for diverting the attention from the relevant to the comparison spheres

- Instead of doing it intuitively, I suggest, before starting the test, to screen the case along the 3 categories mentioned above and estimate the expected impacts they would have on the RIG strength of the examinee at 4 levels (Low, Medium, High, Overwhelming). That should adjust the level by which you are to emphasis the comparison vs. the relevant issues and questions.
- Of course any new information you might get during the pre-test should be incorporated into the decision regarding the relative emphasis of the relevant vs. the comparison questions.

Currently, in most cases we can only rely on our judgment of how certain facts affecting the RIG strength however, an increased awareness to this notion and investment of research efforts in the forthcoming years might bring about research supported information that will direct us in this regard.

It can be done!!!

In the struggle to get closer to science, adopting scientific way of thinking and applying scientific methods and standards, we've lost a lot of the ART side of our profession. While the upsides of this move towards scientific approach can hardly be overestimated, many of us tend to ignore the downsides of this move.

Not to throw the baby out with the bathwater

Make sure not to loose our freedom of creativity in the name of standardization and science

Let us be educated experts rather than by-the-book technicians

Understanding the rationale, the essence and the principles rather than follow automatically formats and standards, which bring about vomiting "scientific" based decisions.

One Final Comment

Along the understanding that polygraph examiners should not function outside of any standardization or without having any scientifically proven support to their technique we should be ware not to narrow our steps and minds beyond the minimum that is necessary to avoid chaos.

Examiners should be able to practice their work with enough freedom to enable flexibility that is needed for adjusting the test to the specific examinee and circumstances, and during the years to achieve research support to the differential treating of the individual case. Interestingly enough let me remind you that even when it comes to test data analysis (TDA), it is well documented that the rate of success achieved by the original examiners is higher than the one achieved by more objective analysis made by others.

Not allowing APA members to use any un-validated (yet) techniques or variations that go beyond the standardization might help us to be accepted by the psychological academic world but take a look at the rate of success that they have with their standardized, validated tests, - non of them get even close to the success of the polygraph testing. To a certain degree, I'm speaking from within the psychological academic world, there is a lot to learn but be ware not to commit a suicide while trying to improve our profession.

One more word on the Future of our profession – The psychophysiological Detection of Deception

It is my belief that whether or not we turn to Adaptive Polygraphy in the next few years using our current psychophysiological measurements, the accelerating progress in brain research will bring us eventually to the Adaptive Polygraphy paradigm one way or another, namely,

Detection of Deception by being versatile and applying

"Different Things to Different People and Different Situations".

Questions?

Thank You