



29th Annual **INCOSE**
international symposium

Orlando, FL, USA
July 20 - 25, 2019

The Good, The Bad & The Ugly

Jennifer Russell
Judy Nolan

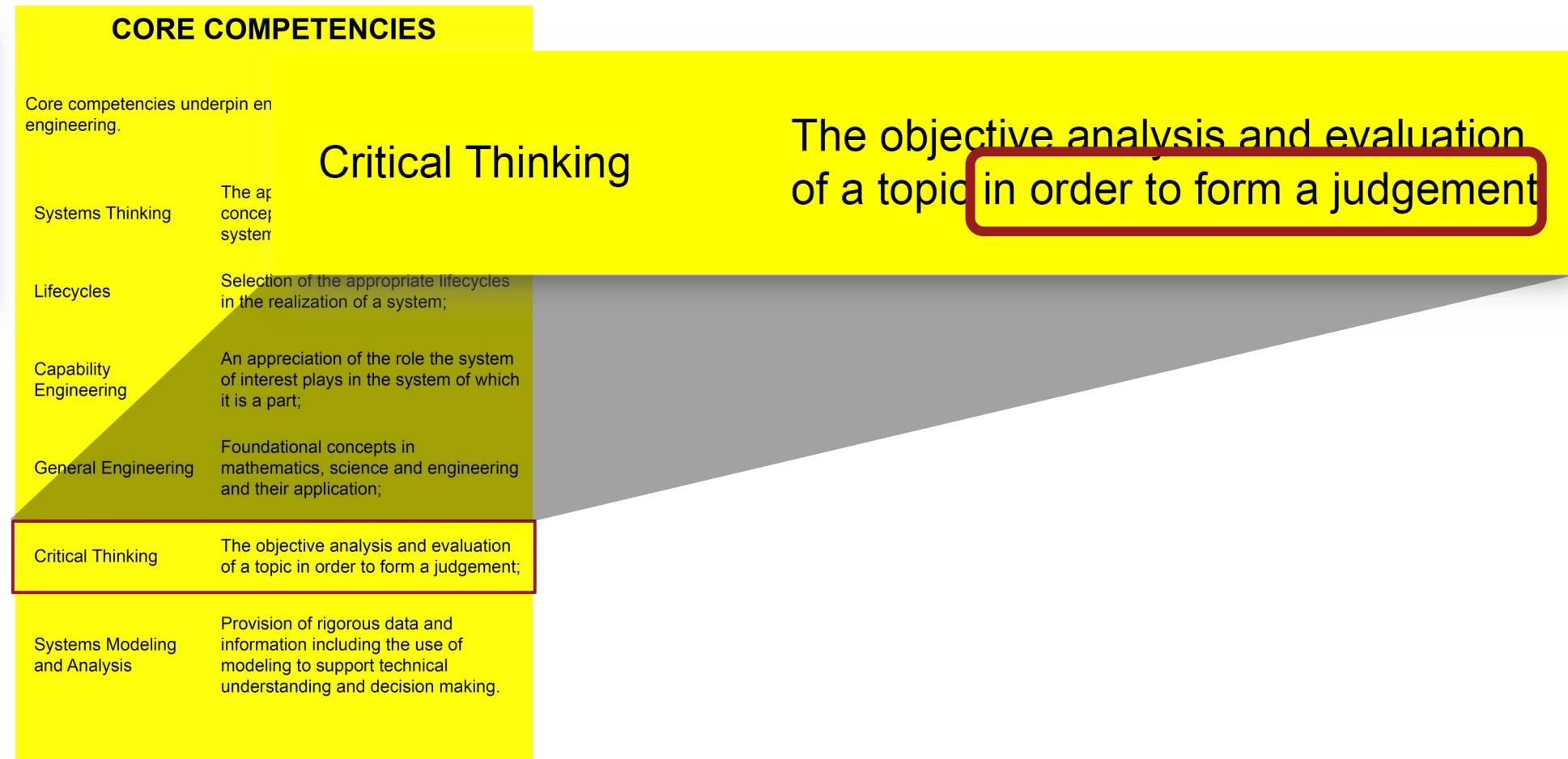
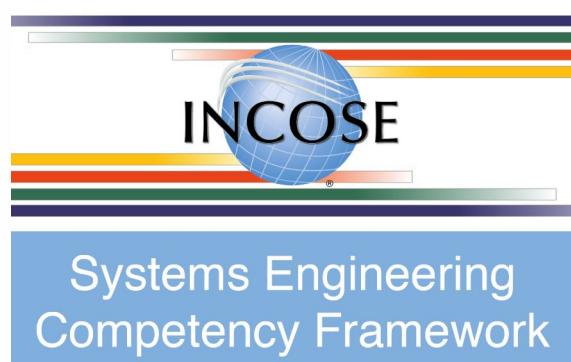
Andy Nolan
Tim Pruitt



THE GOOD
THE BAD
AND THE UGLY



SEs use Judgement





Judgement? Calibrated?

A “Test” for Judgement Calibration

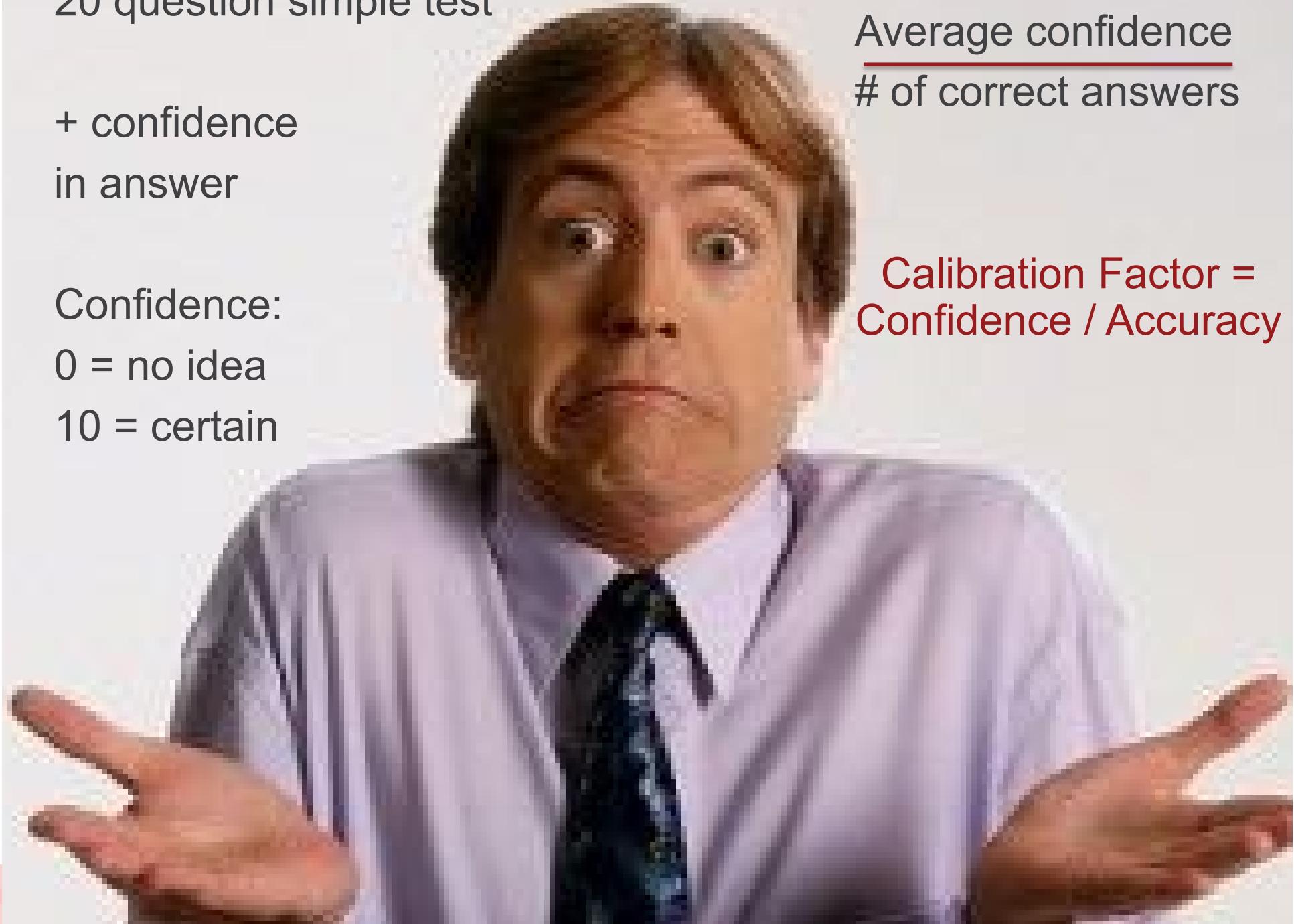
20 question simple test

+ confidence
in answer

Confidence:

0 = no idea

10 = certain



Average confidence
of correct answers

Calibration Factor =
Confidence / Accuracy

**Actual Answer is 456 ft
Guesses between 23 ft and 65,617 ft**



In feet, how tall is the tallest pyramid of Giza (Egypt)?



Are some people good at judgement?

Confidence vs % Error		Confidence Level								
		0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
% Error	-5% - 5%	0	1	0	0	0	0	0	0	0
	-10% - 10%	0	0	0	1	1	0	1	1	0
	-17% - 20%	1	0	0	3	3	2	3	0	0
	-29% - 40%	0	1	2	6	14	18	4	6	3
	-45% - 80%	2	3	12	21	47	37	15	3	0
	-62% - 160%	1	13	21	50	61	23	9	1	1
	-77% - 320%	5	9	27	33	32	14	6	1	2
	-87% - 640%	1	9	4	21	8	2	2	2	0
	-93% - 1280%	1	2	3	1	0	1	0	0	0
	-96% - 2560%	0	0	0	1	0	0	0	0	0

Confidence Level: 0 = no idea; 100 = certain

% Error: Guess/correct answer

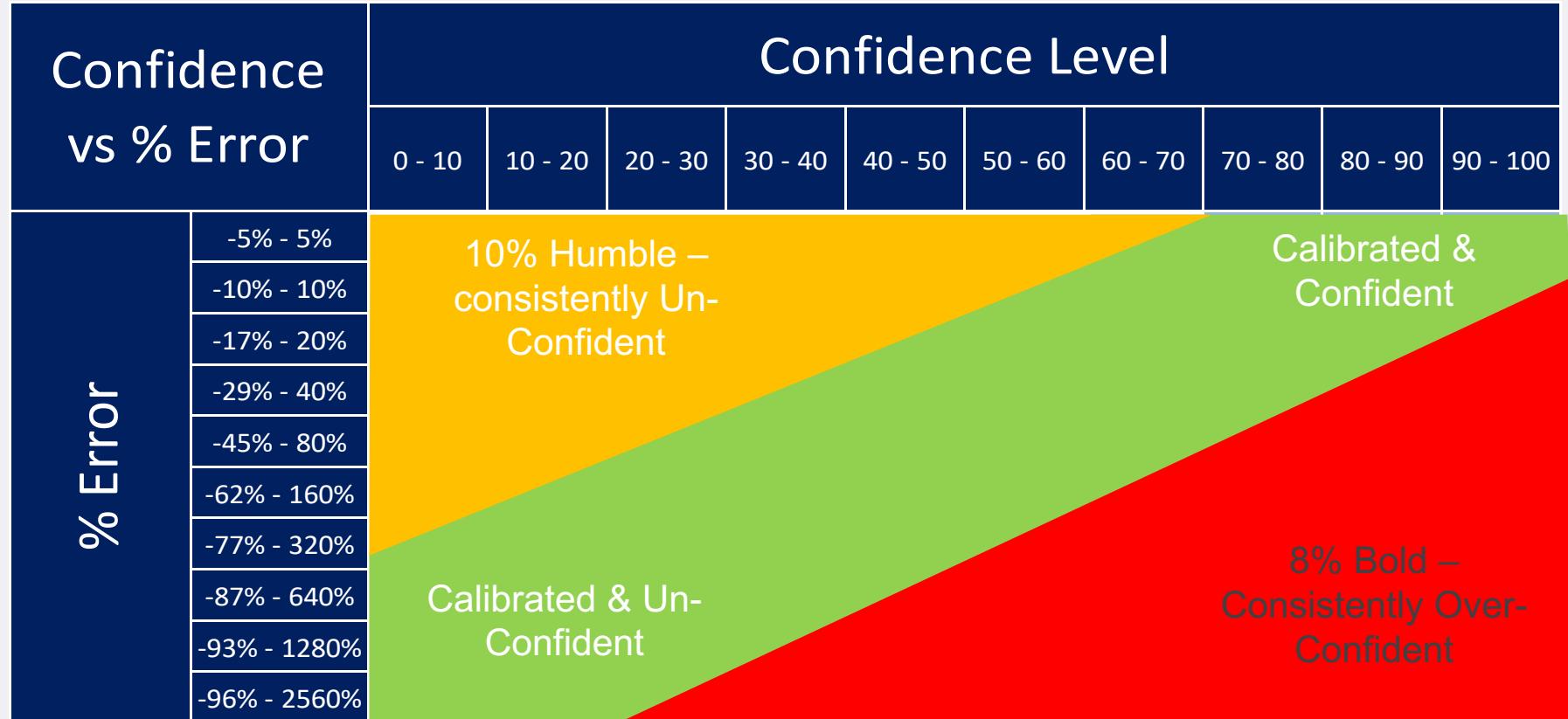
Average Confidence vs average % Error shows a person's consistent level of accuracy.

Consistently Over Confident

Confidence and %Error align

Consistently Under confident

Are some people good at judgement?



Calibrated (Green): 82% were calibrated

Humble (Amber): 10% were better than they thought

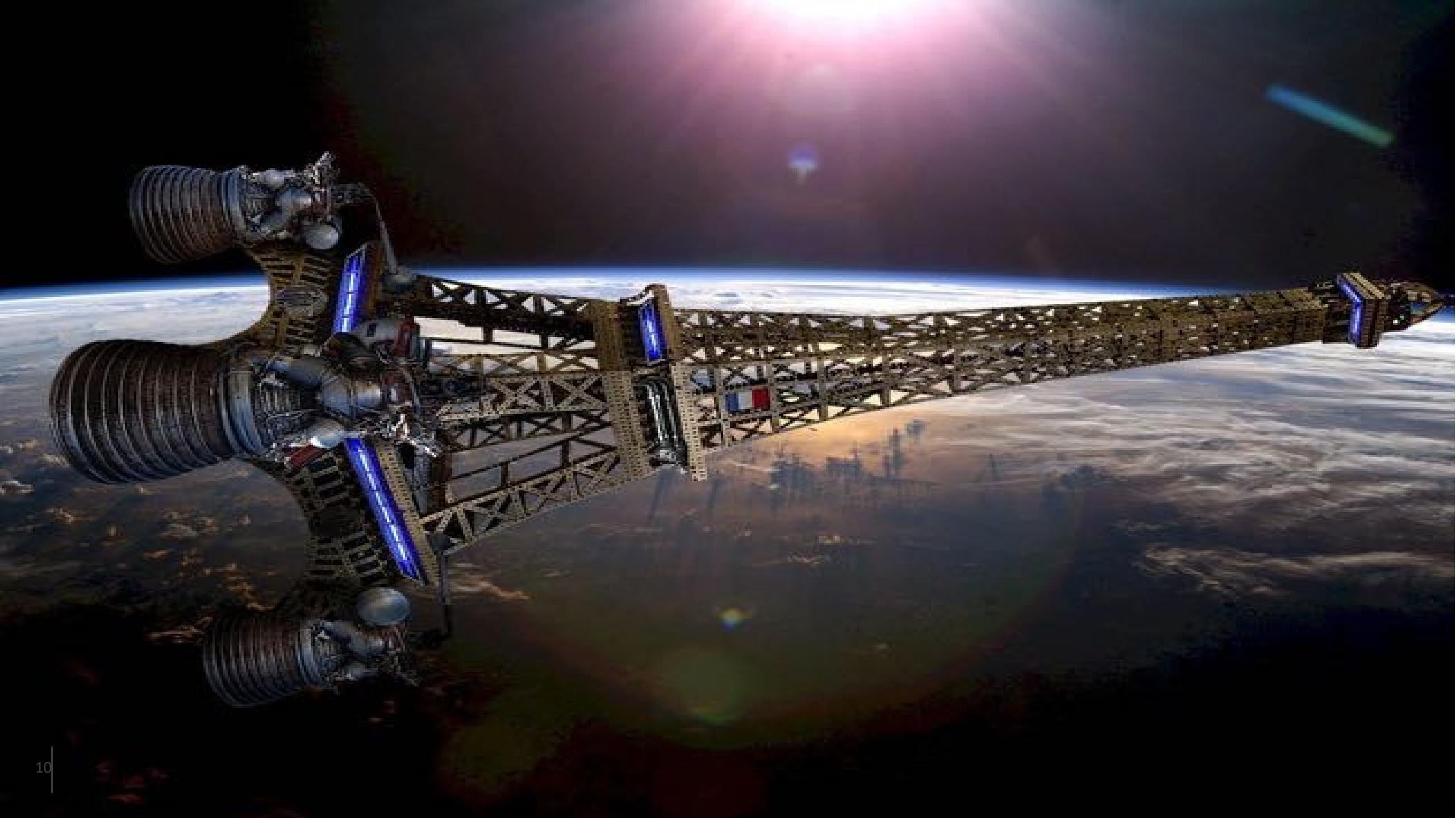
Bold (Red): 8% thought they knew but did not

In feet, how tall is the Eiffel Tower in Paris?

Actual height = 980 ft

Guesses between 115 ft and 164,000 ft





		Y/N	Conf
1	The Eiffel Tower is taller than the Empire State Building?	Y	1
2	A Tennis ball is bigger in diameter than a Cricket ball	N	7
3	On average cats live longer than dogs		
4	Titanium has a higher melting point than stainless steel		
5	More people live in Germany than Japan		
6	An Indian elephant can live longer than an African Elephant		
7	Ice is more dense than water		
8	Rome Italy is north of Beijing China		
9	There are 52 states in the USA		
10	The deepest point in any ocean is in the Pacific Ocean		



		Y/N	Conf
1	The Eiffel Tower is taller than the Empire State Building?	Y	1
2	A Tennis ball is bigger in diameter than a Cricket ball	N	4
3	On average cats lives longer than dogs	Y	7
4	Titanium has a higher melting point then stainless steel	N	6
5	More people live in Germany than Japan	Y	3
6	An Indian elephant can live longer than an African Elephant	N	8
7	Ice is more dense than water	Y	9
8	Rome Italy is north of Beijing China	N	2
9	There are 52 states in the USA	Y	3
10	The deepest point in any ocean is in the Pacific Ocean	N	6

Confidence
= 49

Confidence = sum of
your confidence scores

		Y/N	Conf
1	The Eiffel Tower is taller than the Empire State Building?	No	
2	A Tennis ball is bigger in diameter than a Cricket ball	No	
3	On average cats live longer than dogs	Yes	
4	Titanium has a higher melting point than stainless steel	Yes	
5	More people live in Germany than Japan	No	
6	An Indian elephant can live longer than an African Elephant	Yes	
7	Ice is more dense than water	No	
8	Rome Italy is north of Beijing China	Yes	
9	There are 52 states in the USA	No	
10	The deepest point in any ocean is in the Pacific Ocean	Yes	



		Y/N	Conf
1	The Eiffel Tower is taller than the Empire State Building?	Y	1
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8	Rome Italy is north of Beijing China	N	2
9	There are 52 states in the USA	Y	3
10	The deepest point in any ocean is in the Pacific Ocean	N	6

Accuracy =
 $2 * 10 = 20$

Accuracy is the number
of correct questions *

10

		Y/N	Conf
1	The Eiffel Tower is taller than the Empire State Building?	Y	1
2	A Tennis ball is bigger in diameter than a Cricket ball	N	4
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5	More people live in Germany than Japan	Y	3
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10	The deepest point in any ocean is in the Pacific Ocean	N	6

Confidence = 49

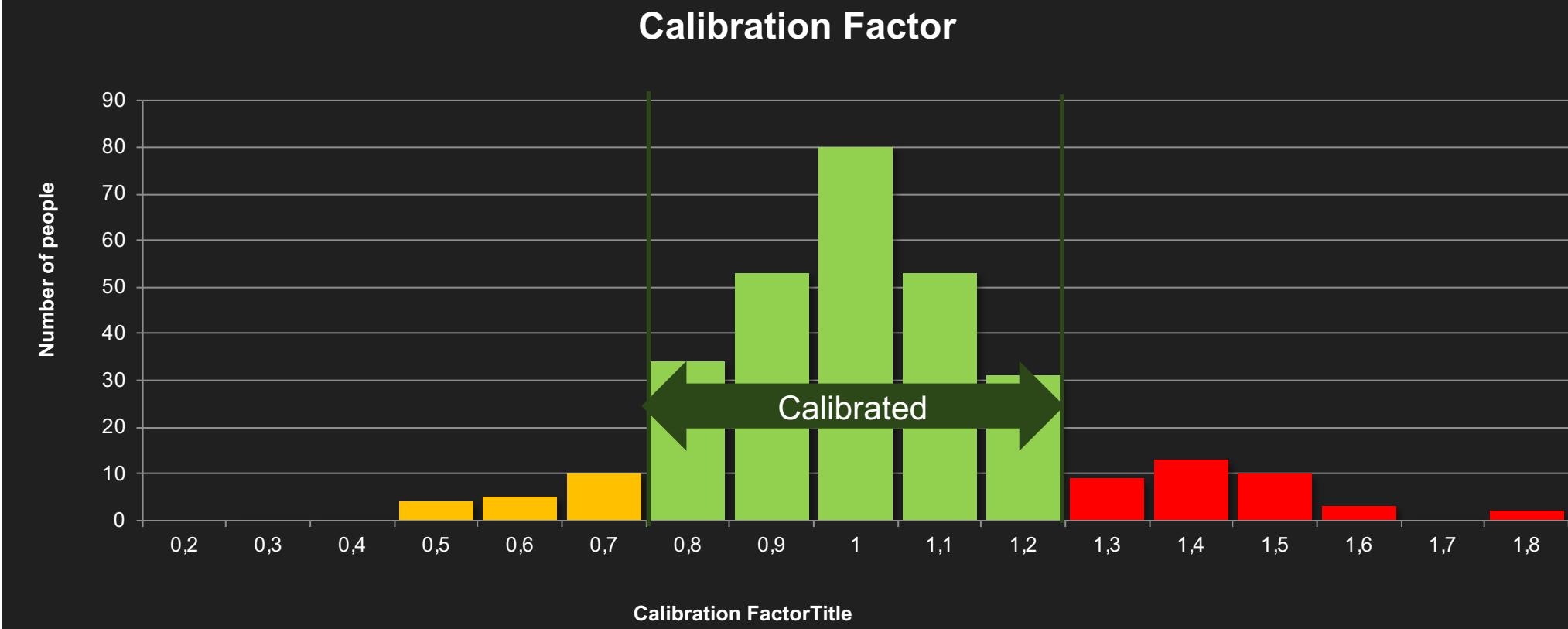
Accuracy = 20

Calibration factor
= 49 / 20 = 2.5

Calibration Factor =
Confidence / Accuracy



Calibration Factor =
Confidence / Accuracy



Calibration Factor = Confidence / Accuracy

 Confidence
 Accuracy
Humble
Calibration Factor
 < 0.8 .

 Confidence
 Accuracy
Calibrated
Factor
 $0.8 - 1.2$


 Confidence
Accuracy
Bold
Calibration Factor
 > 1.2



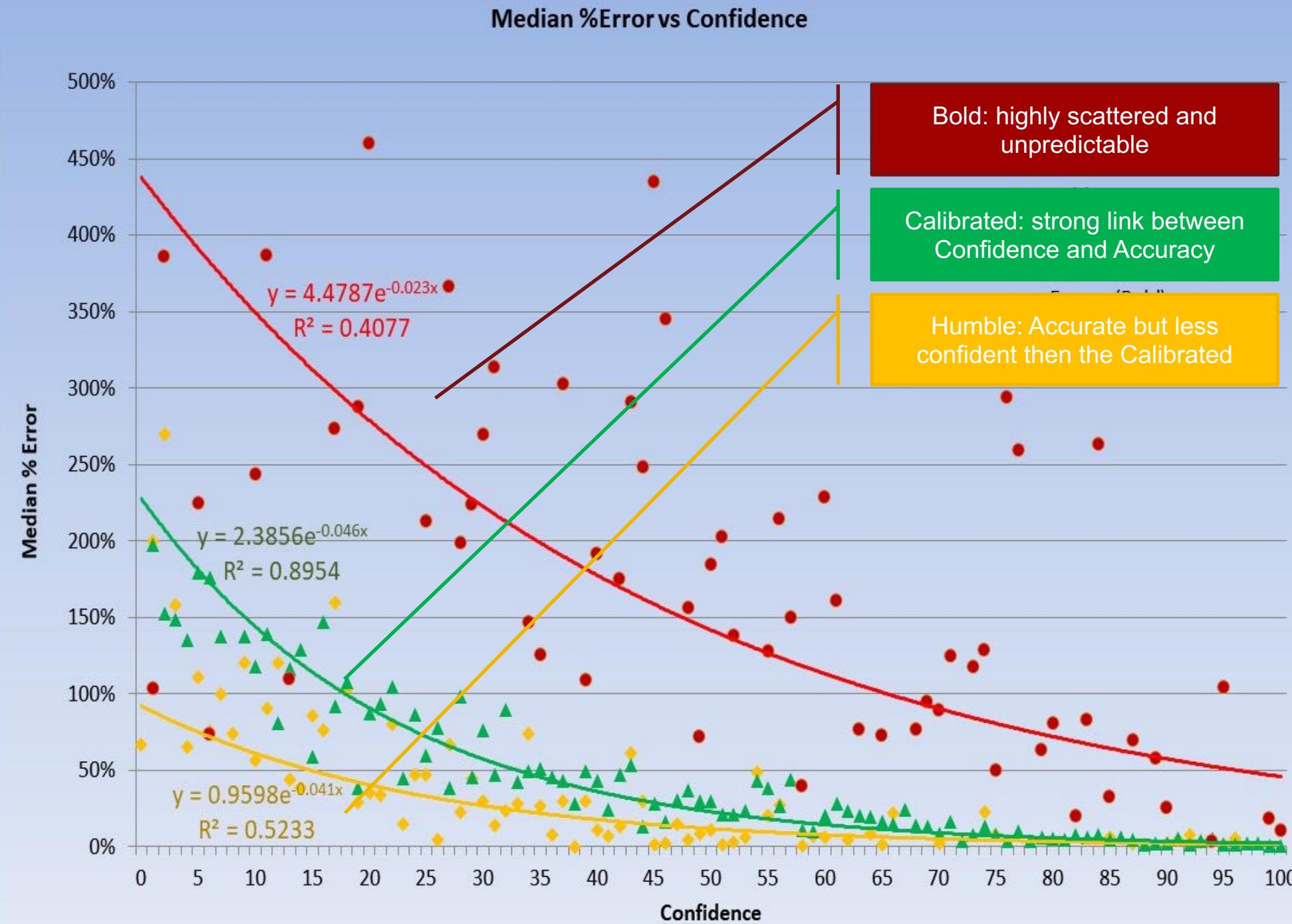
How tall is Leaning Tower of Pisa?

Actual height = 184 ft

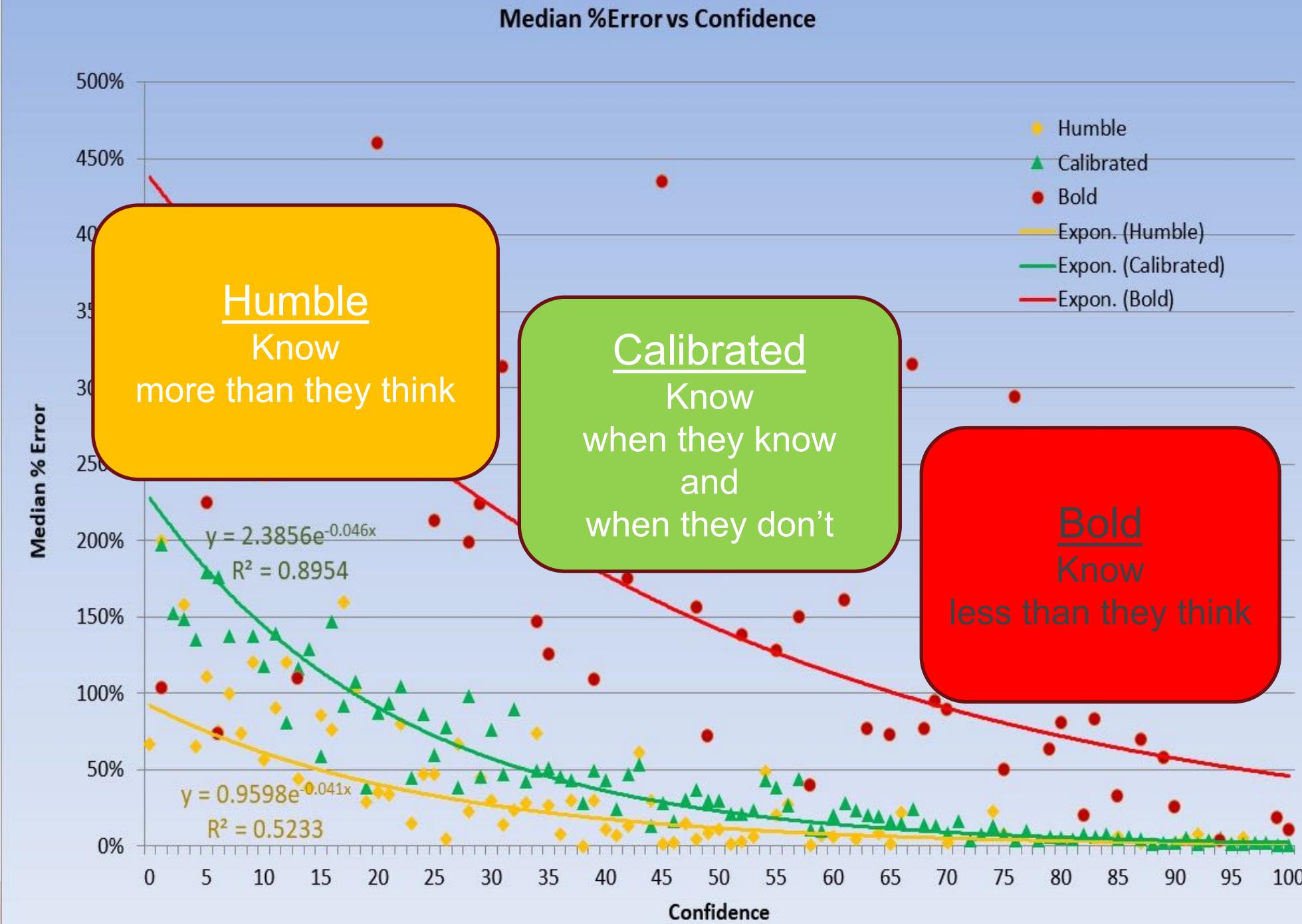
Guesses between $6\frac{1}{2}$ ft and 1,000 ft!



The Bold, the Humble and the Calibrated



What does this mean?



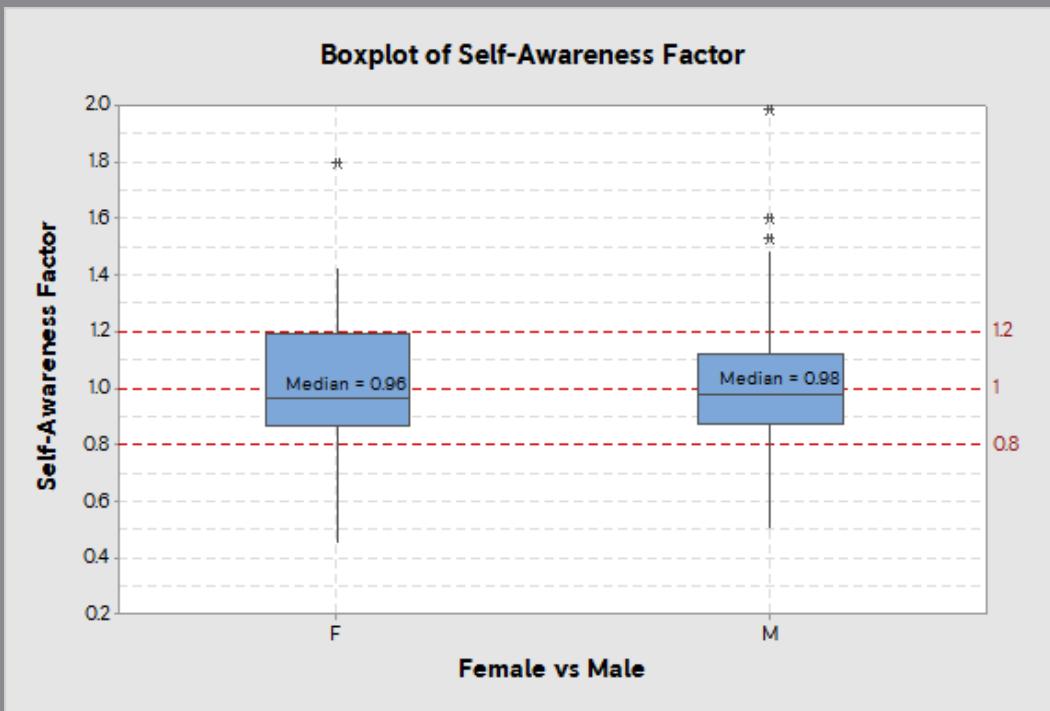


In feet, how tall is Big Ben?

Actual height = 315 ft

Guesses between 50 ft and 50,000 ft!

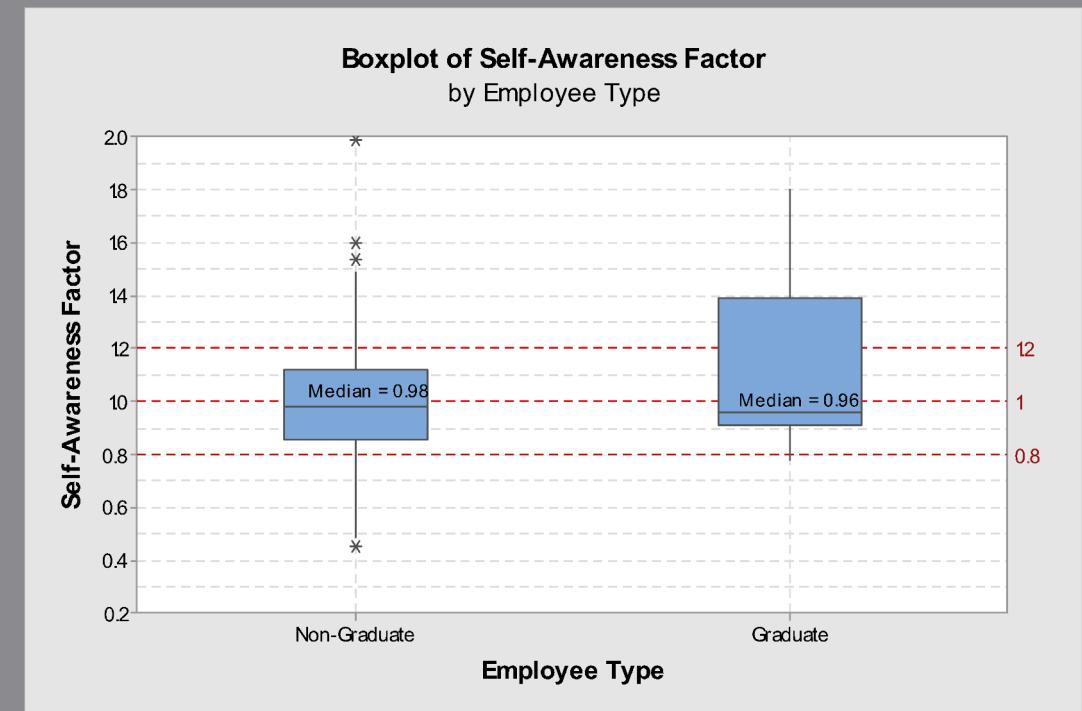




Female vs Male

Calibration – No statistical difference

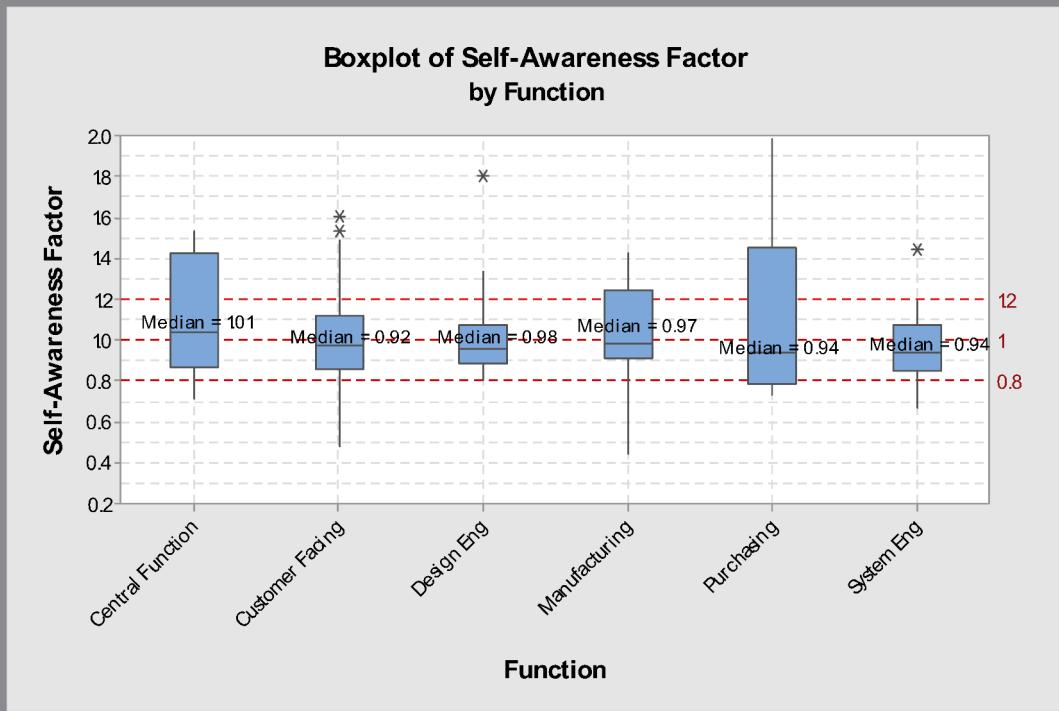
No bold tendencies



Non-Grad vs Grad

Calibration – No statistical difference

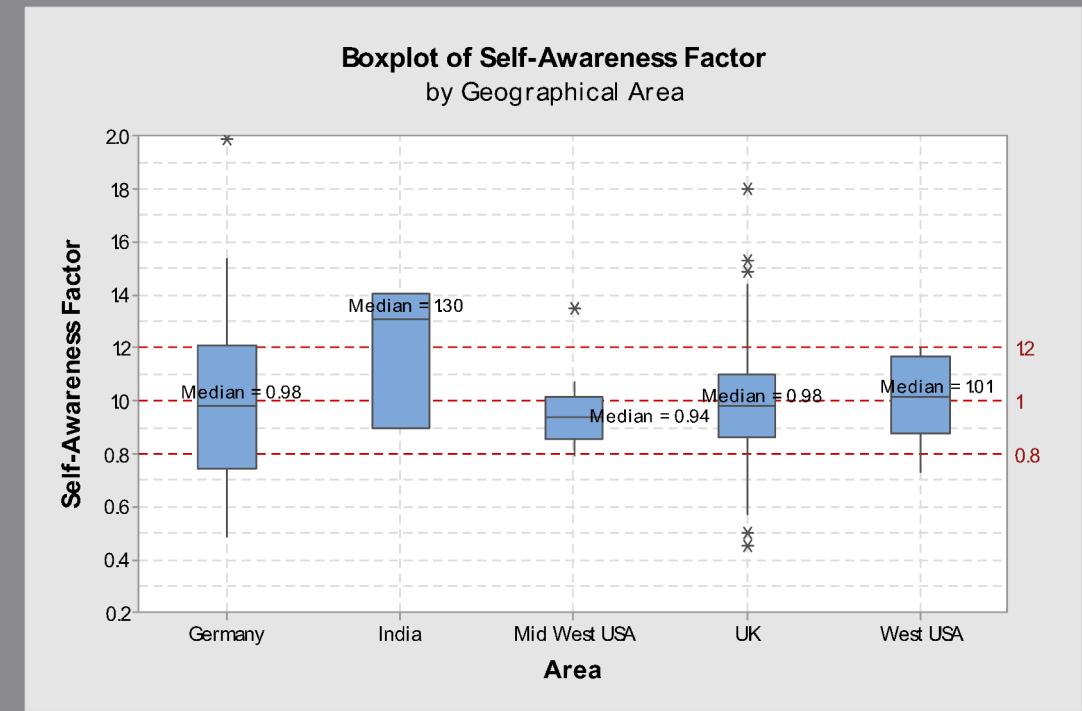
Grads have **bolder** tendencies



Work Function

Calibration – Greater range among Headquarters and Purchasing staff

Headquarters and Purchasing lean Bolder



Geographical location

Calibration – Greater range for Germany and India

India leans Bolder; mid-west USA predominantly Humble

Take test 1,
read results
and then
re-calibrate

Take test 2,
read results
and then
re-calibrate

Take test 3,
read results
and then
re-calibrate

Self Awareness Scores after completing repeated tests





Managing by Calibration

	Humble	Calibrated	Bold
Score	< 0.8	0.8 – 1.2	> 1.2
Behaviors	Reluctant to speak Take a long time to do work Let others lead	Speak when confident Quiet when not	Actively speak Regularly take lead Good presenters
Management	Encourage	Trust	Moderate

Application of Calibration

Enterprise

Team

Environmental

Humble
Calibration Factor < 0.8

Pair with Calibrated

Champion these
people

Geographical?

Calibrated
Calibration Factor between
0.8 and 1.2

Use as Subject
Matter Experts

Is this your
leader?

Training?

Bold
Calibration Factor > 1.2

Use energy and
balance with
Calibrated

Is this your
leader?

Business
Domain?



How long is the Nile River?

Actual distance 4,179 miles

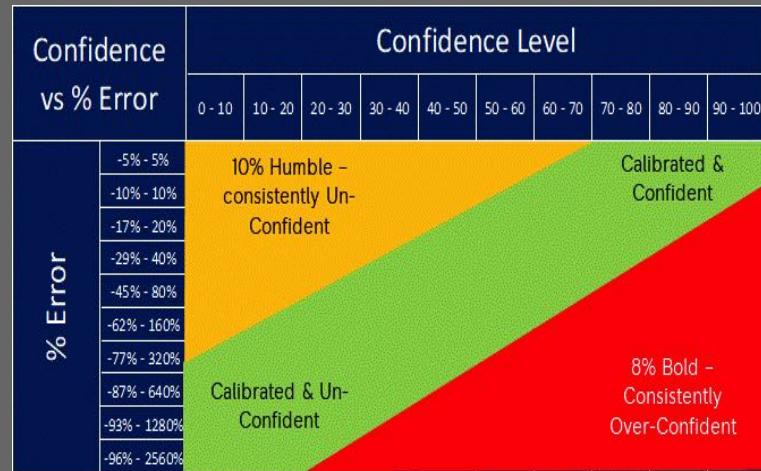
Guesses between 4 miles and 415,000 miles

415,000 miles
would loop the
world
seventeen
times!

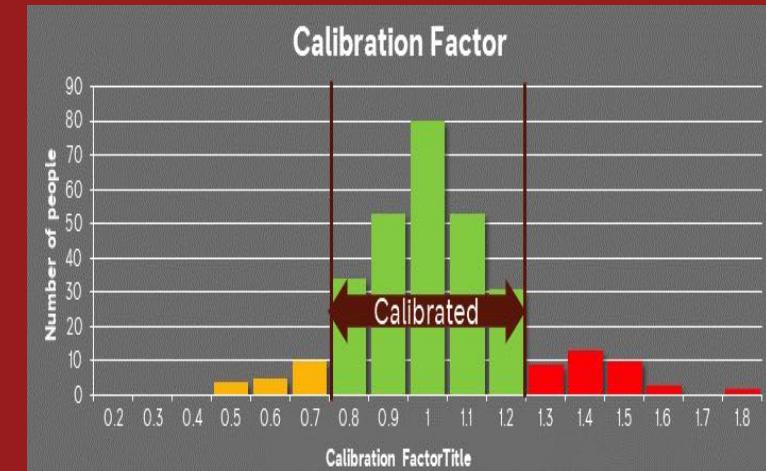


Conclusions

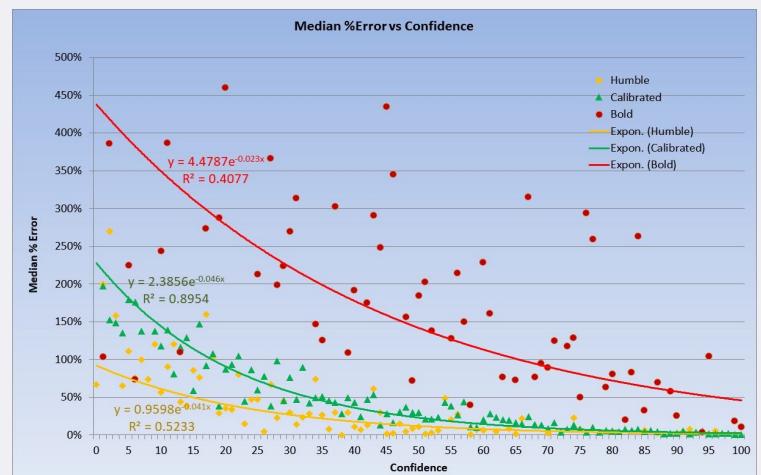
1 Not everyone is good at judgement



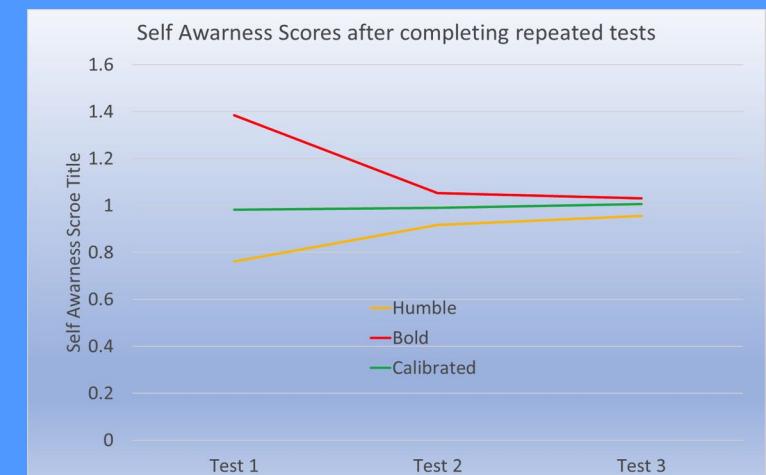
2 Calibration = Confidence / Accuracy



3 Accuracy = Confidence * Calibration



4 Calibration can be learned





In lbs, how heavy can a fully grown African elephant get?

Actual = 11,000 lbs

Guesses between 10 lbs and 110,000 lbs

10 lbs is about the same weight as a slightly plump cat!





Questions?

JLRussell@GarverUSA.com

Calibration Test?

Andy.Nolan@Rolls-Royce.com





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www.incose.org/symp2019