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STO TECHNICAL REPORT

PUB REF STO-MP-SAS-114-PPB

ANNEX B
Interpretation of NATO Standards by Non-Native English Speakers

LtCol James Kajdasz

Interpretation of NATO standards by non-native English Speakers

LtCol James Kajdasz, Ph.D., USAF

James.kajdasz@usafa.edu

Communicating Uncertainty

- **Analysts and advisers often communicate likelihood of potential future outcomes**
  - **Verbal expressions are preferred over numeric probabilities** (Wallsten, Budescu, Zwick & Kemp, 1993)
  - **Verbal expressions of probability are interpreted with a wide variance, differing by considerable margins between individuals** (Budescu & Wallsten, 1995; Clark, 1990)

Communicating Uncertainty

- **Intelligence Agencies publishing standardized lists of verbal expressions attempting to reduce potential miscommunication**
  - **United States:**
    - **14 terms: "almost no chance" to "nearly certain"** (ICD 203, 2015)
    - **38 terms: "Very unlikely" to "surely"** (DIA Tradecraft note 01-15, 2015)
  - **Canada:**
    - **38 terms: "improbable" to "certain"** (CFIC, 2015)
  - **United Kingdom:**
    - **10 terms: "remote" to "almost certain"** (JDP 2-00)
  - **NATO:**
    - **5 terms: "highly unlikely" to " highly likely"** (AJP-2.1, 2015)

Communicating Uncertainty

- **NATO terms offer a unique challenge in that English expressions of probability are being interpreted by non-native English speakers**

NATO AJP 2.1 PROBABILITY STATEMENTS	
More than 90%	Highly likely
60% - 90%	Likely
40% - 60%	Even chance
10% - 40%	Unlikely
Less than 10%	Highly unlikely

- **Are systematic differences in interpretation of phrases observable between different native languages?**

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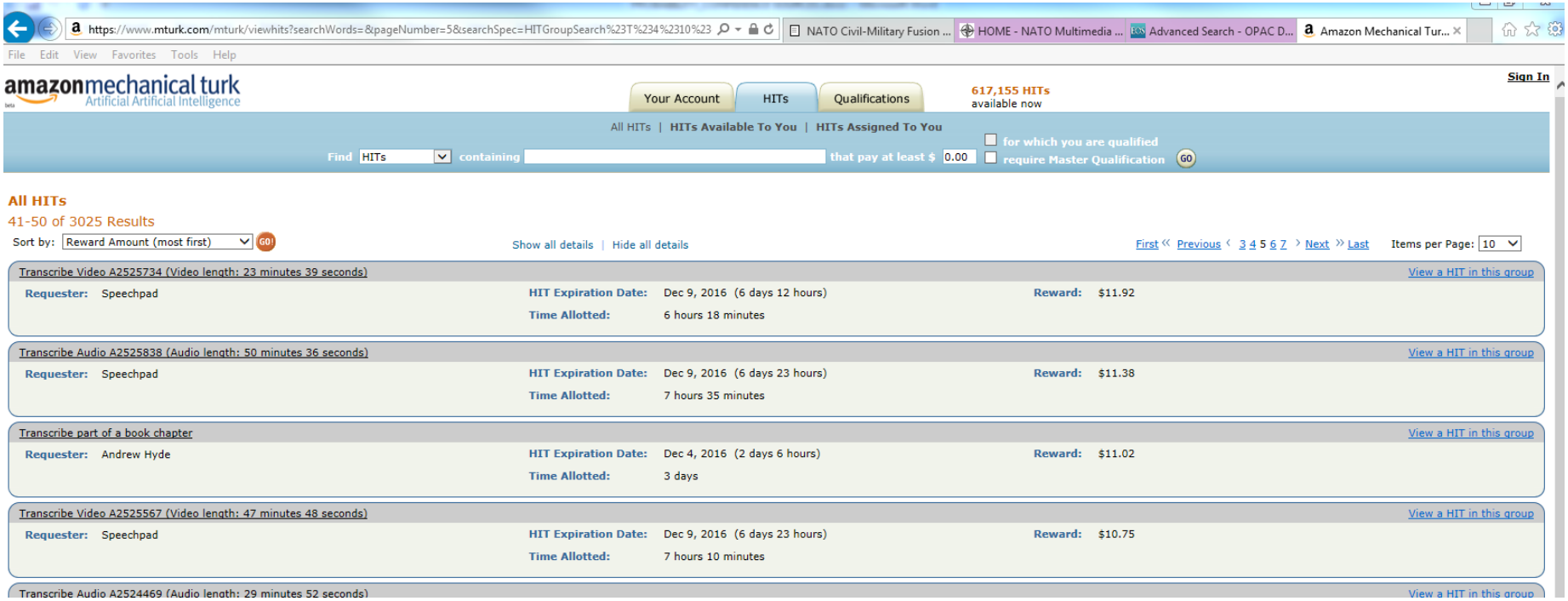
Recruitment

- **Participants recruited through Amazon's Mechanical Turk**



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Data Collection

Probabilistic Expressions

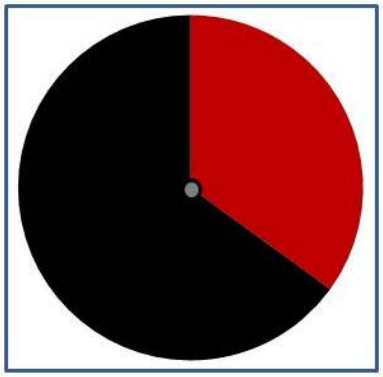
Intro

Thank you for your participation! This study takes approximately 30 minutes and pays $5 USD. In this study you will be asked to interpret various English terms used to describe the likelihood of an event. You will also be asked some questions related to interpretation of probabilities.

Next

Measuring Probability Signatures

Probabilistic Expressions



* 2. If this spinner were spun, what phrase(s) would you use to describe your confidence that a pointer will land on black?

- [ ] Highly Likely
- [ ] Likely
- [ ] Even chance
- [ ] Unlikely
- [ ] Highly unlikely

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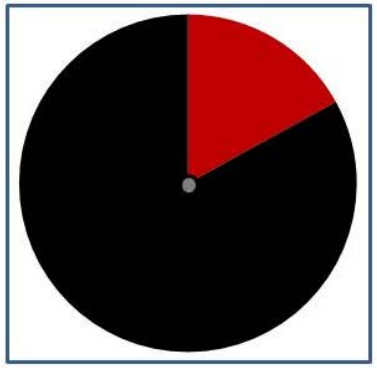
Measuring Probability Signatures

Probabilistic Expressions



* 3. If this spinner were spun, what phrase(s) would you use to describe your confidence that a pointer will land on black?

- [x] Highly Likely
- [x] Likely
- [ ] Even chance
- [ ] Unlikely
- [ ] Highly unlikely

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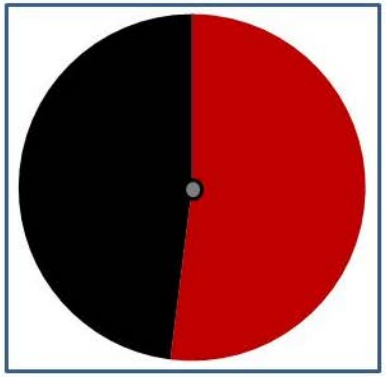
Measuring Probability Signatures

Probabilistic Expressions



* 4. If this spinner were spun, what phrase(s) would you use to describe your confidence that a pointer will land on black?

- [ ] Highly Likely
- [ ] Likely
- [x] Even chance
- [ ] Unlikely
- [ ] Highly unlikely

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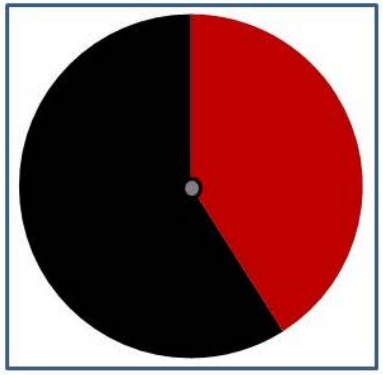
Measuring Probability Signatures

Probabilistic Expressions



* 5. If this spinner were spun, what phrase(s) would you use to describe your confidence that a pointer will land on black?

- [ ] Highly Likely
- [x] Likely
- [x] Even chance
- [ ] Unlikely
- [ ] Highly unlikely

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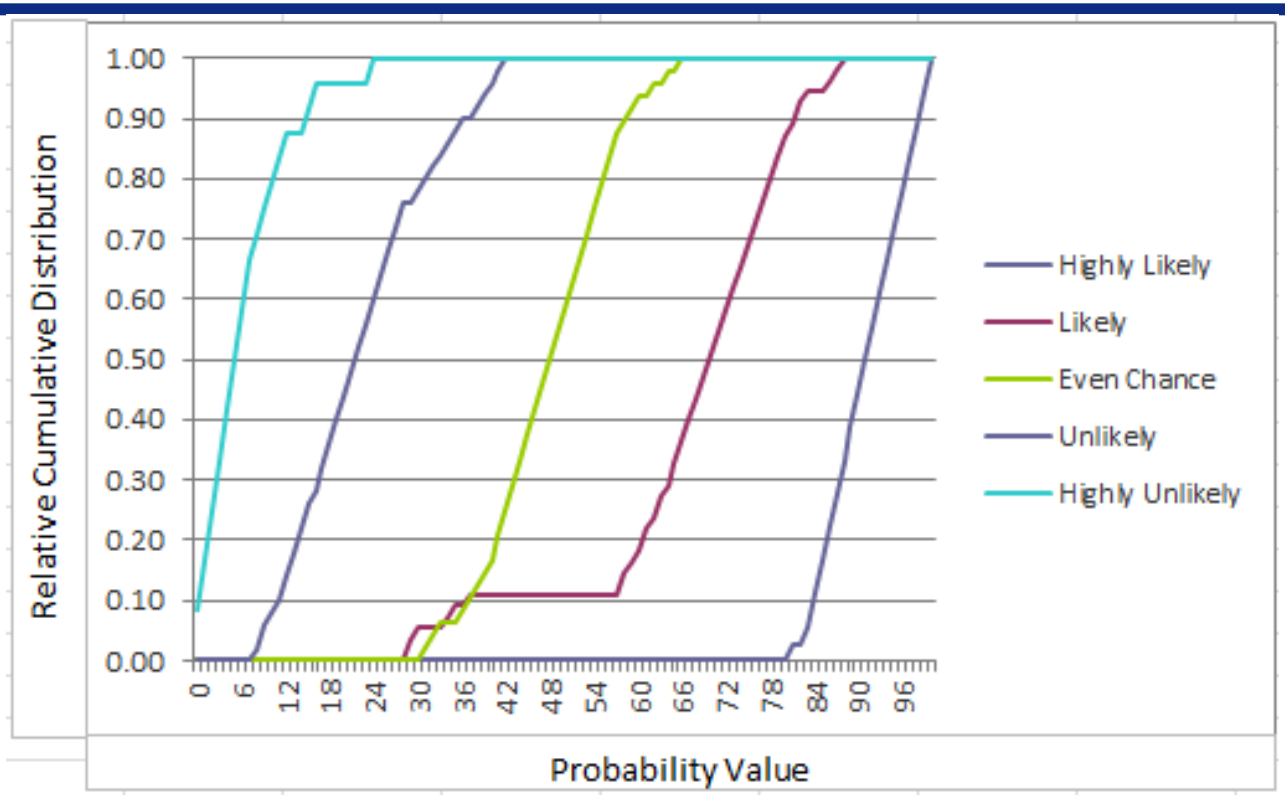
Data Analysis



Propose to compare probability signatures for native English and non-native English for all 5 expressions

Measuring possible covariates: Numeracy

Probabilistic Expressions

Edit

Numbers : You may not use a calculator for any of these questions.

Why are we asking these questions? It's thought that numeracy (one's ability to understand and manipulate proportions, risks, percentages, and probabilities) has an effect on how people might use and interpret verbal expressions of probability.

* 102. Imagine that we roll a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up as an even number?

* 103. In the BIG BUCKS LOTTERY, the chances of winning a $10.00 prize are 1%. What is your best guess about how many people would win a $10.00 prize if 1,000 people each buy a single ticket from BIG BUCKS?

* 104. In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1,000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car?

(Dieckman, Slovic & Peters, 2009)

Measuring possible covariates: Numeracy

* 105. Which of the following numbers represents the biggest risk of getting a disease?

- ◯ 1 in 100
- ◯ 1 in 1000
- ◯ 1 in 10

* 106. Which of the following numbers represents the biggest risk of getting a disease?

- ◯ 1%
- ◯ 10%
- ◯ 5%

* 107. If Person A's risk of getting a disease is 1% in 10 years, and Person B's risk is double that of A's, what is B's risk? _____ % in _____ years.

_____ %

in _____ years.

* 108. If Person A's risk of getting a disease is 1 in 100 in 10 years, and Person B's risk is double that of A, what is B's risk? _____ in _____ years.

_____

in _____ years.

(Dieckman, Slovic & Peters, 2009)

Measuring possible covariates: Numeracy

* 109. If the chance of getting a disease is 10%, how many people would be expected to get the disease:

Out of 100? _____ people

Out of 1000? _____ people

* 110. If the chance of getting a disease is 20 out of 100, this would be the same as having a _____% chance of getting the disease.

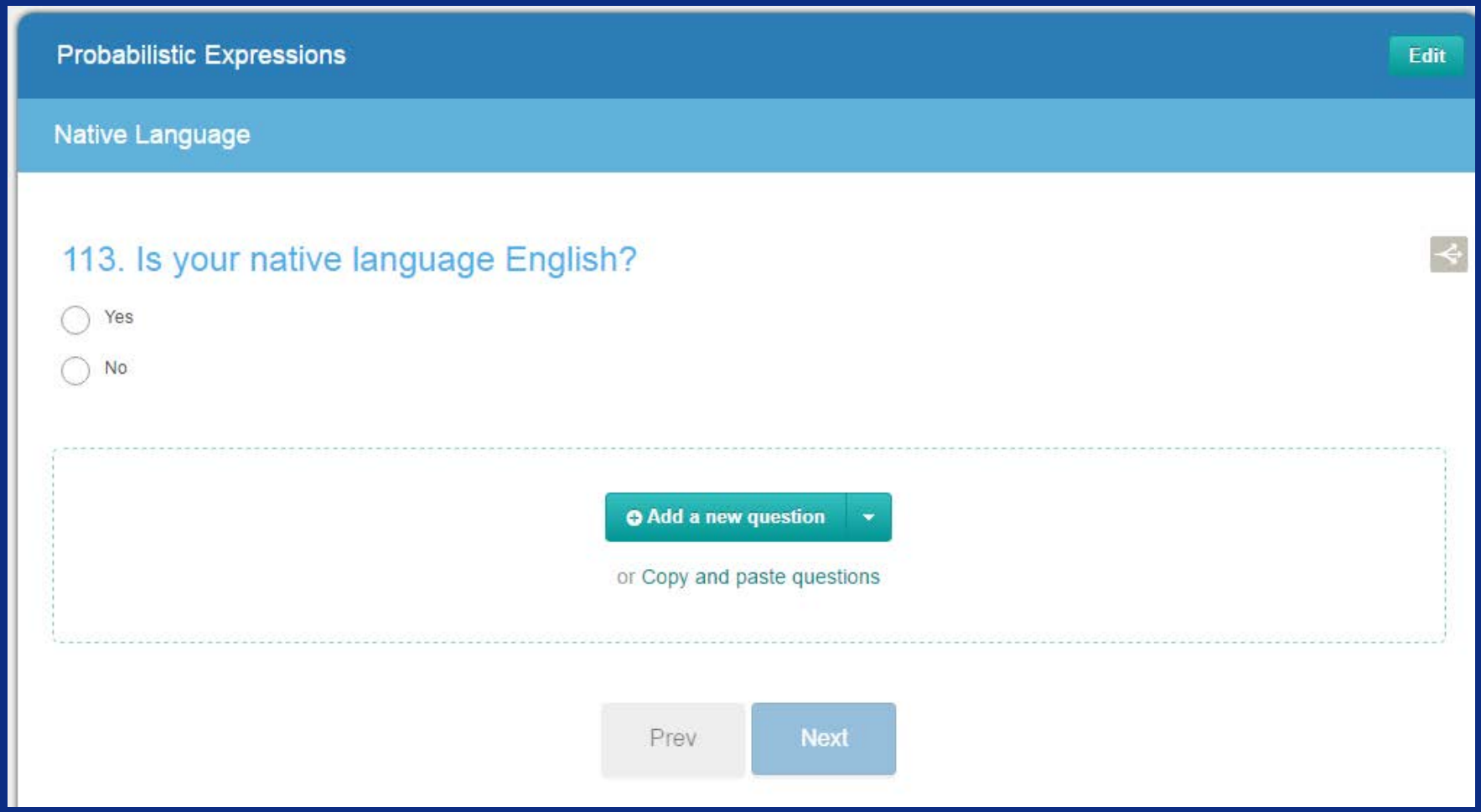
* 111. The chance of getting a viral infection is .0005. Out of 10,000 people, about how many of them are expected to get infected? _____ people.

* 112. Which of the following numbers represents the biggest risk of getting a disease?

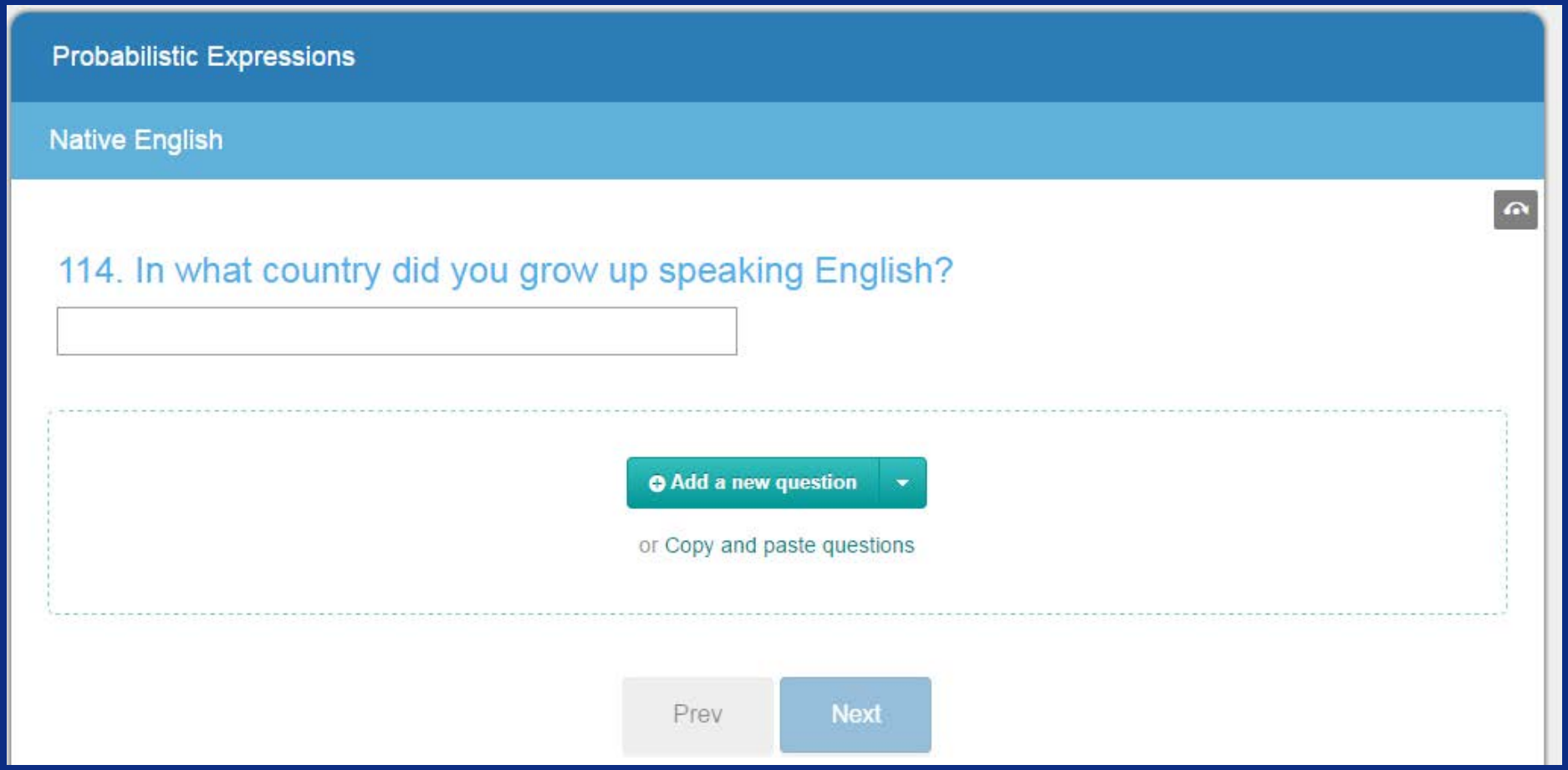
- 1 chance in 12
- 1 chance in 37

(Dieckman, Slovic & Peters, 2009)

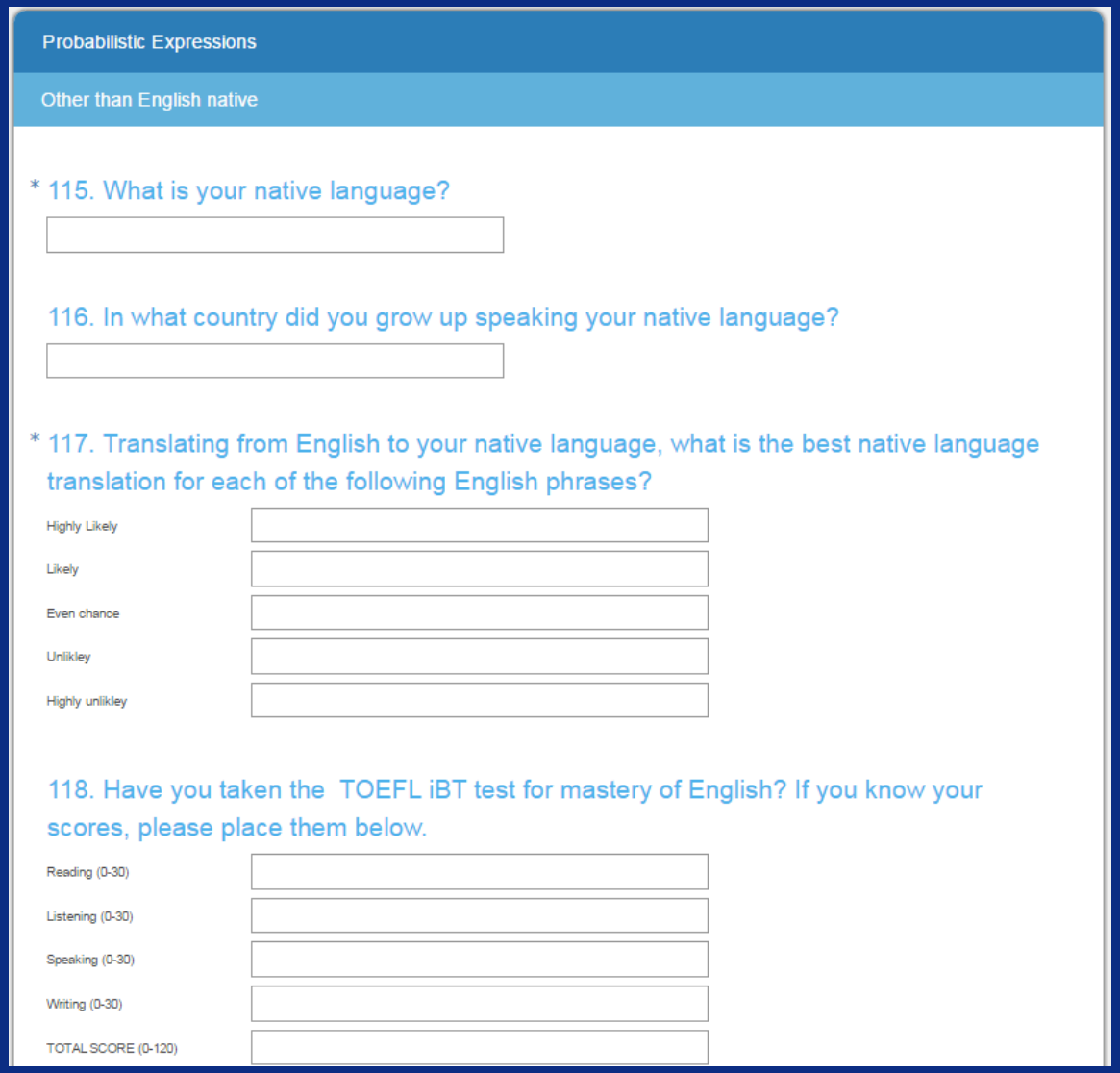
Measuring possible covariates: English Fluency



Measuring possible covariates: English Fluency



Measuring possible covariates: English Fluency



Probabilistic Expressions

Other than English native

* 115. What is your native language?

116. In what country did you grow up speaking your native language?

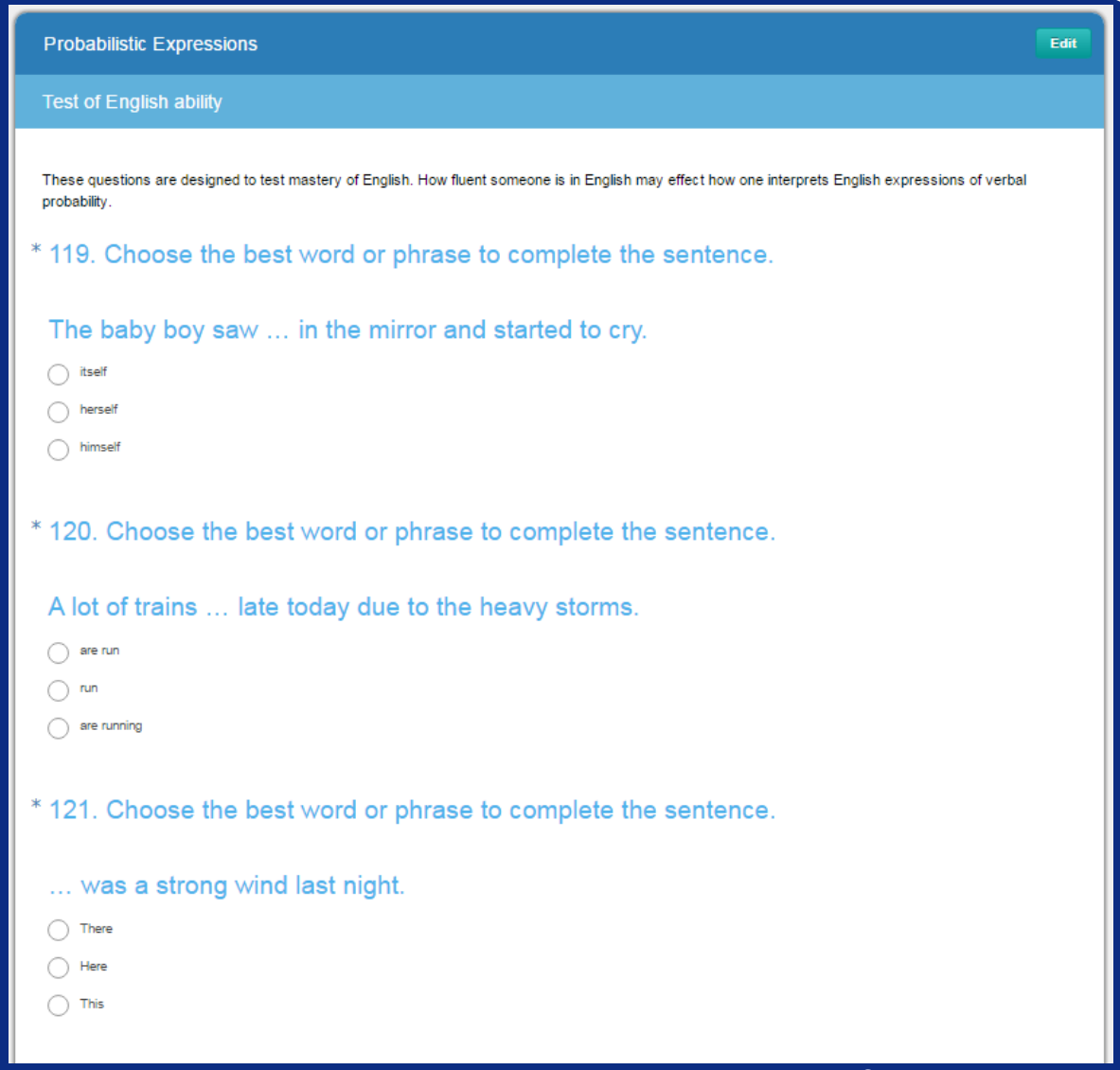
* 117. Translating from English to your native language, what is the best native language translation for each of the following English phrases?

Highly Likely	
Likely	
Even chance	
Unlikley	
Highly unlikley	

118. Have you taken the TOEFL iBT test for mastery of English? If you know your scores, please place them below.

Reading (0-30)	
Listening (0-30)	
Speaking (0-30)	
Writing (0-30)	
TOTAL SCORE (0-120)	

Measuring possible covariates: English Fluency



Probabilistic Expressions

Edit

Test of English ability

These questions are designed to test mastery of English. How fluent someone is in English may effect how one interprets English expressions of verbal probability.

* 119. Choose the best word or phrase to complete the sentence.

The baby boy saw ... in the mirror and started to cry.

- itself
- herself
- himself

* 120. Choose the best word or phrase to complete the sentence.

A lot of trains ... late today due to the heavy storms.

- are run
- run
- are running

* 121. Choose the best word or phrase to complete the sentence.

... was a strong wind last night.

- There
- Here
- This

LearnEnglish. (n.d.). Retrieved December 2, 2016, from http://learnenglish.britishcouncil.org/en/content

Measuring possible covariates: English Fluency

* 122. Choose the best word or phrase to complete the sentence.

Firstly, I want to congratulate you all. Secondly, I would like to wish you good luck and ... I hope you have enjoyed the course.

- ◯ in the end
- ◯ at last
- ◯ finally

* 123. Choose the best word or phrase to complete the sentence.

You ... clean your teeth twice a day to avoid having problems.

- ◯ can
- ◯ should
- ◯ will

* 124. Choose the best word or phrase to complete the sentence.

The children thought they were ... when they saw the bull.

- ◯ in a danger
- ◯ in danger
- ◯ in the danger

* 125. Choose the best word or phrase to complete the sentence.

Jack: I think it's going to rain.
Jill: I ... , the clouds are clearing.
Jack: We'll soon see.

- ◯ disagree
- ◯ complain
- ◯ argue

LearnEnglish. (n.d.). Retrieved December 2, 2016, from http://learnenglish.britishcouncil.org/en/content

Measuring possible covariates: English Fluency

* 126. Choose the best word or phrase to complete the sentence.

I really don't like this meal. ... money in the world wouldn't get me to eat it.

- ◯ Whatever
- ◯ Enough
- ◯ All the

* 127. Choose the best word or phrase to complete the sentence.

Last year, Joanna bought two ... coats in New York.

- ◯ long, black, leather
- ◯ black, long, leather
- ◯ leather, black, long

* 128. Choose the best word or phrase to complete the sentence.

I must report to the meeting that Cyrus completed his first piece of work well ahead of schedule... however, his work has been handed in late.

- ◯ Sequentially
- ◯ Subsequently
- ◯ Consequently

* 129. Choose the best word or phrase to complete the sentence.

That's very good of you but you ... have paid me back until tomorrow.

- ◯ needn't
- ◯ wouldn't
- ◯ couldn't

LearnEnglish. (n.d.). Retrieved December 2, 2016, from http://learnenglish.britishcouncil.org/en/content

Measuring possible covariates: English Fluency

* 130. Choose the best word or phrase to complete the sentence.

I ... intending to stop smoking even before I got this bad cough.

- ◯ would have been
- ◯ had been
- ◯ have been

131. Choose the best word or phrase to complete the sentence.

Anne: Oh! I watched the new TV show last night.
Jo: Was it any good?
Anne: Yes, ... the TV set is so old I could see very little.

- ◯ mind you
- ◯ still
- ◯ by the way

* 132. Choose the word which has a similar meaning to:

consider

- ◯ think about
- ◯ seem well
- ◯ go for

* 133. Choose the word which has a similar meaning to:

talk

- ◯ stroll
- ◯ point out
- ◯ converse

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Measuring possible covariates: English Fluency

135. Choose the word which has a similar meaning to:

return

- account
- go back
- reverse

* 136. Choose the word which has a similar meaning to:

report

- go after
- account
- respect

* 137. Choose the best word to complete the sentence.

She hit her ... while she was playing football.

- motor
- tail
- shoulder

* 138. Choose the best word to complete the sentence.

The ... went to the police.

- crime
- solicitor
- shoulder

LearnEnglish. (n.d.). Retrieved December 2, 2016, from http://learnenglish.britishcouncil.org/en/content

Measuring possible covariates: English Fluency

* 139. Choose the best word to complete the sentence.

It was bad but it was not a ... .

- gate
- magazine
- crime

* 140. Some words are often used together, e.g. smelly + socks. Choose a word which is often used with:

concrete

- builder
- thrill
- proposal

* 141. Some words are often used together, e.g. smelly + socks. Choose a word which is often used with:

tender

- diet
- words
- beast

* 142. Some words are often used together, e.g. smelly + socks. Choose a word which is often used with:

sophisticated

- dress
- purse
- ship

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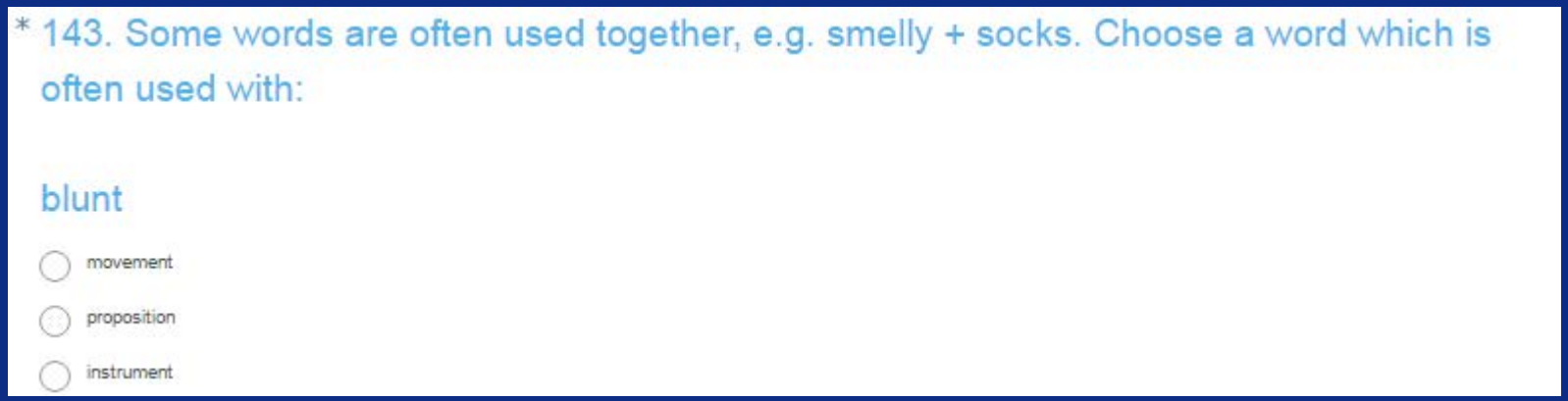
Measuring possible covariates: English Fluency



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Debrief

Probabilistic Expressions

Edit

Debrief

Thank you for participating in this research. Your time and effort are really appreciated. The study was examining how non-native English speakers differ from native English speakers in understanding verbal expressions of probability.

You were presented with some common verbal expressions used to communicate the likelihood that a given event will occur. You were asked to use these words to describe the likelihood that a spinner would end up on a particular color. We can use this information to create a map of what words you prefer to use for a given set of likelihoods. We then compare that preference to the preferences of other speakers of other languages. It's believed that some differences will be observed between countries.

We will use statistical tests to analyze the data you have provided. The results of this research could help avoid miscommunication when describing the chances a future event will occur. Unfortunately, we cannot provide you with feedback on your own performance because the data collected is anonymous. However, Dr Kajdasz can give you a summary of the results if you contact him.
In addition, if you have any questions or concerns about this research or your participation in it, then please
contact Dr. Kajdasz on the email listed below:
Dr. James E. Kajdasz, USAF Academy
E-mail: james.kajdasz@usafa.edu

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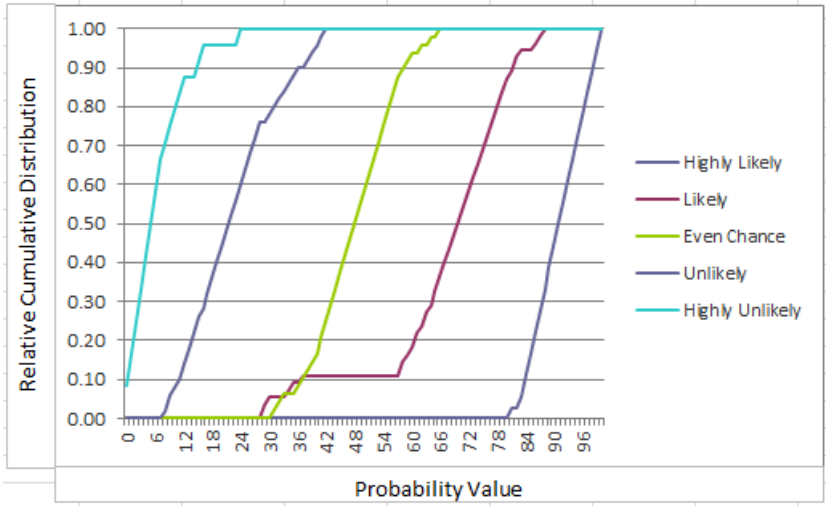
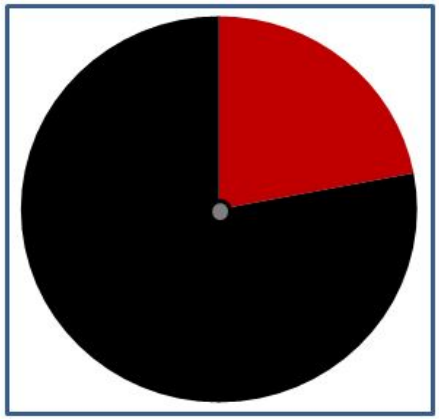
Proposed Data analysis

- Compare probability signature of native English speakers to each non-English language across each of 5 probability statements. (2-sample Kolmogorov-Smirnov)
- Compare high English fluency to low English Fluency within each non-English language across each of 5 probability statements
- Compare high numeracy to low numeracy in English speakers across 5 probability statements.
  - If significant, compare high and low numeracy across non-English speakers



Part 2: (Assuming we see significant differences)

- **Recruit non-English speakers for languages in which significant differences were observed.**



6. <<Written in Native Language>> If this spinner were spun, what phrase(s) would you use to describe your confidence that a pointer will land on black?

- ☐ <<Native Word 1>>
- ☐ <<Native Word 2>>
- ☐ <<Native Word 3>>
- ☐ <<Native Word 4>>
- ☐ <<Native Word 5>>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