Identifying Deceptive Speech Across Cultures

Nishmar Cestero

Molly Scott

Sarah Ita Levitan

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Outline

- Background
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 - Previous Work
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What is "Deception"?

- Deliberate choice to mislead
 - Without prior notification
 - To gain some advantage or to avoid some penalty
- □ Not:
 - Self-deception, delusion, pathological behavior
 - Theater
 - Falsehoods due to ignorance/error

Previous Deception Research

Has focused on...

- Facial expression cues (Ekman '76, Frank '03)
- Body posture and gestures (Burgoon et al '94)
- Brain imaging technologies (e.g. MRI) (Langleben et al '02)
- Biometric factors (e.g. increases in blood pressure, perspiration, etc.) (Horvath '73)
- Variation in lexical choice (Streeter et al '77)

Previous Work (Hirschberg et al '05)

- CSC Corpus
- Automatic deception detection procedures: accuracies
 20% better than human judges.
- Interesting individual differences in some behaviors were observed. (e.g. variation in overall pitch range when lying vs. truth)
- Human judges' accuracy in judging deception could be predicted from their scores on simple personality tests.
- Examined only American verbal deceptive behaviors.

Goals

- To develop technologies which help humans detect deception by providing more relevant information
- To identify techniques to help select humans who are good at deception detection.

Research Questions

- What objectively identifiable features characterize peoples' speech when deceiving in different cultures?
- What objectively identifiable audio cues are present when people of different cultures perceive deception?
- What language features distinguish deceptive from nondeceptive speech when conversants speak a common language? When one conversant is not a native speaker of that language?

Hypotheses¹

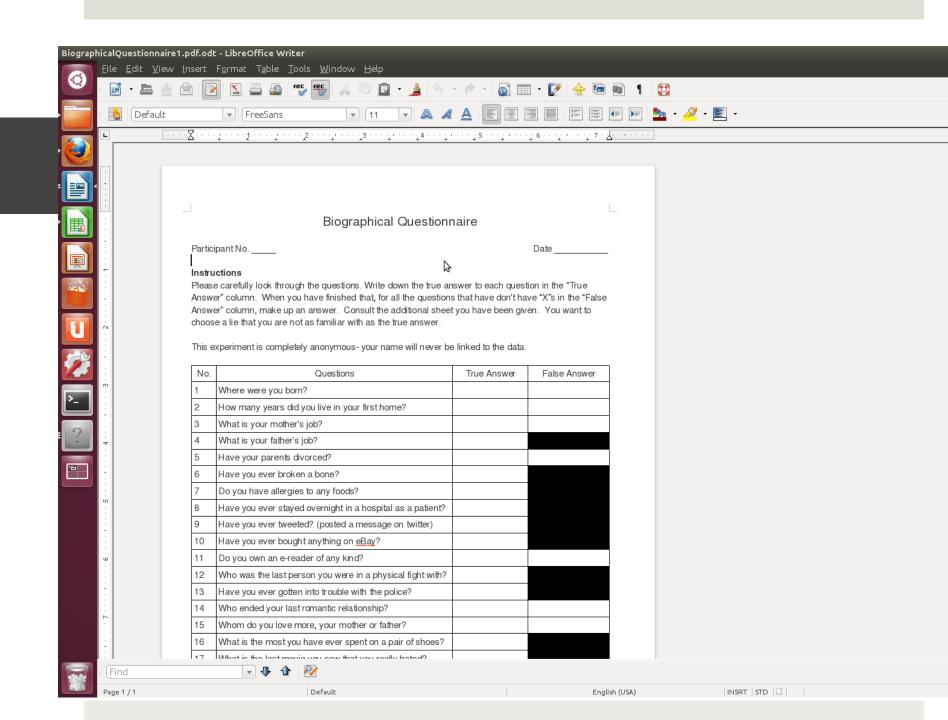
- H1: Acoustic, prosodic and lexical cues can be used to identify deception in native Arabic and Mandarin speakers speaking English with accuracy greater than human judges.
- H2: Results of simple personality tests can be used to predict individual differences in deceptive behavior of native American, Arabic, and Mandarin speakers when speaking English.
- H3: Simple personality tests can predict accuracy of American judges of deceptive behavior when judging Arabic and Mandarin speakers speaking English.
- H4: Particular acoustic, prosodic and lexical cues can be used to identify deception across native and nonnative English speakers while other cues can only be used to identify deception within English speakers of a particular culture.

Hypotheses, continued.

- H5: Some personality traits can predict individual differences in deceptive behaviors across native and nonnative English speakers while other personality traits can only predict individual differences in deceptive behaviors within a particular culture.
- H6: Simple personality tests can predict accuracy of Arabic and Mandarin judges of deceptive behavior when judging native American and nonnative American speakers speaking English.
- H7: Acoustic, prosodic and lexical cues of deception can be mediated by the gender and/or culture of the deceiver and target.
- H8: Judges' ability to detect deception is mediated by the gender and/or culture of the deceiver.

The Experiment

- Background Information (e.g. gender, race, language)
- Biographical Questionnaire
 - "Fake Resume" paradigm
 - Personal questions (e.g. "Who ended your last romantic relationship?", "Have you ever watched a person or pet die?")
- NEO FFI
- Baseline
- Lying game
 - Payment scheme
 - No visual contact
 - Keylogging



Samples

Sample 1



Sample 2



Current Status

- Data collection
 - Over 50 pairs have been recorded
 - This summer:
 - Hours of speech: about 5 hours
 - 9 pairs, 13 pairs by the end of the week
- Extracting intensity measures
- Participant pool
 - American English and Mandarin Chinese speakers
 - Recruited from Columbia and Barnard campus

Future work

- Arabic speakers
- Feature extraction
 - Acoustic/Prosodic (i.e. duration, speaking rate, pitch, pause)
 - Lexico/Syntactic (i.e. laughter, disfluencies, hedges)
- Correlate behavioral variation in lies vs truth with standard personality test scores for speakers (NEO FFI)
- Machine learning experiments to identify features significantly associated with deceptive vs non-deceptive speech.

Thank you!