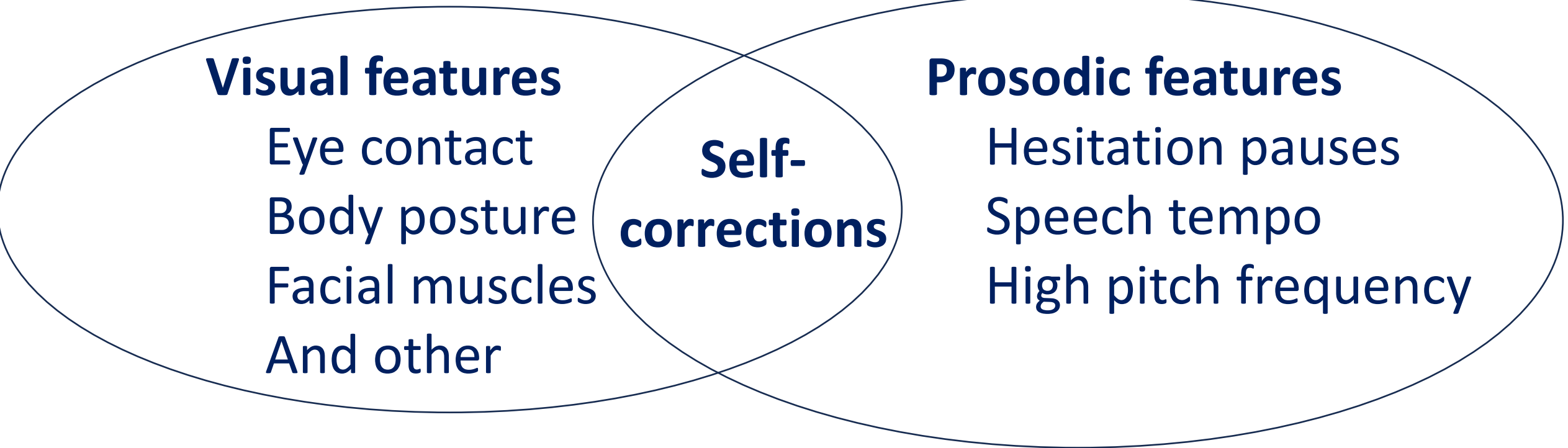


Existing models for diagnosing unreliable information [lie]

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Modality of logicity: *therefore «следовательно», because «потому что», because of the fact that «из-за того, что» и др.*
Verbs of action: *went «пошёл(-а)», actions took place «это происходило», play «играли», lasted «длилось» и др.*
Emotion-expressing vocabulary: *liked it «понравилось», mixed emotions «смешанные эмоции», existential crisis «экзистенциальный кризис», takes over the soul «берёт за душу»*

Research goals

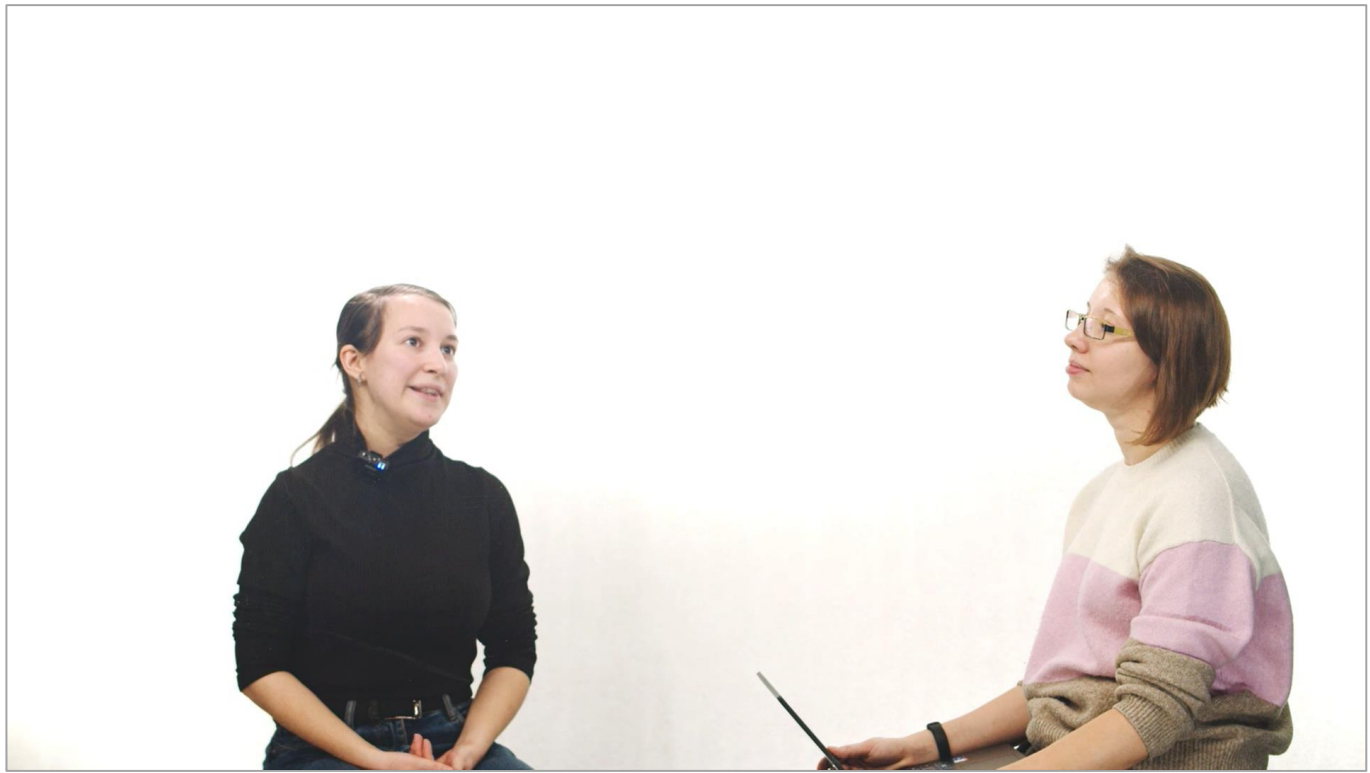
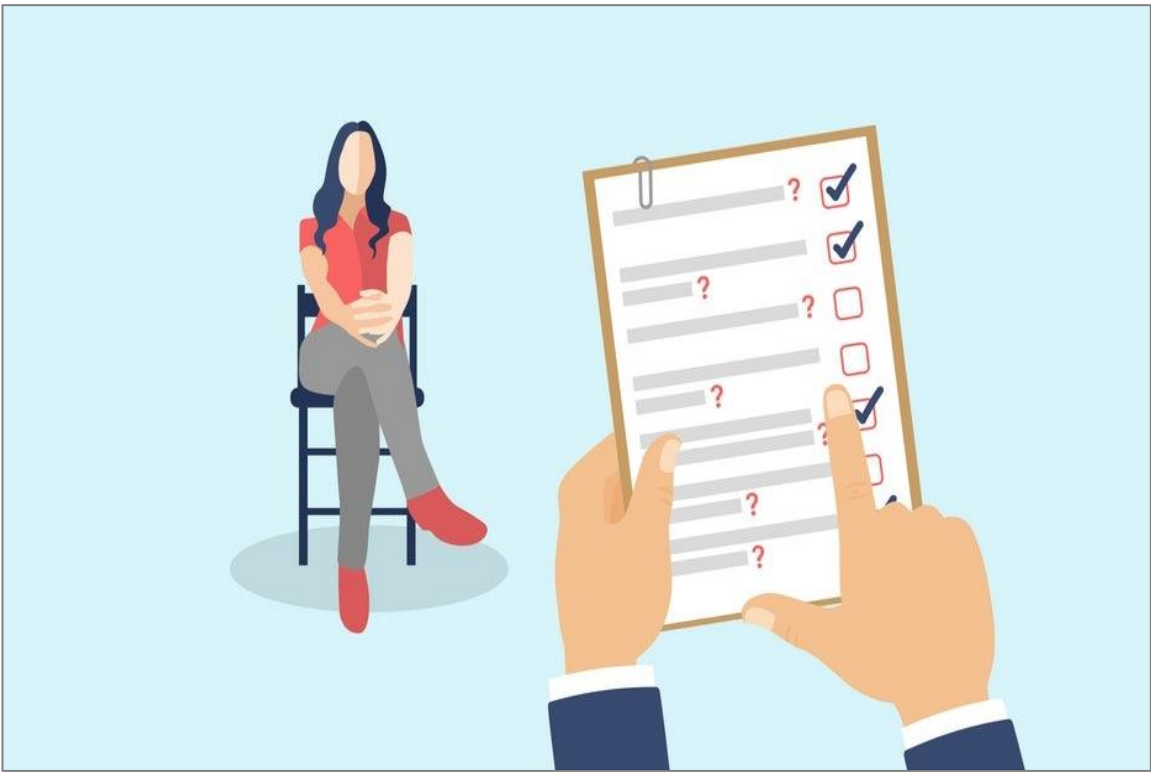
- To develop a model for diagnosing unreliable information by compiling several existing methods and methodics;
- To assess the significance of individual features in the model.

Hypotheses

- The model with both verbal and non-verbal features for diagnostic deception works well (Kibrik 2010: 142-143) (→ true)
- Speech Pace, Number of Hesitation Pauses (Isaeva 2020:45) and Smile Without Blinking (Kreidlin 2002:364) indicate unreliable information better than other features (→ partially true)

Experiment design

- 1) The respondents are acquainted with the topic and the points of the monologue. They are told that they have to lie about some recent event and that they will be asked a few follow-up questions;
- 2) The respondents are asked to talk about some real recent event that they remember best and answer follow-up questions;
- 3) The respondents are asked to talk about any event – either the real one, or the one that they had made up – in order to exclude bias in the processing of the data.



Speech types	Prepared number of segments		Unprepared number of segments	
	Truth	Lie	Truth	Lie
Male	10	10	10	10
Female	10	10	10	10

~231
minutes of
speech

40
respondents

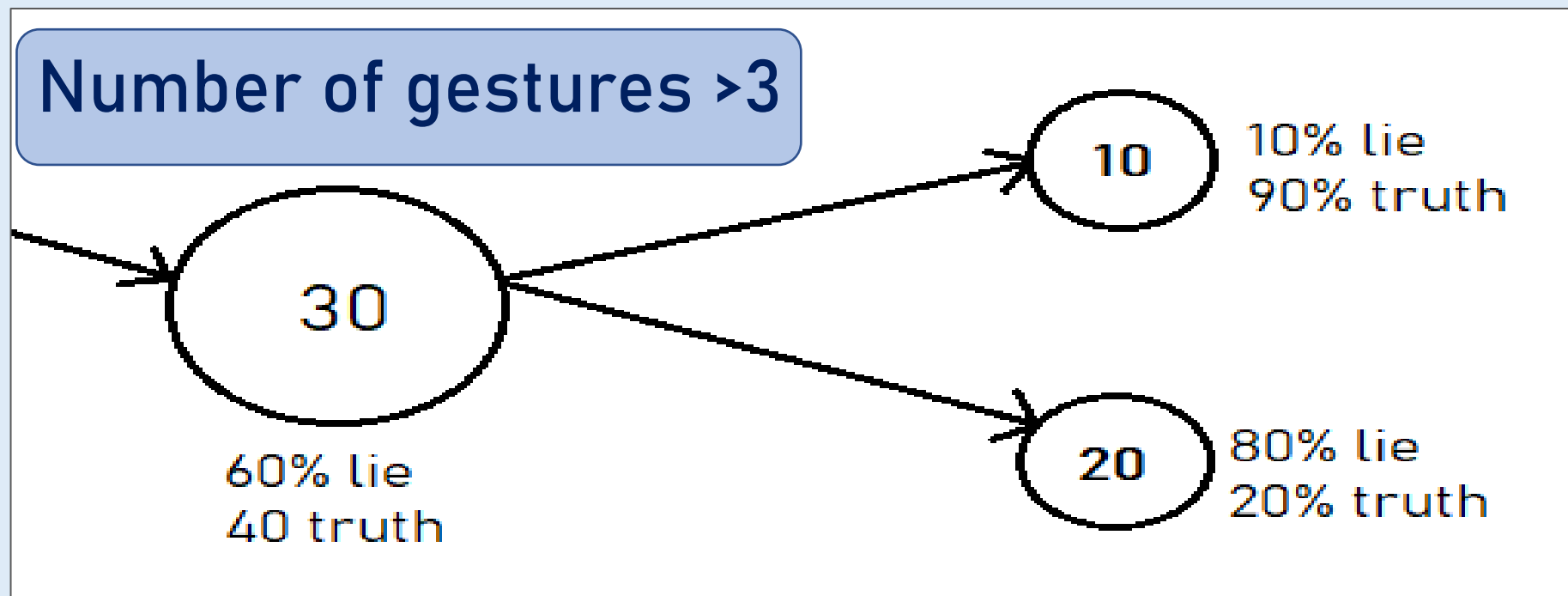
Material processing

- Manual linguistic annotation of speech segments with the help of Praat and module Whisper programs
- Statistical tests and machine learning (Random Forest Classifier's feature_importances_)

Features in the diagnosis model developed aka unreliable information markers

Verbal	Prosodic	Visual
lack of details	slow speech pace	eye contact avoidance
frequent logical modality	high pitch frequency	tensioned body posture
frequent vocabulary with dynamic semantics	large number of hesitation pauses	frequent body posture changes
lack of 'perceptual' vocabulary		covering the mouth with the hand
small sentence length		self-adaptor gestures
large number of self-corrections and tongue-slips		smiles without blinking
And other...		And other...

Feature importances (FI) – a numerical estimation of how much a feature makes the nodes of trees in the forest "cleaner" on average.



Decision tree
identifies truth and lie
(an artificial example)

Results

- An integrated approach to identifying unreliable information is justified: high accuracy is achieved (90-92%) when using verbal, prosodic and visual features.
- Prepared speech features with the highest FI: movement of the facial muscles; vocabulary with dynamic semantics.
- Unprepared speech features with the highest FI: the number of details; vocabulary with dynamic semantics.
- The younger the respondent, the more important the verbal features are.

Limitations: small sample size → absence of a test sample.

