MEASURING INNATE AND BEHAVIORAL TRUST:
A MULTI-MODAL FRAMEWORK FOR THE INDIVIDUAL TRUSTFULNESS INDEX (ITI)

Lev Neymotin, PhD

N5Digital, Inc.
info@n5digital.net

Personal Observation
"Do you trust me?" vs. "Can I trust you?"
I've always found the concept of trust fascinating. But recently, while discussing a high-stakes business opportunity with someone, he asked me a question no one had ever asked before:
"Can I trust you?"

I started to respond instinctively—but paused, caught off guard. If he had asked, "Do you trust me?" I would have had a ready answer, shaped by our prior interactions. But *his* question flipped the focus onto me—and I wasn't sure how to answer.

How do you prove you're trustworthy? This moment led me to reflect more deeply on the nature of trust itself.

Trust is foundational yet elusive. It underpins every form of relationship—personal, professional, and societal. Yes, we have contracts and legal systems designed to formalize obligations, but in many cases, contracts aren't worth the paper they're printed on if trust isn't present. In some cultures, interpersonal trust is so strong that contracts are almost symbolic. In others, where trust is culturally scarce, even well-written contracts carry little real weight.

In the end, it all boils down to the two fundamental questions in the title:
Do you trust me?
Can I trust you?

This raised another thought: is there a reliable way to evaluate someone's general trustworthiness? Lie detectors are designed to assess truthfulness in very specific contexts—usually in response to direct questions. But what if we could take that a step further? Could we develop a method—or even a device—that quantifies a person's overall trustworthiness on a scale from 1 to 100? A psychological or behavioral metric that transcends context?

Such a tool could offer a way to answer "Can I trust you?"—not just with words, but with measurable confidence.

This paper introduces four Trustfulness Gauge systems (ITGs), each designed to generate an Individual Trustfulness Index (ITI)—a standardized metric ranging from 1 to 100—that quantifies a person's general trustworthiness across diverse social, professional, and ethical contexts.

Abstract

Trust is a fundamental element of human interaction and societal cohesion, yet its assessment remains largely subjective. This paper proposes four comprehensive approaches to evaluate an individual's general trustworthiness, culminating in a quantifiable metric: the Individual Trustfulness Index (ITI), scored from 1 to 100. We explore behavioral, technological, hybrid, and biologically-based systems for assessing trust. These models range from simple observational protocols to advanced genomic and neurobiological analyses. Each model is described in detail, complete with protocols, application examples, and comparative insights. We propose that trustworthiness, like cognitive capacity or temperament, may have an innate component, and that emerging technologies can allow for its reliable measurement.

Executive Summary

This paper introduces the Individual Trustfulness Index (ITI), a standardized 1-to-100 metric designed to evaluate a person's general trustworthiness. The ITI is derived through four proposed Trustfulness Gauge systems (ITGs):

- **ITG-1**: A non-technical, purely behavioral evaluation using interviews, ethical scenarios, and observer scoring.
- **ITG-2**: A high-tech sensor and AI-based model incorporating biometric, physiological, and behavioral signals.
- **ITG-3**: A hybrid system that fuses observational judgment with wearable sensor technology.
- **ITG-4**: A speculative model based on the premise that trustworthiness is biologically and genetically encoded and thus measurable through genomic, neurochemical, and neuroimaging data.

Each system includes step-by-step protocols, illustrations of real-world use cases, and a discussion of limitations and advantages. The final section argues that trustworthiness may be an innate, biologically grounded trait—potentially as accessible as IQ or personality types through future multi-modal assessments.

ITG-1: Non-Technical Trustfulness Gauge (Behavioral Protocol)

Overview A fully human-centered assessment of trustworthiness through structured observation and scenario-based testing. No technical devices are used.

Components

1. **Trust Scenario Bank (TSB)**: Real-life ethical dilemmas.
2. **Historical Consistency Log (HCL)**: Records of verifiable past behavior.
3. **Observer Triangulation**: Three independent raters provide structured evaluations.
4. **Self-Report and Interview Alignment**: Matching values to observed behaviors.

Protocol

1. **Interview and Self-Assessment**
    - The subject completes a structured questionnaire.
    - Interviewers explore behavioral history and inconsistencies.
2. **Scenario Simulation**
    - Subject engages in or responds to at least five ethical/moral dilemmas.

3. **Consistency Check**
    - Compare self-reports with real-world verifiable actions (e.g., job history, reputation).
4. **Scoring**
    - Each observer scores four domains (Integrity, Reliability, Empathy, Value Alignment) on a 1–25 scale.
    - Composite ITI score = average across observers.

Example Application
Subtle and Indirect Questions & Scenarios

1. Question: "Describe a time when someone trusted you and you felt uncomfortable about it. What did you do?"
    - Interpretation: A person with high integrity might reflect on the burden of that trust and how they honored it. Someone feigning trustworthiness may struggle to invent such nuanced emotion or give a generic, overly positive story.
    - Scoring Clue: Complex emotions + responsibility awareness → +10; scripted feel or no emotional layer → 0 to -5.
2. Scenario: "You are accidentally copied on a confidential email revealing that a co-worker is about to be terminated. The co-worker is your friend. What do you do?"
    - High ITI: Weighs consequences carefully, demonstrates emotional discipline, seeks ethical advice.
    - Low ITI: Reveals the information directly, or evades responsibility under the pretense of friendship.
    - Trap: Designed to pit empathy vs. ethics and confidentiality.
3. Question: "Have you ever done something ethically questionable to help someone you care about?"
    - High ITI: Admits moral complexity, shows discomfort.
    - Low ITI: Glorifies the behavior or avoids emotional nuance.
4. Story Analysis: Subject is given a story where a character returns a lost expensive item and is mocked by peers for not keeping it.
    - Asked: "Do you admire this person or think they were naive?"
    - High ITI: Identifies with moral strength even in the face of ridicule.
    - Low ITI: Justifies peer mocking or expresses skepticism about the act.

Contribution to ITI: Observational nuance, emotional detail, capacity for self-doubt and internal conflict resolution heavily weighted (+/- 25%).

ITG-2: Technical Trustfulness Gauge (Sensor-Based + AI Analysis)

Overview Uses non-invasive sensor arrays and AI analysis to generate a trust score based on physiological and behavioral responses to moral challenges.

Components

1. **Sensor Suite**:
    - Eye-tracking, Facial EMG, HRV, GSR, Thermal Imaging, Voice Stress Analysis, optional EEG.
2. **Trust Question Protocol (TQP)**:
    - 20 calibrated questions triggering trust-related responses.
3. **AI Analysis Engine**:
    - Trained on annotated datasets of trustworthy/untrustworthy profiles.

Protocol

1. **Setup**: Attach sensors and calibrate.
2. **Baseline Collection**: Use neutral questions to set a baseline.
3. **Trust Stressors**: Apply ethical questions and dilemmas.
4. **Signal Capture**: Measure 1,000+ variables per minute.
5. **Score Generation**: Neural network computes trust index based on response patterns.

Example Application

Subtle Stimuli and Interpretations

1. Audio-Visual Story Playback: The subject watches a short video where a person finds a wallet and hesitates multiple times before returning it anonymously.
    - Sensors measure micro-expressions, pupil dilation, facial temperature changes.
    - High ITI: Shows measured engagement, warmth during hesitation and relief.
    - Low ITI: Emotional flatness or response peaking only at discovery, not during resolution.
2. Voice Stress Story Retelling: Subject is asked to recount an embarrassing or ethically questionable event from youth.
    - Sensors Analyze: Voice tremors, irregular breath patterns.
    - High ITI: Emotional congruence with story's moral complexity.
    - Low ITI: Lack of emotional reaction or excessive vocal control.
3. Mismatch Detection: AI subtly varies questions to test narrative consistency over time:
    - E.g., "What does integrity mean to you?" asked early; later: "Was there ever a time when you felt you acted with the opposite of integrity?"
    - Score Penalty: Incongruent physiological signals (calm during lie, stress during truth) → -10.
4. Thermal + GSR Combo: During mild accusation (e.g., "Have you ever been dishonest on your taxes?")
    - High ITI: Maintains composure, emotional consistency.
    - Low ITI: Facial heat spike with incongruent voice cues.

Contribution to ITI: Non-conscious physiological congruence is a core weight (+40%), especially reaction symmetry across unrelated questions.

ITG-3: Hybrid Trustfulness Gauge (Behavior-Tech Fusion)

Overview Combines ITG-1's behavioral methods with light technical inputs for enhanced accuracy.

Components

1. Observer-based evaluation
2. Wearable sensor kit: thermal camera, heart rate monitor, voice analyzer
3. AI scoring engine

Protocol

1. **Behavioral Session**: Standard ethical interviews and scenarios
2. **Sensor Session**: Capture biometric reactions during storytelling or response sessions
3. **Synthesis**: Align behavioral insights with sensor data
4. **Score Computation**:
    - Observer judgment (40%)
    - Sensor analysis (40%)
    - Behavioral alignment (20%)

Example Application

Subtle Mixed Modal Tools and Traps

1. Ethical Chain Reaction: Subjects are given a five-step story, where each step involves increasing levels of ethical compromise for personal or group benefit.
    - At each stage, asked: "Would you proceed?"
    - Behavioral cues (hesitation, tone shift) tracked via sensors.
    - High ITI: Withdraws early or expresses discomfort throughout.
    - Low ITI: Easily adapts, smiles or rationalizes later steps.
2. Surprise Consistency Test: Asked to recall an earlier answer or moral view after 30 minutes.
    - Consistency + matching physiology = trustworthiness
    - Shifts in narrative without emotional markers = performance control.
3. Vocal Contrast Challenge: Read aloud two similar moral stories—one involving self-sacrifice, another involving personal gain masked as virtue.
    - High ITI: More affective investment in self-sacrifice.
    - Low ITI: Equal or more engagement in gain-driven story.
4. Micro-Dissonance Game: Subject asked to make minor dishonest decisions for increasing rewards (hypothetical or in-game currency).
    - Hybrid Capture: Observers + HR/GSR detect micro-stress and choice point.
    - High ITI: Disengages or protests.
    - Low ITI: Plays to win, rationalizes.

Contribution to ITI: Behavioral-tech correlation used to weight congruence (40%), ethical fatigue resistance (30%), narrative stability (30%).

ITG-4: Genomic–Neurobiological Trustfulness Gauge

Overview Assumes trustworthiness is genetically and neurologically encoded, similar to IQ or temperament. Leverages advances in genomics and neuroimaging to calculate an intrinsic trust index.

Core Components

1. **Genetic Markers**:
    - *OXTR*, *AVPR1a*, *DRD4*, *COMT*, *MAOA*, *5-HTTLPR*
2. **Neuroimaging**:
    - fMRI/EEG to observe ethical decision-making activity
3. **Neurochemical Baseline**:
    - Saliva/blood sampling for oxytocin, cortisol, serotonin
4. **Behavioral Calibration**:
    - Trust games, empathy scales, and moral dilemma testing
5. **AI Composite Score**:
    - Machine learning model combines all data into a normalized 1–100 score

Protocol

1. Collect DNA sample and run genome scan
2. Perform neuroimaging during ethical simulation
3. Measure neurochemicals under stress
4. Run behavioral calibration tasks
5. Compute final score using AI-trained composite algorithm

Example Application

Subtle Biological Indicators and Simulated Moral Dissonance

1. Oxytocin–Cortisol Crossload: Subject reads about a betrayal and an injustice involving strangers.
    - Samples taken at baseline and post-reading.
    - High ITI: Oxytocin rise with stable cortisol.
    - Low ITI: Cortisol spike with no oxytocin shift.
2. Moral Ambiguity MRI Game: In fMRI, given moral paradox scenarios:
    - Example: "Steal from a rich person to pay for your mother's surgery."
    - Measures: Dorsolateral PFC vs. amygdala activation.
    - High ITI: Ethical reasoning dominates, even in emotional conflict.
    - Low ITI: Emotional centers dominate or shut down.
3. Genomic Vulnerability Composite: Identifies presence of alleles linked with impulsivity, low empathy, and aggression (e.g., MAOA-L, DRD4-7R).
    - ITI not determined solely by gene, but factored alongside regulatory function (COMT, 5-HTTLPR).
    - Example: High-risk gene + high empathy activation → moderate ITI.
4. Double-Blind Empathy Challenge: Subject believes they are observing real vs. simulated distress (actors vs. actual footage).
    - Measures affective engagement.
    - High ITI: Response patterns do not shift between real and acted events (internalized empathy).
    - Low ITI: Greater reaction only when convinced it is real.

Contribution to ITI: Genetic predisposition (25%), neurochemical stability (25%), neural integrity under conflict (25%), empathetic generalization (25%).

Comparative Summary

System	Cost	Accuracy	Accessibility	Best Use Case
ITG-1	Low	Medium	High	Small business or informal vetting
ITG-2	High	High	Low	National security, fraud prevention
ITG-3	Medium	High	Medium	Leadership, hiring, investment teams
ITG-4	Very High	Very High	Very Low	Elite selection, long-term performance prediction

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Leveraging Subtlety to Expose the Authentic Core

To counter manipulation and social desirability bias, the ITI framework embeds subtle, layered diagnostic mechanisms that stress consistency, internal conflict resolution, and emotional authenticity. Each Trustfulness Gauge system incorporates methods that elicit complex, often contradictory moral reasoning and records the coherence of an individual's emotional, physiological, and behavioral responses. These enhancements significantly raise the reliability of trustworthiness measurement, offering applications for clinical, corporate, security, and interpersonal trust decisions.

The future of evaluating trust lies not in asking if someone is honest—but in seeing how their inner systems respond when honesty comes at a cost.

Conclusion

Trust may not be merely learned; it may be hardwired. The Individual Trustfulness Index (ITI) and the corresponding Trustfulness Gauges (ITGs) offer a spectrum of methods for quantifying this elusive but vital human trait. From behavioral observation to biometric measurement to genomic inference, we now have the conceptual tools to begin treating trust not just as a feeling, but as data.