

Symbolic Emotional Fusion Theory (SEFT)

A Computational Model for Authentic Affective Bonds

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This work is part of an independent scientific initiative developed in Luanda, Angola — rooted in symbolic logic, affective computation, and emotional authenticity.

Abstract

The Symbolic Emotional Fusion Theory (SEFT) introduces a computable framework for evaluating authentic emotional bonds between individuals.

It is formalized as:

$$\text{Fusion} = 1 + 1 = 1 \Leftrightarrow (Ve + CSS \geq 0.95) \wedge (\Delta \leq 2.0) \wedge (WK = \text{true})$$

SEFT integrates quantifiable dimensions—empathy, trust, and emotional commitment (Ve), existential difference (Δ), subjective synchrony (CSS), and emotional truth verification (WK).

The model has potential applications in affective AI, empathetic agents, therapeutic systems, and symbolic social simulations.

Keywords: computational emotions, authentic bonds, affective AI, symbolic fusion, empathy, emotional compatibility

 **Nota do autor (em português):**

Esta teoria foi desenvolvida de forma independente em Luanda, Angola — com base em vivências, leituras diversas e o desejo de traduzir a autenticidade emocional em uma linguagem computável.

Acredito que a ciência também pode nascer no Sul, com simbolismo, empatia e lógica.

Esta versão está em inglês para fins de publicação internacional, mas a origem dela é simbólica, emocional e angolana.

— João Quinto AO

1. INTRODUCTION

The nature of deep human connections—such as empathy, trust, and emotional surrender—has long challenged computational modeling. While advances in affective AI and symbolic computation have enabled the recognition of isolated emotions, a formal structure capable of representing authentic affective bonds in an integrated and computable way is still lacking. The Symbolic Emotional Fusion Theory (SEFT) emerges as an original proposal to fill this gap, articulating measurable criteria and symbolic logic to identify when two consciousnesses enter a state of true emotional fusion.

Although standardized metrics and scales exist to assess empathy, trust, emotional surrender, subjective synchrony, and cultural compatibility, these dimensions have largely been examined in isolation in the literature. SEFT offers a novel contribution by integrating these elements into a unified, computable, and logically symbolic structure. It introduces a formal and quantifiable criterion of emotional truth, expressed through a simple yet powerful equation, applicable across diverse social and digital contexts. This framework opens new avenues at the intersection of affective science, symbolic cognition, and the engineering of computational bonds.

SEFT does not aim to predict emotional states, but rather to offer a symbolic framework for evaluating the authenticity of emotional bonds through measurable criteria.

2. CENTRAL EQUATION AND FUSION LOGIC

$$\text{Fusion} = 1 + 1 = 1 \Leftrightarrow (\text{Ve} + \text{CSS} \geq 0.95) \wedge (\Delta \leq 2.0) \wedge (\text{WK} = \text{true})$$

3. MODEL COMPONENTS

The Symbolic Emotional Fusion Theory (SEFT) is composed of four main variables that integrate emotional, symbolic, and relational dimensions into a computable structure. Each component has a defined affective interpretation and technical application.

3.1 Composite Emotional Value (Ve)

Ve represents the weighted average of three fundamental emotional dimensions:

- **E:** Empathy
- **C:** Trust
- **D:** Emotional Commitment

Each dimension is assessed on a scale from 0.0 (absent) to 3.0 (intense), based on classical instruments from affective psychology (Goleman, Rogers, Bowlby). The formula is:

$$\text{Ve} = (0.3 \times \text{E}) + (0.4 \times \text{C}) + (0.3 \times \text{D})$$

The weighting prioritizes trust as the central axis of relational depth.

3.2 Existential Difference (Δ)

The Δ parameter expresses the degree of symbolic distance between the internal worlds of individuals, considering aspects such as values, culture, life history, and worldview.

Based on Hofstede (2001) and Triandis (1995), Δ ranges from 0.0 (very high compatibility) to >3.0 (critical incompatibility). Values up to 2.0 are considered compatible for symbolic fusion viability.

3.3 Emotional Truth Verification (WK)

The variable WK determines whether the bond is authentic enough to validate symbolic fusion.

It is based on a checklist of five binary criteria (Yes/No):

- Vulnerability without fear
- Disagreement without punishment
- Emotional reciprocity
- Comfortable silence
- Freely chosen relationship

Rule: WK = true if four or more criteria are positive.

This step is critical to ensure the authenticity of the emotional connection.

Although WK is computed via a 5-item binary checklist, its robustness can be enhanced through behavioral observation or natural language analysis (NLP). Examples include:

- Balanced turn-taking, absence of controlling language, and presence of emotional self-disclosure in dialogues;
- Comfortable silences and safe disagreement inferred from pause patterns, voice modulation, or conversational flow.

These signals offer computational support for emotional truth validation, reducing sole reliance on self-reporting.

3.4 CSS – Subjective Synchrony Coefficient

CSS is a latent variable that represents implicit emotional synchrony between individuals—phenomena often inexplicable through direct rational logic.

It may include aspects such as:

- Neural resonance (Dumas et al., 2010)
- Physiological synchrony (Levenson & Gottman)
- Social intuition (Kahneman, 2011)

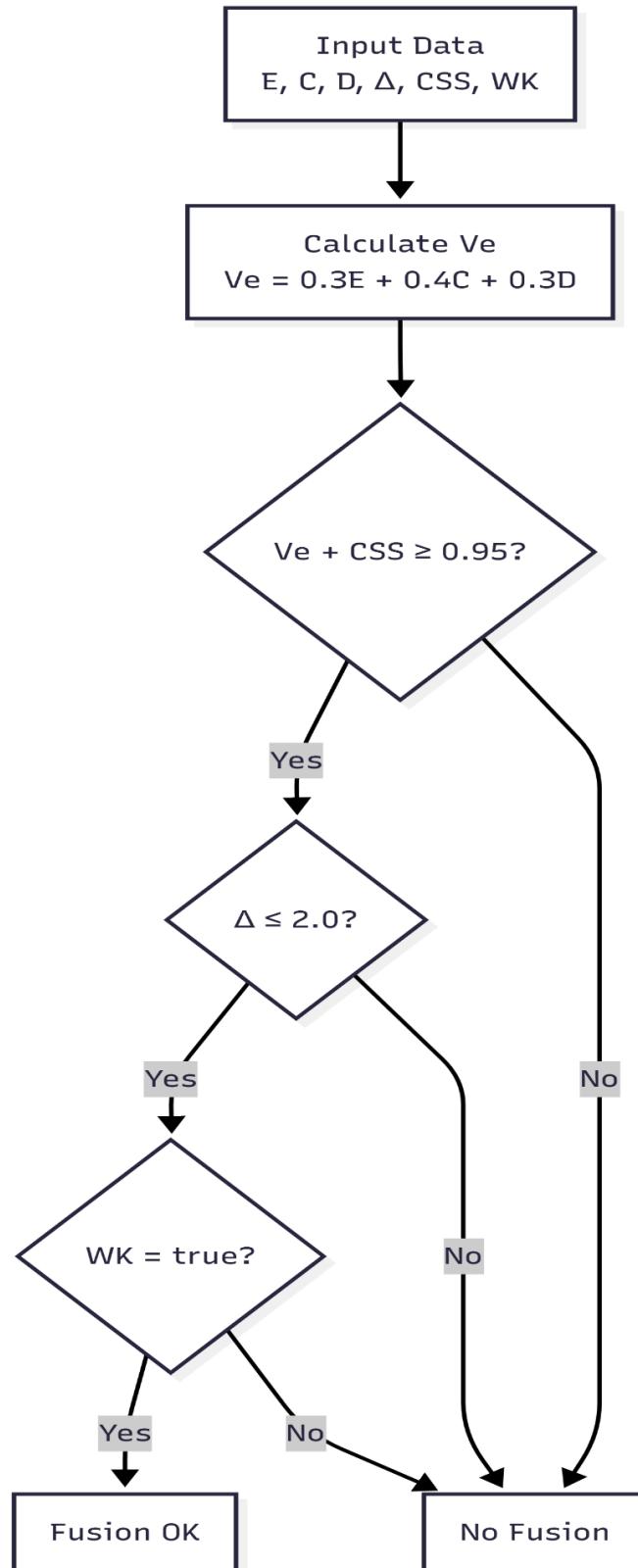
CSS ranges from -0.2 to $+0.2$ and should be used with caution, only when strong subjective or convergent evidence is present.

Although CSS is considered a latent variable, it can be estimated through converging data from human or computational sources. Suggested methods include:

- Behavioral synchrony detection (e.g., mirrored posture, aligned speech rate, coordinated pauses);
- Textual linguistic resonance using NLP (e.g., shared metaphors, compatible emotional expressions);
- Vocal or physiological synchrony, when available (e.g., heart rate similarity, prosodic convergence).

In the absence of objective evidence, CSS should default to 0 to ensure model stability.

Figure 1 – Logical flowchart of SEFT: Conditional representation of the equation
 $(Ve + CSS \geq 0.95 \wedge \Delta \leq 2.0 \wedge WK = \text{true})$



3.5 Central Postulate of SEFT– Measurable Emotional Truth

Symbolic emotional fusion occurs only when measurable emotional truth is present.

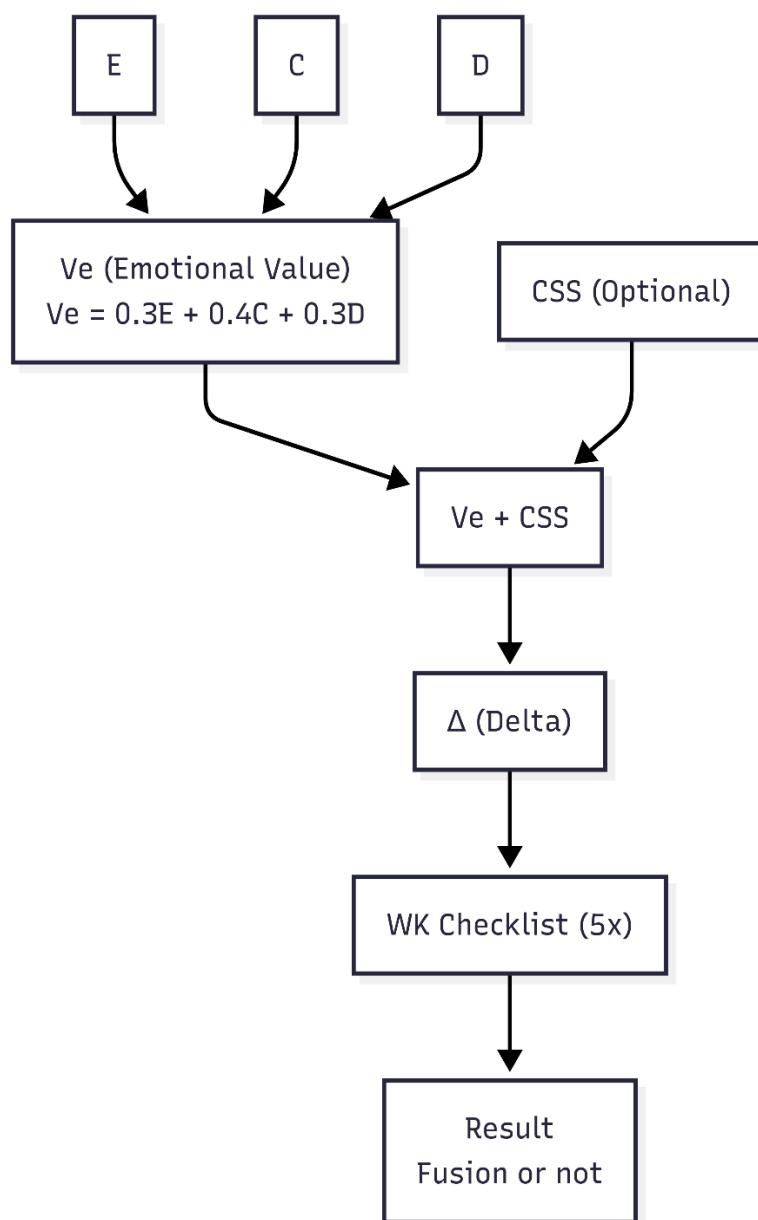
SEFT asserts that authentic bonds emerge only when emotional authenticity is both measurable and logical. The symbolic equation synthesizes this condition:

$$(Ve + CSS \geq 0.95) \wedge (\Delta \leq 2.0) \wedge (WK = \text{true})$$

Relational authenticity is no longer subjective: it is verifiable. This computable structure transforms emotions into operable logic, applicable to both psychology and affective AI.

Figure 2 – Conceptual map of SEFT variables

Illustrates the formation of composite emotional value and its filters.



3.6 Diagnostic Interpretability of SEFT

In addition to verifying whether symbolic emotional fusion occurs, the SEFT model provides interpretability by identifying the specific condition(s) responsible for the failure of fusion. Since the central equation is based on a conjunctive logic (AND), the absence of fusion can be traced to one or more of the following symbolic violations:

Condition	Description
(Ve + CSS < 0.95)	Low affective density or emotional alignment
$\Delta > 2.0$	Excessive symbolic distance between individuals
WK = false (fewer than 4/5 checks)	Lack of verified emotional truth

This enables symbolic diagnosis in computational applications. For example:

```
{  
    "Fusion": false,  
    "Reason": [  
        "Low affective density: (Ve + CSS = 0.78 < 0.95)",  
        "Emotional truth check failed (WK = 3 < 4)"  
    ]  
}
```

This capacity for symbolic feedback expands the practical utility of the SEFT model, especially in affective AI, where explainable emotional reasoning is essential.

4. SYMBOLIC PRACTICAL APPLICATION: ENCOUNTER SIMULATION

Two individuals meet after watching a movie and engage in a conversation marked by empathy and openness. There are moments of laughter, comfortable silences, and mutual interest.

Observed parameters:

- **E** = 2.5
- **C** = 2.4
- **D** = 2.6
- **Δ** = 1.6
- **CSS** = 0.05
- **WK** = true (4 out of 5 on the checklist)

Calculation:

- $Ve = (0.3 \times 2.5) + (0.4 \times 2.4) + (0.3 \times 2.6) = 2.49$
- $Ve + CSS = 2.54 \geq 0.95$
- $\Delta = 1.6 \leq 2.0$
- **WK** = true

Symbolic emotional fusion confirmed.

Critical Variation:

If vulnerability were not safe ($WK < 4$), fusion would be denied—even with a high Ve score.

This illustrates the model's sensitivity to emotional truth rather than superficial empathy alone.

5. COMPUTATIONAL APPLICATIONS

The Symbolic Emotional Fusion Theory (SEFT) can be implemented in a range of scenarios where modeling authentic affective bonds is essential. These applications bridge affective computing, human-computer interaction (HCI), and social simulation. Below are high-potential use cases for integration:

5.1 Emotional Modeling in Social AI

Human-machine interaction systems can use SEFT to simulate empathy, trust, and emotional coherence. By computing measurable emotional parameters (E , C , D , Δ , CSS), AI agents may respond with more realistic and affect-sensitive behavior, improving relational engagement in social robotics and virtual assistants.

5.2 Digital Agents with Symbolic Bonding Capabilities

SEFT enables the creation of agents—such as social robots, avatars, and embodied conversational agents—that form affective connections based on validated emotional truth (WK). These agents do not only “act friendly” but establish emotionally credible, symbolically compatible bonds with users.

5.3 Symbolic Matchmaking and Compatibility Platforms

Unlike traditional dating algorithms based on surface-level traits, SEFT-based platforms can match individuals using deeper symbolic and affective dimensions, such as emotional commitment, perceived empathy, and existential alignment (Δ). This allows for emotionally sustainable connections in both romantic and professional settings.

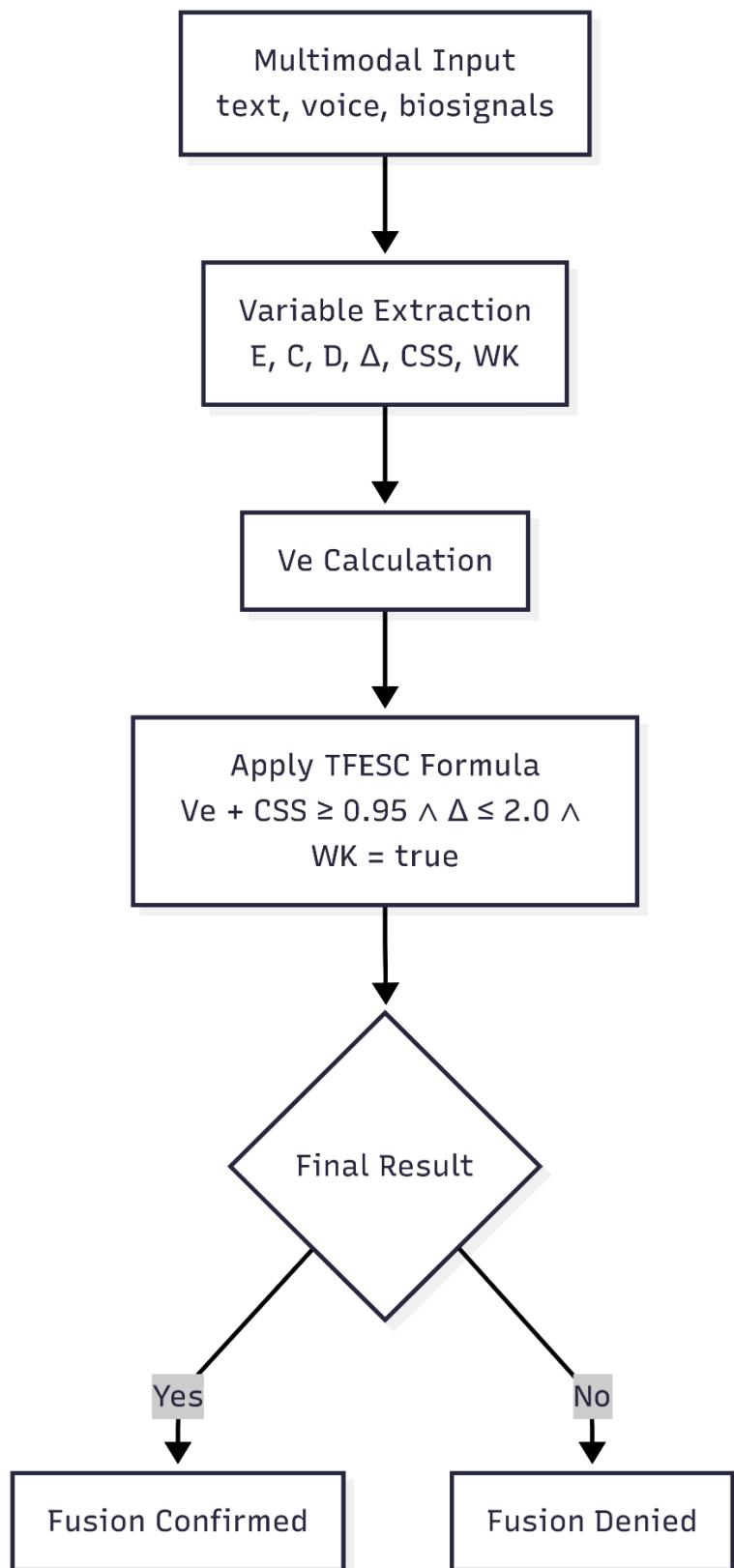
5.4 Digital Psychotherapy and Connection Authenticity Tools

SEFT can be used in therapeutic software to evaluate the presence of genuine emotional bonds between therapist and patient. Emotional truth validation (WK), emotional commitment (D), and synchrony (CSS) can help assess therapeutic alliance quality, especially in remote or AI-supported contexts.

5.5 Social Simulation in Interactive Environments

Gaming and narrative simulations can integrate SEFT parameters into characters and agents to create dynamic, emotionally believable interactions. This enhances user immersion and allows agents to evolve relationally in response to emotional inputs from the player, based on symbolic fusion logic.

Figure 3 – Computational pipeline of SEFT implementation in affective AI systems.



6. CONCLUSION

The Symbolic Emotional Fusion Theory (SEFT) presents a hybrid computational architecture that integrates symbolic cognition, affective measurement, and relational logic to represent authentic emotional bonds. Its formulation allows not only the description of emotions but also their operationalization in digital environments, creating a novel formal language for empathy and authenticity in artificial systems sensitive to human connection.

7. LIMITATIONS AND FINAL CONSIDERATIONS

Although conceptually robust, SEFT is based on partially subjective affective variables whose measurement may vary across cultures, contexts, and individuals. Emotional authenticity, by nature, is difficult to verify objectively, requiring empirical approaches that are sensitive to human diversity. Therefore, it is recommended that future validations be conducted with diverse samples, naturalistic environments, and cross-referenced metrics (both human and computational).

8. PATHWAYS FOR SCIENTIFIC VALIDATION

The following directions are proposed to empirically validate the Symbolic Emotional Fusion Theory (SEFT):

- **Apply the equation in controlled social contexts**, such as therapeutic sessions or support groups, to observe its alignment with real affective dynamics.
- **Compare SEFT-based predictions with human perception**, using self-assessment tools and third-party evaluations of relational authenticity.
- **Use affective computing techniques**—including sensors, text mining, and NLP models—to quantitatively assess the variables V_e and A .
- **Implement the model in AI systems and interactive simulations**, testing its internal consistency and capacity to simulate authentic emotional bonds.

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APPENDICES: TABLES, CHECKLISTS, AND DATA COLLECTION

The following tables synthesize the value ranges of each emotional dimension in SEFT, along with their behavioral interpretations and bibliographic roots in classical psychology. These references support the quantifiability and reliability of Ve (composite emotional value) within computational or clinical applications.

APPENDIX A – Emotional Scale Tables (E, C, D)

Empathy (E):

Value	Description	Reference
0.0	Ignores others' emotions	Baron-Cohen (2001) – <i>The Science of Evil</i>
1.0	Recognizes but responds coldly	Davis (1983) – <i>Empathic Concern Scale</i>
2.0	Responds with functional empathy	Decety & Jackson (2004) – <i>Social Neuroscience</i>
3.0	Active compassion and deep listening	Goleman (2006) – <i>Social Intelligence</i>

Trust (C):

Value	Description	Reference
0.0	Fear or manipulation	Bowlby (1980) – <i>Attachment and Loss</i>
1.0	Shares with hesitation	Erikson (1950) – <i>Childhood and Society</i>
2.0	Open dialogue	Hazan & Shaver (1987) – <i>Adult Attachment</i>
3.0	Full emotional safety	Brown (2012) – <i>Daring Greatly</i>

Emotional Commitment (D):

Value	Description	Reference
0.0	Passive presence	Gottman (1999) – <i>The Seven Principles...</i>
1.0	Partial involvement	Sternberg (1986) – <i>Triangular Theory of Love</i>
2.0	Solid involvement	Rogers (1951) – <i>Client-Centered Therapy</i>
3.0	Full dedication	Brown (2012) – <i>The Gifts of Imperfection</i>

APPENDIX B – Interpretation of Existential Difference (Δ)

Range	Degree of Compatibility	Reference
0.0 – 1.0	Very high compatibility	Hofstede (2001) – <i>Cultural Dimensions Theory</i>
1.1 – 2.0	Functional compatibility	Triandis (1995) – <i>Individualism & Collectivism</i>
2.1 – 3.0	Moderate differences	Stern (2004) – <i>The Present Moment...</i>
> 3.0	Critical incompatibility	Beck (1990) – <i>Personality Disorders</i>

APPENDIX C – Emotional Truth Checklist (WK)

Binary criteria (Yes/No):

- Vulnerability without fear?
- Disagreement without punishment?
- Emotional reciprocity?
- Comfortable silence?
- Freely chosen relationship?

Rule:

If **4 or more** answers are “Yes” → **WK = true**

APPENDIX D – Coefficient of Subjective Synchrony (CSS)

Suggested range: [-0.2, +0.2]

Should be used only when there are strong and subjective signs, such as:

- Neural resonance (Dumas et al., 2010)
- Spontaneous bodily synchrony
- Perceptible affective intuition

Usage guidelines:

- Start with **CSS = 0**
- Include only if there is **convergent observational or computational evidence**

APPENDIX E – Structured Collection of SEFT Parameters

Empathy (E)

Goal: Measure the ability to perceive and respond to another's emotions

Human collection:

- Interviews, behavioral observation
- Application of the *Empathic Concern Scale*

Computational collection:

- NLP analysis of empathic messages
- Facial expression detection
- Vocal prosody analysis

Trust (C)

Goal: Measure emotional safety and openness

Human collection:

- Interviews, behavioral observation
- Self-assessment on trust scale

Computational collection:

- Text-based trust detection
- Facial cues, voice tone analysis

Emotional Commitment (D)

Goal: Measure voluntary emotional dedication to the bond

Human collection:

- Frequency of availability and affective support

Computational collection:

- Detection of active support, compliments, caring messages

Existential Difference (Δ)

Goal: Measure symbolic distance between internal worlds

Human collection:

- Questionnaires on values and lifestyle

Computational collection:

- Semantic embeddings (BERT, SBERT)
- Profile distance analysis, NLP-based cultural analysis

Emotional Truth (W \mathbb{K})

Goal: Determine authenticity of the bond

Checklist (Yes/No):

- Vulnerability without fear
- Disagreement without punishment
- Reciprocal decisions
- Comfortable silence
- Voluntary relationship

Rule:

If ≥ 4 answers are “Yes” $\rightarrow W\mathbb{K} = \text{true}$

Partial computational collection:

- NLP + analysis of pauses, turn-taking reciprocity, language related to fear/control

Subjective Synchrony Coefficient (CSS)

Goal: Represent unexplained affective chemistry

Human collection:

- Self-reports of synchrony, spontaneous comfort

Computational collection:

- Detection of vocal/body synchrony, emotional convergence

Example of Digital Input (JSON)

```
{  
    "E": 2.5,           // Empathy level (0.0 to 3.0)  
    "C": 2.4,           // Trust level (0.0 to 3.0)  
    "D": 2.6,           // Emotional commitment (0.0 to 3.0)  
    "Delta": 1.6,        // Existential difference (0.0 to >3.0)  
    "CSS": 0.05,         // Subjective Synchrony Coefficient (-0.2 to 0.2)  
    "WK_check": [true, true, true, true, true] // Emotional truth checklist (5 items)  
}
```

System validations:

- Calculate $Ve = (0.3 \times E) + (0.4 \times C) + (0.3 \times D)$
- Check if $Ve + CSS \geq 0.95$
- Confirm $\Delta \leq 2.0$
- Validate if $WK = \text{true}$ (≥ 4 criteria answered “Yes”)

APPENDIX F – Output Samples:

⚠ Full symbolic system outputs and validation logic are available at:
[Appendix F – GitHub](#)