

Embodied communication and intersubjectivity: phenomenological-dynamic foundations, neurobiological correlates and clinical implications of the Italian version of Fuchs & Koch's Embodied Intersubjectivity Scale

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Abstract Intersubjectivity, intended as the embodied and reciprocal communication between individuals, emerges early in life and is fundamental to social and emotional development. This process involves both pre-reflective bodily attunement and higher-order cognitive functions. Theoretical frameworks including existential-phenomenology and psychodynamic Multiple Code Theory emphasize the role of the lived body and pre-reflective processes as the implicit foundation of linguistic communication and intersubjective experiences. Neurobiological evidence supports these views, highlighting systems like the Mirror Neuron System and mentalization networks. Disruptions in embodied intersubjectivity are common across psychiatric conditions, such as schizophrenia spectrum disorders, major depression, and eating disorders. These

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alterations underscore the diagnostic and therapeutic relevance of assessing embodied intersubjectivity in clinical settings. Integrating multidisciplinary perspectives may enhance our understanding of intersubjective dysfunctions and guide the development of innovative assessment tools. Therefore, we present the Italian version of Fuchs & Koch's Embodied Intersubjectivity Scale. The scale was administered to a community sample of 178 participants, with the aim of testing the fit of the original one-factor model, as well as examining the scale's reliability and its convergent and divergent validity. Interestingly, the findings indicated that a two-factor model – distinguishing between other-related experiences and self/world-related experiences – provided a better fit to the data. The Italian version of the EIS demonstrated solid reliability and showed positive correlations with measures of empathy, perceived empathic and social self-efficacy, and anomalous world-experiences. Overall, the 10-item Italian adaptation of the EIS appears to be a valid and reliable instrument for assessing embodied intersubjectivity within Italian-speaking populations.

Keywords: embodiment, intersubjectivity, empathy, emotions, psychometrics

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0. Introduction

Philosophical and psychological discourses have long struggled to grant bodily forms of expression the ontological and epistemological status of language, due to a persistent attachment to a propositional model of meaning grounded in syntactic and abstract representation. To move beyond this reductive opposition between verbal and bodily communication, it is necessary to conceive linguistic acts as forms of embodied intersubjectivity, whose intelligibility arises from the relational dynamics of the lived body, regardless of the communicative channel (Campisi, 2019). The notion of intercorporeality, which – as we will see – is closely connected to embodied intersubjectivity, originates and develops within the phenomenological philosophical tradition before reaching the natural sciences. It therefore seems an interesting opportunity that natural sciences are now moving closer to philosophy to dialogue. From the standpoint of the natural sciences, intersubjectivity is typically conceptualized as a reciprocal, predominantly non-verbal communication between individuals, evident from early infancy. In protoconversations, infants and caregivers engage in mutual emotional regulation through gaze, facial expressions, and vocalisations. These interactions are spontaneous, rhythmic, and emotionally attuned. Infants show a clear preference for social stimuli, such as faces and smiles. Two forms have been identified: primary intersubjectivity, present from birth and based on dyadic emotional exchange, and secondary intersubjectivity, emerging around the end of the first year, involving joint attention toward objects in a triadic interaction (Trevarthen & Hubley, 1978).

Traditional cognitive theories have linked intersubjectivity to universal developmental stages culminating in language acquisition, associating it with metacognition – the capacity to reflect on one's own and others' mental states. However, disruptions in intersubjective attunement, emotional expression, and bodily communication are frequently observed in psychiatric conditions (Herba & Phillips, 2004), emphasizing the importance of investigating the interplay between embodied intersubjectivity and language through multidisciplinary lenses and stressing the need for innovative psychometric tools. In particular, a psychometric scale aimed at measuring embodied intersubjectivity is not only a clinical tool, but also an attempt to reconnect to philosophy disciplines that are not

strictly philosophical – such as psychology, neuroscience, and psychiatry – highlighting the central role played by the body in the relationship between emotions and language.

1. The dimensions of intersubjectivity

1.1. Phenomenological-dynamic foundations

Heidegger proposes that the fundamental horizons of human's being-in-the-world are the environmental-world, the self-world and the with-world inhabited by Others (Heidegger, 1999). These dimensions picture the modality of encountering the world, respectively as the practical environment of everyday dealings, the self's existential world of concerns and possibilities, and the intersubjective world shared with Others. With respect to the being-in-the-world, being-with is seen as an immediate structural characteristic of existence, as the condition of possibility for empathy to arise (Heidegger, 2010).

To the notion of empathy understood in a cognitive sense, Scheler prefers the concept of sympathy as a “feeling-with” that does not involve mental imitation or experiential overlap, but an immediate co-experience of the Other's emotional acts (Scheler, 1954). For Scheler, intersubjectivity arises from a pre-personal and pre-reflective level of affectivity, and the encounter with the Other takes place prior to any cognitive recognition, within the domain of shared affective tonalities. In a face-to-face encounter, what presents itself is neither a mere physical body nor a disembodied psyche, but rather the inseparable wholeness of a lived, embodied mind as an expressive unity (Scheler, 1954).

Similarly, Merleau-Ponty emphasized that being-with emerges through body-to-body attunement, or intercorporeality – a direct, pre-reflective perceptual link between bodies, through which one directly recognizes another as an Alter Ego and understands their actions (Merleau-Ponty & Smith, 1962). For Merleau-Ponty, language and corporeality are not autonomous dimensions but variations of a single embodied expressive link between subjects. Language is not simply juxtaposed to the body, nor is the body merely a material support for language; rather, they are modulations of the same fundamental gesture: the manifestation of meaning in the world. In Merleau-Ponty's perspective, the body is not an object, but an experiencing subjectivity that both perceives and institutes meaning. The body speaks even before verbal language. This is what Merleau-Ponty calls an expressive gesture: not a sign that replaces an already formed thought, but the very place where communication takes shape. Language is understood as a bodily practice, an embodied mode of signification where bodily gestures are seen as the original form of language and spoken words as a particular kind of gesticulation. In this sense, the semiotics of the body and the semiotics of language are not two distinct systems of signs, but two levels of the same instituting dynamic within an intersubjective space.

This notion resonates with Bucci's Multiple Code Theory (MCT) (Bucci, 1993), a psychodynamic view on how emotional and bodily experiences are integrated with symbolic thought. MCT proposes that humans process emotional information across subsymbolic, nonverbal symbolic, and verbal symbolic systems, which are connected via the referential process (Bucci, 1997). MCT suggests that during intersubjective encounters, subsymbolic processing allows individuals to directly grasp and respond to Others' emotional expressions without translating them into symbolic categories (Bucci, 2002).

In the following study, Merleau-Ponty's phenomenology, Heidegger's modality of encountering the world and Bucci's MCT will serve as a compass to guide the interpretation of the results. Given that psychometric assessments depend on symbolic language and that the evaluation of embodied intersubjectivity depends on the individual's

ability to linguistically communicate bodily experiences, a phenomenological-dynamic approach could offer a more nuanced understanding of the study's findings. Both Merleau-Ponty's phenomenology and MCT will be used to highlight the foundational role of bodily sensations and pre-reflective experience in affective and cognitive development, while the tripartite structure of Heidegger's being-in-the-world will serve as existential dimensions within which intersubjective experiences will be situated and interpreted. This approach contrasts with that of the natural sciences, insofar as it does not conceive neither the environmental-world, the self-world and the with-world nor embodiment, empathy and intersubjectivity as independent constructs, but rather as dimensions that are interconnected and interdependent through the mediation of (inter)corporeality – the fulcrum of our encounter with the various dimensions of the world and the source of expressive gestures.

1.2. Cognitive and pre-cognitive insights

Natural sciences commonly conceptualize intersubjectivity as the outcome of multiple cognitive domains operating at different levels of complexity. According to this view, intersubjective understanding emerges from basic socio-cognitive functions – such as conspecific recognition, social attention, and emotional processing – as well as from higher-order capacities including empathy, social learning, stereotyping, and mentalization (Happé et al., 2017). At the heart of these intersubjective processes lies our understanding of the Self, which can be described in terms of minimal self or ipseity, i.e. “a core awareness of existing as a vital, self-identical subject of experience” (Borda & Sass, 2015). This foundational sense of self, implicit in all conscious experience, is rooted in the lived body (Merleau-Ponty & Smith, 1962), providing the basis for the “for-me-ness” of experience (Schneider, 1959).

Regarding intersubjective relations, the cognitive perspective holds that we perceive others externally and infer their mental states through observable signals – a capacity defined as Theory of Mind (ToM) (Frith & Happé, 1999). Simulation Theory (ST) proposes that we understand others by internally simulating their experiences or actions, relying on our own embodied and affective capacities. In contrast, Theory Theory (TT) holds that social understanding is achieved through an inferential process in which we apply a tacit “folk psychology” or conceptual framework to interpret the mental states of others. Traditionally thought to develop gradually until around age eleven, more recent evidence suggests ToM may arise much earlier – possibly before seven months – via an innate tendency to see others as intentional agents (Beer & Ochsner, 2006). This capacity is shaped within attachment relationships, through intersubjective learning and the internalization of cultural codes shared via language. However, as we have seen, our phenomenological-dynamic approach inspired by Merleau-Ponty, Heidegger and Bucci propose a different understanding of intersubjectivity – not as a cognitive skill, but as a pre-reflective, embodied practice – which can shed new light on the neuroscientific data (Gallagher & Zahavi, 2020).

1.3. Neurobiological correlates

The establishment of a stable ipseity – crucial for interpersonal and intersubjective functioning – depends on effective perceptual integration, which enables unified object perception and supports bodily grounding and perspective-taking. This process involves the synthesis of interoceptive and exteroceptive signals, and engages brain regions such as the medial/lateral prefrontal cortex, temporo-parietal junction, and insular cortex, which represent the neuroanatomical correlates of basic self-awareness. Disruptions in

this integration are documented in Autism Spectrum Disorder (ASD) and Schizophrenia Spectrum Disorder (SSD) (Sass et al., 2018).

Cognitive sciences link the emergence of the social dimension of experience to the Mirror Neuron System (MNS), involving regions such as the posterior parietal and ventral premotor cortices (Gallese, 2014). MNS activation underlies the immediate, pre-reflective experience of Others' motor events, and supports the development of a sense of agency in social contexts, even when actions are only mentally represented. A higher-order system, the mentalization system (MENT), further processes these motor and emotional cues, enabling the interpretation of Others' internal states. This system integrates both verbal and non-verbal stimuli, the latter being essential for establishing empathic connections (Vogeley, 2017).

A fundamental point to keep in mind when reading neuroscientific studies is that of *circular causality* (Fuchs, 2020), according to which phenomenological, psycho(patho)logical, neurophysiological, environmental, and social influences continuously interact with one another – unlike the linear causality model typical of medical physiopathology (Borsboom et al., 2019). The neural resonance processes highlighted by the natural sciences – rather than being interpreted as components of an inferential (IT) or simulation-based (SI) process – seem to be an integral part of the direct perception of others' intentions (Gallagher & Zahavi, 2020). From a phenomenological standpoint, indeed, when we perceive the actions or gestures of the Other, we directly grasp their meaning without the need for theoretical inferences or internal simulations. The activation of the MNS may therefore be understood as the neural correlate of the direct perceptual experience of the Other's action, precisely because certain mental states find direct expression in bodily language (Gallagher & Zahavi, 2020).

Moreover, sex differences have been observed in MNS-related brain regions (Cheng et al., 2009), underling how women typically exhibit more efficient face processing, higher empathy, emotional sensitivity, and greater interest in social cues compared to men (Proverbio, 2023). When discussing subjective variations, it is important to highlight how intersubjectivity lends itself to multiple interpretations. It may refer either to the ontological dimension that underlies our participation in the with-world, or to its specific ontic manifestations as particular ways of bodily finding oneself in the shared world. If we refer to the former, it is obviously meaningless to speak of subjective variations. Subjective assessment instead concerns the ontic manifestation of individual's subjective capacity to access this human dimension through the mediation of one own's body.

1.4. The problem of empathy

Cognitive sciences define empathy as the capacity to recognize and represent the affective state of another, leading to the elicitation of a similar emotional state and the activation of autonomic and somatic responses. While some authors consider empathy a unitary process, others argue it involves at least three distinct neurocognitive components: cognitive, emotional, and motor empathy (Blair, 2005). Cognitive empathy, equivalent to ToM, refers to the ability to represent others' mental states, while motor empathy involves the imitation and synchronization of facial expressions, vocalizations, posture, and movement (Hatfield et al., 2011). Emotional empathy entails the automatic decoding of affective stimuli, activating in the observer the same neural areas involved in their own emotional responses (Rizzolatti & Sinigaglia, 2006).

The “5E cognition” approach proposes that cognition is embodied, embedded, enacted, emotional, and extended. In this framework, embodiment is seen as a dynamic process where the neurophysiological aspects (living-body) and the subjective experience (lived-

body) dynamically interact with each other and with the lived-world, being embedded in a physical and socio-cultural environment. Enaction emerges from the continuous, dynamic and adaptive relationship between embodied mind and context, while emotion refers to inter-bodily resonance (Troncoso et al., 2023).

Within a phenomenological-dynamic 5E framework, intersubjectivity emerges as a direct, immediate, shared bodily interaffective experience between embodied agents (Colombetti & Thompson, 2007) in a shared environment, where emotional and bodily features are intertwined with cognitive processes (Fuchs, 2017). This mechanism does not require reflective awareness but rather arises directly from interaffective resonance through embodied being-with (Heidegger, 2010). Therefore, cognitive empathy may take place precisely because cognition is itself embodied or, in other words, on the basis of human's being-with as intercorporeality (Merleau-Ponty & Smith, 1962). Compared to the various notions of intersubjectivity found in the phenomenological tradition, Merleau-Ponty's intercorporeality roots intersubjectivity in the body as a pre-personal field of expression that makes perception, communication, and encounter possible. The Other is not grasped as a mind hidden behind a body, but as a living body that responds, moves, and expresses intentionality. Therefore, embodied intersubjectivity is grounded in the reciprocity of our embodied language: through the movement of the body in a shared environment, the subject immediately understands the Other (Gallagher & Zahavi, 2020).

1.5. Embodied Intersubjectivity in clinical practice

Altered intersubjective processes are transdiagnostic phenomena observed across various psychiatric and neurological conditions, including psychotic, mood, eating, personality, and developmental disorders, as well as in cases of acute brain injury (Desmarais et al., 2018). In SSDs, “dis-embodiment” or the disruption in the constitution of the embodied Self results in a breakdown of intersubjectivity, manifesting as a gradual withdrawal from the world – a condition described as “schizophrenic autism” (Minkowski, 1927). This is linked to “dis-sociality”, a disturbance in the intuitive grasp of social patterns and embodied attunement (Stanghellini & Ballerini, 2011), marked by deficits in interaffectivity (Froese & Fuchs, 2012). In contrast, “hyper-embodiment” or the excessive identification with the body-as-object is central in Major Depressive Disorder (MDD), especially in melancholia (Fuchs & Schlimme, 2009). Here, the Other is often perceived as a generalised figure whose approval is sought, leading to a breakdown of emotional attunement (Stanghellini et al., 2019). In contrast, manic episodes in Bipolar Disorder (BD) are marked by pseudo-intimacy and baseless familiarity (Stanghellini et al., 2019). The very attempt to conceptualize subjective variations of embodied intersubjective as if they could be quantified in discrete levels entails a set of inherent conceptual limitations, that will be examined in the dedicated section of the manuscript (see Section 5. Limitations and future perspectives).

A phenomenological-dynamic approach centered on embodied intersubjectivity may aid diagnostic understanding. In BD, intercorporeality varies with mood: mania involves hyperconnection, while depression brings disconnection with the Other. From a MCT perspective, individuals with BD show greater emphasis on bodily sensations, intense emotional arousal, and frequent somatic metaphors, in contrast to subjects with unipolar MDD (Mariani et al., 2020). In SSDs, intercorporeality is more consistently impaired, with fragmentation of body experience and relational detachment, together with the use of an hyper-symbolic, overly abstract and propositional language (Tonna et al, 2022).

Furthermore, Anorexia Nervosa appears to be subtended by a “conflict of embodiment” (Fuchs, 2022) and a parallel alteration of linguistic embodiment (Meneguzzo et al, 2023).

The lived-body becomes a “lived-body-for-others”, experienced as an object to be judged, with the Other becoming a mediator of identity (Stanghellini et al., 2019).

1.6. The Embodied Intersubjectivity Scale

All this considered, we recognized the relevance of the embodied intersubjectivity construct and we proceeded to investigate which screening tool would be more suitable for assessing it in an Italian cohort. Intersubjective difficulties are in fact commonly measured by the means of tests evaluating cognitive empathy and not intercorporeality. Our decision fell onto Fuchs & Koch’s Embodied Intersubjectivity Scale (EIS) (Fuchs & Koch, 2014), a new and brief psychometric test with good internal reliability and the possibility to be employed in both clinical and research settings.

This 10-items scale was originally designed to be used in dance movement therapy. It was first tested with a sample of university students (Cronbach’s alpha = 0.87) and then further employed in the context of a Randomized Controlled Trial on movement therapy with individuals with SSD and ASD (Cronbach’s alpha = 0.90) (Mastrominico et al., 2018).

The scale has a six-point Likert scale with 0 representing “applies not at all” and 5 representing “applies exactly”.

2. Materials and Methods

2.1. Participants and procedure

The translation process involved three native English speakers who independently adapted the scale, followed by a collaborative discussion to resolve discrepancies. Two independent researchers then performed a back-translation from Italian to English. No dialectal adaptation was needed due to the general population’s fluency in standard Italian.

For the purpose of this work, we opted to follow Nunnally who recommends an ideal ratio of 10 respondents per item (Loo, 2002). As a result, our a priori targeted sample size was at least 100 participants.

Participants were recruited through convenience and snowball sampling, starting with 45 individuals from the University of Florence who each invited five others to complete the online questionnaire, continuing until data saturation. Inclusion criteria included informed consent, age 18–65, high school education or higher, Italian nationality and residency, and fluency in Italian. Exclusion criteria included illiteracy, inability to consent or complete the questionnaire, lifetime psychiatric or substance use disorders, or current psychopharmacological treatment.

The questionnaire was administered via Google Forms, ensuring anonymity. Demographic and clinical data were collected. Out of 221 initially recruited participants, 194 completed the questionnaire, but after exclusions (due to incomplete data or meeting exclusion criteria), the final sample included 178 participants.

All participants completed a three-month follow-up retest to assess the stability of the embodied intersubjectivity construct. Data collection took place from February to August 2022, and the study was approved by the local Ethics Committee.

2.2. Summary of hypotheses

The phenomenological-dynamic literature highlights how the fundamental horizons of our being-in-the-world appear to be the environmental-world, the self-world and the with-world inhabited by Others as interconnected and co-dependent domains of

existence (Heidegger, 2010). Psychometric studies also showed correlations between anomalous world experiences such as aberrant perceptual salience, anomalous embodied-self experiences, and intersubjective impairments (Patti et al., 2022).

For the purpose of this study, it was hypothesised that embodied intersubjectivity could be negatively correlated both with indexes of disembodied self-experience such as those measured by the Embodied Sense of Self Scale (ESSS) and with anomalous world-experiences such as those measured by the Aberrant Salience Inventory (ASI), which, in turn, were found to be related to positive schizotypy and psychosis risk. Furthermore, it was hypothesised that embodied intersubjectivity could be positively correlated with measures of empathy (Italian Short Empathy Quotient scale, EQ-short) and perceived empathic and social self-efficacy (Perceived Empathic Self-Efficacy Scale, PESE; Perceived Social Self-Efficacy Scale, PSSE).

2.3. Instruments

2.3.1. Embodied Sense of Self Scale (ESSS)

The Italian Version of the Embodied Sense of Self Scale (ESSS) (Patti et al., 2022) is a 19-items self-reported scale which evaluates embodied self experiences. Each item has a five-point Likert scale from “Strongly disagree” to “Strongly agree”. Higher scores indicate higher levels of anomalous embodied-self experiences.

2.3.2. The Italian Short Empathy Quotient scale (EQ-short)

The Italian Short Empathy Quotient scale (EQ-short) (Paolo Senese et al., 2018) is a 15-items self-reported scale with 6 filler items and 7 reverse items. Each item has a four-point Likert scale from “true” to “false”. The scale used is divided into three dimensions: Cognitive Empathy (CE), Emotional Reactivity (ER), and Social Skills (SS). Higher scores indicate higher ability in identifying and describing others’ emotions.

2.3.3. The Perceived Empathic Self-Efficacy (PESE) / Perceived Social Self-Efficacy Scale (PSSE)

The Perceived Empathic Self-Efficacy / Perceived Social Self-Efficacy Scale (PESE/PSSE) (Di Giunta et al., 2010) is a 10-items self-reported scale. Each item has a five-point Likert scale from “not well at all” to “very well”. It is divided in two subscales: the Perceived Empathic Self-Efficacy Scale (PESE) evaluates the subjective perception of one’s empathic capacity, while the Perceived Social Self-Efficacy Scale (PSE) examines the ability in building interpersonal relationships, initiating social contact, and developing new friendships. Higher scores indicate higher self-efficacy.

2.3.4 The Aberrant Salience Inventory (ASI)

The Aberrant Salience Inventory (ASI) (Cicero et al., 2010) is a 29-item self-reported scale with dichotomous answers (“Yes”/“No”) which evaluates salience alterations determining anomalous world-experiences that have been proved to be a reliable predictor of psychosis-proneness. Scores range from 0 to 29; higher scores indicate higher psychosis proneness; moreover, the score of 14 is suggested to be the cut off value to psychotic risk.

2.4. Data analysis

Pearson's correlation coefficient was calculated to evaluate validity. Reliability was assessed by estimating Cronbach's alpha coefficients for total scale, and subscales were calculated to assess reliability.

Exploratory Factor Analysis (EFA) was conducted using scree test to select the number of factors according with evidence in the literature showing the good reliability of this method (Fabrigar et al., 1999). Accordingly, the decreasing curve of the eigenvalues was represented, and the factors preceding the flattening of the curve were selected. Orthogonal rotation (VARIMAX) was performed.

Confirmatory Factor Analysis (CFA) was performed using maximum likelihood estimation. Root-Mean-Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker–Lewis Index (TLI) were calculated. Indices of acceptable fitness are values below 0.08 for RMSEA, values above 0.9 for CFI, and above 0.95 for TLI (Taasoobshirazi & Wang, 2016). Statistical analyses were performed using IBM SPSS 25.0 and AMOS 24 (Arbuckle, 2014), with p values < 0.05 indicating statistical significance.

3. Results

3.1. Descriptive Statistics

The final sample consisted of 178 subjects, of which 105 (59%) were female and 73 (41%) were male. The mean age was $34,7 \pm 13,4$ years and the mean level of schooling was 18.1 ± 3.5 years. Regarding their professional statuses, 12 (6.7%) were unemployed, 51 (28.7%) were students, and 115 (65.6%) were employed. As for their sentimental statuses, 58 (32.6%) were single and 120 (67.4%) had a stable relationship. All the subjects resided in Italy and were native Italian speakers. The mean scores of each administered scale are shown in **Table 1**, together with the comparison between male and female individuals: female subjects showed significantly higher scores in EIS and ESSS.

Scale	Score	F (n=105)	M (n=73)	t(176)
EIS	26.18 ± 9.68	27.85 ± 9.58	23.60 ± 9.31	2.94**
ESSS	40.92 ± 13.39	42.61 ± 13.60	38.49 ± 12.78	2.03*
EQ-short	44.97 ± 5.58	45.58 ± 6.32	44.08 ± 4.18	1.77
PESE	23.46 ± 2.99	23.58 ± 2.88	23.27 ± 3.14	0.67
PSSE	15.33 ± 2.67	15.35 ± 2.71	15.29 ± 2.63	0.18
ASI	12.93 ± 6.66	13.22 ± 6.89	12.51 ± 6.34	0.70

Table 1. Mean scores \pm standard deviation for each administered scale.

Abbreviations. EIS: Embodied Intersubjectivity Scale, ESSS: Embodied Sense-of-Self Scale, EQ-short: Empathy Quotient, PESE: Perceived Empathic Self-Efficacy, PSSE: Perceived Social Self-Efficacy Scale, ASI: Aberrant Salience Inventory * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.2 Factor Structure

A CFA was carried out to test if the original single-factor model fit the Italian Version of the scale. The CFI for the original single-factor model was 0,755, the RMSEA was 0,222, and the TLI was 0,615, showing inadequate model fitness with respect to the data. Therefore, an EFA was carried out; prior to this, communalities were evaluated, as shown

in Table 2; since all items showed communalities >0.2 , no item was removed according to Child (Child, 2006). The scale was then tested with respect to factor structure. Two factors showed eigenvalues >1 (5,821, and 1,563) and the scree test showed that two factors preceded the flattening point of the graph, as shown in Figure 1. The factor loadings for the two factors are shown in Table 2 together with the mean, standard deviation, and item–total correlation for the scale.

Figure 1: Scree test used for the EFA.

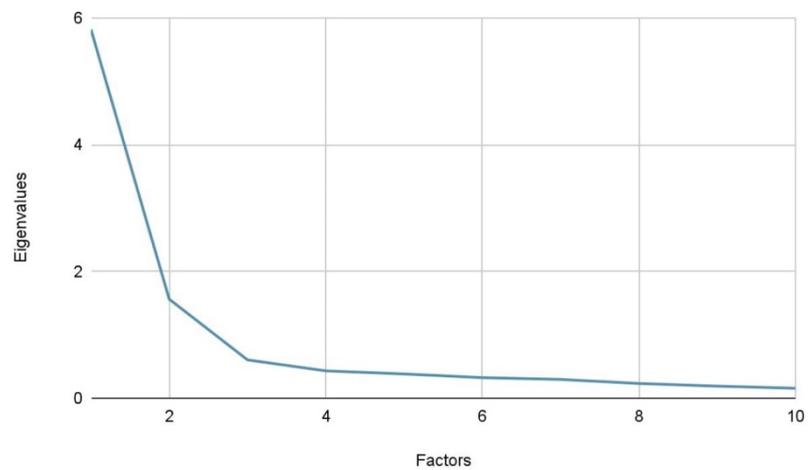


Figure 1: Scree test used for the EFA.

Item	Communality	Factor 1	Factor 2	Mean \pm SD	Item-Total Correlation
1. I can pick up the movements of others.	0.630	0.789	0.088	2.73 \pm 1.403	0.542
2. Through movement I can transmit / communicate aspects of myself.	0.650	0.735	0.332	3.05 \pm 1.199	0.683
3. Through the movement of others, I realize how they feel (e.g., joy, tension).	0.676	0.796	0.206	3.20 \pm 1.055	0.632
4. I can accompany others in movement (“mirror” movement).	0.781	0.870	0.156	2.64 \pm 1.387	0.654
5. I can recognize how others feel through joint movement.	0.735	0.581	0.631	2.02 \pm 1.287	0.810
6. Through joint movement a connectedness arises.	0.782	0.523	0.713	2.74 \pm 1.368	0.830
7. If others move in sync with me, I feel accepted by them.	0.820	0.053	0.904	2.35 \pm 1.377	0.602
8. Something new can emerge in moving with others.	0.794	0.257	0.853	2.60 \pm 1.257	0.724
9. I can understand what others want to express with movement.	0.697	0.611	0.569	2.64 \pm 1.138	0.775
10. If another person moves in sync with me I feel understood.	0.819	0.182	0.886	2.21 \pm 1.294	0.694

Table 2: Communalities between items of the Embodied Intersubjectivity Scale; factor loadings for the two-factor model; mean \pm standard deviation, and item–total correlation for the items of the scale.

The first factor, that we will name “Embodied Intersubjectivity - Other subscale” (EIS-O) (see Section 4. Discussion), includes seven items (1, 2, 3, 4, 5, 6 and 9).

The second factor, that we will name “Embodied Intersubjectivity - Self/Environment subscale” (EIS-SE), includes six items (5, 6, 7, 8, 9 and 10).

The two constructs are each represented by a series of subscale-specific items (EIS-O: 1, 2, 3, 4; EIS-SE: 7, 8, 10) and three shared items (5, 6, 9) that we choose not to exclude in order not to lose data and not further shorten an already brief scale. The inherent limitation of our choice is made explicit in the dedicated section of the manuscript (see section 5. Limitations and future perspectives).

A confirmatory factor analysis was carried out for the described two-factor model: the CFI was 0,944, the TLI was 0,919, and the RMSEA was 0,113, showing that the model demonstrated a better fitness than single-factor model with respect to the data.

3.3. Reliability and Validity

Regarding reliability, the Cronbach’s alpha was 0.902 for the EIS-O, 0.918 for the EIS-SE subscale, and 0.917 for the whole scale.

A medium effect size (>0.30) was detected for the correlations between EIS-O and EQ-CE and EQ total score, and between EIS total score and EQ-CE, and EQ total score (Cohen, 2013). Correlations between EIS-O and EQ-SS, PESE, and PSSE, between EIS-SE and ASI, ESSS, EQ-CE, EQ total score, and PESE, and EQ total score and ASI, EQ-SS, PESE, and PSSE showed a small effect size (>0.10) (Cohen, 2013). Correlation analyses regarding validity are reported in Table 3.

	EIS-O	EIS-SE	EIS_tot	ASI	ESSS	EQ-CE	EQ-ER	EQ-SS	EQ_tot	PESE	PSSE
EIS-O	1	0.804***	0.938***	0,090	0.020	0.370***	0.133	0.231**	0.354***	0.296***	0.203**
EIS-SE	0.804***	1	0.953***	0.270***	0.154*	0.268***	0.115	0.094	0.224**	0.186*	0.126
EIS_tot	0.938***	0.953***	1	0.174*	0.900	0.326***	0.134	0.173*	0.302***	0.252**	0.174*

Table 3. Pearson’s correlation coefficients between the psychometric indices in the study.

Abbreviations. EIS: Embodied Intersubjectivity Scale, EIS-O: EIS Other, EIS-SE: EIS Self/Environment, ASI: Aberrant Salience Inventory, ESSS: Embodied Sense-of-Self Scale, ESSS-R: ESSS Self-recognition, ESSS-C: ESSS Self-consistence, ESSS-A: ESSS Self-awareness, EQ-short: Italian Short Empathy Quotient scale, EQ-CE: EQ Cognitive Empathy, EQ-ER: EQ Emotional Reactivity, EQ-SS: EQ Social Skills; PESE: Perceived Empathic Self-Efficacy, PSSE: Perceived Social Self-Efficacy Scale. Statistical significance. * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

4. Discussion

The Italian version of the Embodied Intersubjectivity Scale (EIS) offers valuable insights. Notably, women scored higher than men on embodied intersubjectivity, despite similar levels of empathy and self-efficacy, aligning with prior findings on women’s heightened sensitivity to bodily cues (Proverbio, 2023). Importantly, such results should not be interpreted as reflecting differences in the ontological structure of intersubjectivity itself, but rather as variations in its lived, ontic expressions within specific individuals and groups.

Contrary to the original single-factor model, a two-factor structure emerged through dimensionality reduction: one focused on “Other” experiences (EIS-O), and the other on “Self/Environment” experiences (EIS-SE). Both factors appear to positively correlate with empathy - more specifically with cognitive empathy - and with perceived empathic self-efficacy (the subjective capacity in empathic exchanges), with the first factor showing a stronger and more significant correlation. Within a phenomenological-dynamic framework, embodied intersubjectivity does not merely support cognitive processes in an ancillary way, but rather constitutes their very condition of possibility (Fuchs, 2017). Cognitive empathy emerges through a pre-reflective, bodily attunement to the expressive

cues of the Other, mediated through gestures and movements (Merleau-Ponty & Smith, 1962). It is through this embodied co-presence that language itself gains its pragmatic and affective thickness, allowing meaning to be dynamically co-constructed in intersubjective encounters. Consequently, intercorporeality underpins the communicative and interpretative capacities that are fundamental to both emotional understanding and linguistic exchange (Gallagher & Zahavi, 2020).

The absence of a significant correlation between both factors and emotional reactivity – a subscale assessing the extent of an individual’s responsiveness to Others’ emotions – may be attributable to the EIS’s lack of explicit evaluation of subjective competencies in emotional responsiveness toward Others.

In addition to that, the first factor shows positive correlation with social skills, which measures interpersonal competencies such as active listening, effective communication, and conflict resolution, and with perceived social self-efficacy, which tackles the subjective capacity in building interpersonal relationships and initiating social contact. These findings substantiate the thesis that embodied intersubjectivity forms the pre-linguistic condition of possibility for communicative and linguistic competence, highlighting how linguistic acts are not isolated cognitive operations but are rooted in an intercorporeal field where meaning is co-constituted through embodied interaction (Merleau-Ponty & Smith, 1962). The expressive body mediates access to the Other’s subjectivity and establishes the affective ground upon which language as a symbolic system is built. Embodied intersubjectivity thus provides the tacit, pre-conceptual layer of shared intentionality necessary for linguistic communication, where gestures and bodily presence operate as primordial modes of signification (Campisi, 2019). In this light, language emerges as a continuation and sedimentation of embodied expressive practices, and communicative skills can be seen as developments of the primary bodily attunement to the emotions and intentions of Others, emphasizing once again the interdependence between the semiotics of both language and the body. For its capacity in grasping pristine aspects of the embodied with-world experience, we choose to name the first factor “Embodied Intersubjectivity - Other subscale” (EIS-O).

The second factor shows predictable positive correlations with measures of cognitive empathy and empathic self-efficacy, but does not exhibit correlations with social skills and perceived social self-efficacy. Moreover, it shows surprising positive correlation with anomalous experiences of both the world and the embodied self, contrary to our initial hypotheses. This suggests that higher scores on this dimension of embodied intersubjectivity are associated with a heightened sensitivity to subtle alterations in the perception of the environment and of one’s own bodily presence. From a phenomenological perspective, these findings may point to a loosening of the tacit structures that ordinarily govern the pre-reflective engagement with the world and with one’s own body, potentially leading to a destabilization of the basic sense of reality and self-coherence. These results highlight the importance of the embodied dimension not only in fostering empathic and communicative capacities but also in maintaining a stable and continuous sense of self and world. From a clinical point of view, this subscale seems to be able to intercept dimensions of increased permeability of self–world boundaries (Nelson et al., 2012) which may be shared with psychosis-prone subjects. Moreover, it seems to grasp aspects of the environmental-world and embodied self-world experience which are known to be intertwined with the experience of the with-world, and therefore we choose to name it “Embodied Intersubjectivity - Self/Environment subscale” (EIS-SE). The methodological decision to retain the three items shared by both subscales underscores, once again, the impossibility of imposing a strict partition among the various modalities of encountering the world. Even at the ontic level – let alone the ontological

– these dimensions invariably overlap, reflecting the inherent interweaving of experiential structures rather than neatly separable domains.

Our study supports the reliability and validity of the Italian version of the Embodied Intersubjectivity Scale, with a two-factor model targeting other-experience and self/environment-experience providing a good fit. However, we suggest considering the total score of the scale as an indicator of the overall levels of embodied intersubjectivity. Overall, the EIS total score appears to be a reliable measure of interbodily resonance, being related to cognitive empathy, social skills, perceived empathic and social self-efficacy. Moreover, the EIS could also potentially serve as a tool to evaluate the patient's capacity to identify and linguistically communicate the bodily sense of connection with the Other during intersubjective interactions.

The EIS offers promising clinical applications, including improved diagnostic precision, better assessment of social functioning, and enhanced tracking of treatment outcomes, particularly in body-oriented and emotion-focused therapies. By incorporating non-verbal, bodily dimensions of intersubjectivity, the scale complements existing cognitive-emotional tools and could be especially useful in evaluating interpersonal disruptions, specifically in psychotic disorders.

5. Limitations and future perspectives

The present study should be interpreted in light of several limitations. First, the sample cannot be considered fully representative of the Italian population, given its restricted age range and the absence of ethnic minorities and non-native speakers. Furthermore, the use of a non-clinical and relatively homogeneous cohort limits the generalizability of the findings. Second, reliance on self-report measures introduces well-known sources of bias, including subjectivity in introspection and social desirability effects. Third, the decision to retain three overlapping items across subscales may entail a degree of conceptual redundancy and could inflate inter-subscale correlations, although this choice was made to preserve the brevity and usability of the instrument. A fourth limitation concerns a broader epistemological issue within psychological research: the tendency to implicitly over-attribute relational difficulties to the suffering subject. On the one hand, social and interpersonal dynamics cannot be excluded from the genesis of such difficulties; on the other, psychometric instruments offer no direct access to these social components, as they remain necessarily mediated by the respondent's subjective experience. When clinicians speak of “dis-,” “hyper-,” or “conflicted” embodiment, they are therefore referring to deviations from a statistical norm, rather than to unambiguous causal mechanisms. Consequently, psychometric results should be interpreted as correlational rather than causal: the presence of disturbances in embodied intersubjectivity in a clinical population does not, in itself, reveal the direction of causality. Such difficulties may also reflect the reduced capacity – or availability – of so-called healthy individuals to engage in embodied, affective resonance with persons in distress.

Future research should examine the EIS's convergent and divergent validity with additional psychological measures, and validate the two-factor structure in clinical populations to explore differences across psychiatric diagnoses.

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