

EMBODIED AND EXBODIED MIND: WHAT IN BETWEEN WHEN BODY IMAGE AND BODY SCHEMA (DE)-CONNECT?

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ABSTRACT

When social and clinical psychology “work together,” cultural-based disturbs, like eating disorder behaviour, can be seen in a new light. Self-image is a perception product based on icon memory, imagination, sensory stimulus, social context expectations, self-beliefs about social context adequacy, etc. Still, it is also based on self-representation, like dress, fashion, maquillage, etc.

A different discourse can be done for what psychology intends for body schema. Body gesture, movement, and action result from very complex different neural systems cooperation, combining sensory and motor brain centres. Training to build neuro-motor schemas requires a very long time and effort, as in each human art like dance, sports, playing drama, art crafts competencies, etc.

What if one’s body image and body schema are unbalanced? If the social body image pressure will bring one’s total mimesis with it or to an original, personal interpretation is here attributed to the “exboding” capacity, coming from a “sufficient” balance between body schema and body image.

Some anorexia nervosa patients are frequently engaged in intense physical activities. In our interpretation, their conscious control of the body comes from the social colonisation of embodied images that produce a disequilibrium between body image and body schema. Thus, a sort of “body-image” liberation could be possible if a deep awareness of our body schema is reached.

The central hypothesis of this work is that the embodiment processes, primarily dependent on cultural pressure, have to be seen in unstable equilibrium with exbodiment experiences, which can be considered as the expression of body schema originated by personal sensory-motor history (see References 1; 2; 3). To evaluate the possible separation between the two, a new picture questionnaire has been elaborated.

Dysmorphic “confusion” is widely spreading in contemporary Western societies, particularly among adolescents (4; 5). The perception of how we are seen by others (body image) is one of the core issues in social trends, education, and psychopathology (6).

On the other hand, what one implicitly knows of his/her somatic body (body schema) represents the psychological antecedent basis implied in social interaction (2).

This article attempts to give a quantitative dimension to the two sides of the body, the structural, implicit one (body-schema) and the public, partly self-controlled one (body-image).

Keywords: *Embodied mind; Body image; Body schema; Picture test; Erotic Capital.*

INTRODUCTION

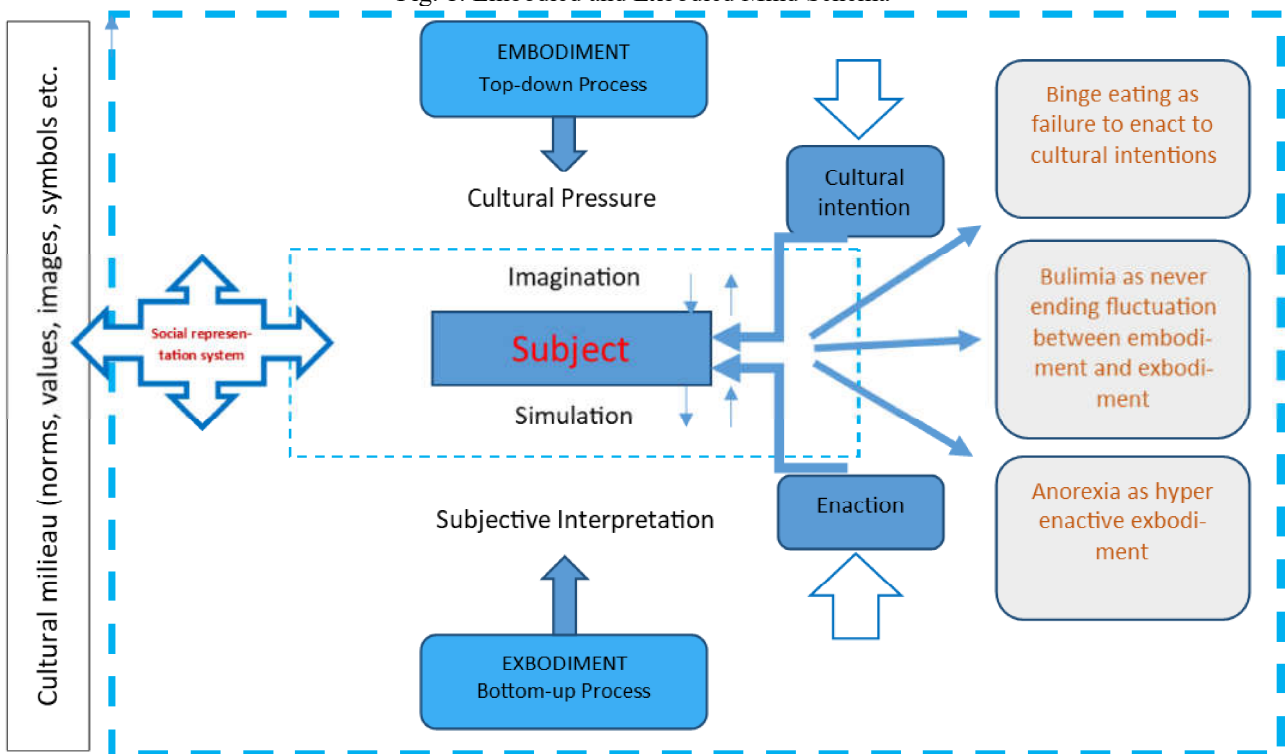
The frame theory, inspired by the Embodied Cognition and Enaction Theory (7; 8), is a theoretical perspective with a common background. Oxford Dictionary states: «Embodiment (noun): a tangible or visible form of an idea, quality, or feeling, as in "she seemed to be a living embodiment of vitality".» Following these suggestions, it is possible to interpret embodiment as a "top-down" process of the interaction between subjects and cultures. Her subjects are conceived as targets of cultural pressure, composed of social representations or "ideas" (9).

According to the Perception Theory (10), a "top-down process of social models" can be defined as how subjects direct their behaviour based on cultural solicitations. Our social-psychological perspective constantly confronts her or himself with the "collective-mind" point of view (11).

We suggest that the interaction between subject and culture is a two-way process: the top-down influences, embodied by people, and the bottom-up one. We call "exbodiment" this "bottom-up" process, the function of the body schema structure. Exbodiment indicates how subjects "enact" their embodied cultures and how the body expresses their intentionality (12; 13; 14) toward the world they live in. This occurs in the Peripersonal Symbolic Sphere (also called in social psychology "the life living", Lewin, 15), where culture is seen as the framework from which people conceive (top-down) norms as a continuous strength to cope with the influence (12). The verb "to enact" comes from the philosophy of language theory.

It emphasises the specific ontology of a bill or a legal proposal because the structure of legal sentences are social facts with a particular grade of objectivity. Action is a more general word, while enaction stresses the institutional nature of people's activity. We cannot just say that "one acts," but we propose that oriented enactions, acted by subjects and structured by a culture, construct one's social world. Exbodiment indicates how subjects "enact" their embodied cultures. For example, exbodiment refers to the process applied by anorexic girls to organise their social echo system to control their attempt to represent the "fitting form" detected in cultural symbols. Embodiment relates to the incoming shape from a culture to a subject. At the same time, exbodiment refers to the never-ending process by which subjects express their mostly contrasted acceptance of a cultural and social model. Picture 1 presents a graphic representation of the general relationship model within embodied and exbodied processes (see 16).

Fig. 1: Embodied and Exbodied Mind Schema



In Fig. 1, dashed external lines stand like a porous border between the global cultural milieu and what has been here called the "peri-personal symbolic sphere" (not all the possible cultural contents affect an individual!). In a certain way, the Social Representation System is an "engine" that pulses from the general cultural milieu values, images, and symbols into the personal sphere. At the core of it, we find the subject so written because we assume, also, if not verifiable, it is the source or origin of psychological processes. Around the issue are traced lines into the two more relevant psychological processes for our discourse: imagination – facing cultural intentions – and simulation – facing personal enaction –. Individual imagination constitutes a sort of "glue" that captures cultural contents because perception and personal

representation become personal beliefs when emotional reactions occur. Conversely, enaction via simulation and direct-action experiences gives access to a unique way to be in the world, called Exbodiment. Following neurological research (17; 18), it is possible to consider embodiment as an effect of cultural pressure that originates from the image of oneself, in other words, called "body image".

On the other hand, exbodiment, the word that stays here for personal skills or expressiveness, is a function of body schema because exbodiment results from the specialisation and integration of the sensory-motor body systems. It is possible to sustain (8) that body schema refers to neural systems implicated in movement, while body image refers to the visual-affective beliefs of oneself (19). The body image can be considered the representation of the self according to the cultural pressure in a specific society.

As stated, this research hypothesises that body schema (the basis on which rest exbodiment) and body image (embodiment) can result in very different balances. The Body Image and Schema Test aims to reveal and describe the body image/schema equilibrium.

Materials and Methods

The research here presented rests on a double approach to the aim of the study (in what balance are body image and body schema), approaches based on two empiric tools developed by authors: The Body Image and Schema Test and the Erotic Capital Grid.

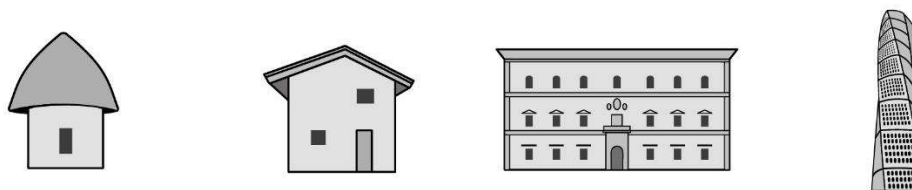
The tool we developed, called the Body Image and Schema Test, is based on pictures designed to investigate this unconscious knowledge to overcome the difficulty of verbally expressing one's body schema. The Body Image and Schema Test (this is the full name, shortly called BIST) has been created using symbolic pictures for different anatomic apparatus (cardio-circulatory, respiratory, digestive, reproductive systems) and self-representation, bonds, cultural females and males' images. Figures 2 and 3 are samples of two test items. A synopsis of the entire BIST test is available at Open Science Framework (OSF) Url:

https://osf.io/2swta/?view_only=f307556c41e54ac4ababec06edc14704 .

Fig. 2: Example item "mouth"



Fig. 3: Example Item house



Pictures are ordered on a four-point Likert scale from simple to complex. The final version is under validation, counting on a total sample via the Amazon Mechanical Turk tool of around 8000 subjects (see OSF URL: https://osf.io/2swta/?view_only=f307556c41e54ac4ababec06edc14704).

The Body Image and Schema Test has also been cross-tested with a subsample of girls confronted by a specific grid for measuring Erotic Capital (20) on Facebook profiles. As it is known, Facebook and other social media (i.e. Instagram) is the most popular instrument to present oneself to an extensive social group.

The in-progress test demonstrates initial reliability as a potential objective tool to describe body schema structure and better understand body image in different "body experiences" and what differences between the two could be used as sources for personal inquiry.

Catherin Hakim's "Erotic Capital" book (2011) is the main inspiration for the presented exploration. Girls and many young women struggle with the image they think reflects the Great Mirror of the Generalised Other (Mead, 11).

Users' self-representation in their Facebook bulletin board is the access point of Alberto Zatti and Nicoletta Riva's working team.

The "Erotic Capital Grid" of Facebook profile images tries to rate the erotic capital implicitly expressed through a public profile; in other words, the public presentation of the self (the body image). It attempts to measure three of the six factors theorised by Hakim (the seventh, fertility, is explicitly omitted by Hakim because of its low relevance in Western society). This research also omitted face beauty (because of its innate origin) and sex performance (not commonly shown on internet socials). The remaining factors from Hakim's theory here are body sex appeal, fashion and embellishment, and social and communication abilities.

The Grid consists of items which are grouped into four main aspects. Aspects can be illustrated into two principal axes: the "Styling Axis" (the "Me" that is presented ") and the "Seduction Axis" (the "You" to whom the message is implicitly sent).

The Styling Axis consists of two aspects/categories: the Embellishment category (i.e. items are hairstyles and makeup) and "Fashion" (i.e. items are clothing, accessories such as handbags, earrings, etc.).

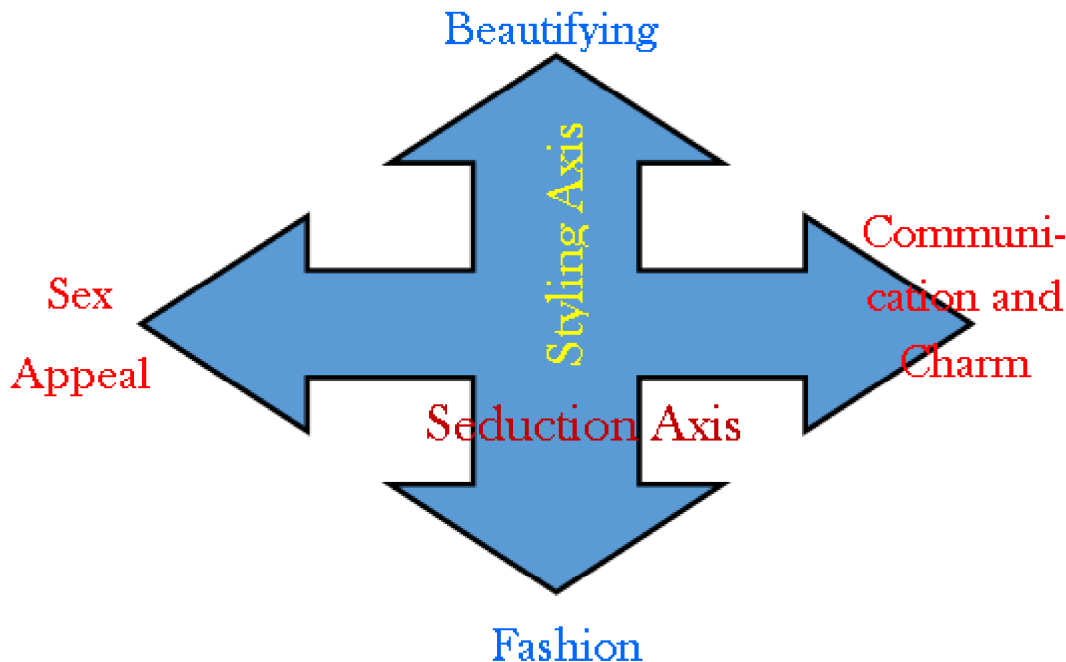
The Seduction Axis consists of two categories: "Communication and Charm" (i.e. items are "poses" and "look"); the category called Sex Appeal (which includes items such as the percentage of naked skin, the mouth expression- closed, winking, laughing, etc.).

A correction of the relative intrinsic weight of each variable has been made (variables are 0/1-like) to transform them from categorical to scale values.

As stated before, this analysis is assumed to indicate the body image because it is self-evident that the image itself cannot be done without considering the cultural context by which fashion, embellishment, seduction rules, etc., are core issues. In other words, the body is always dressed, posed, and pictured; rarely (or never) is nude flesh presented (except for medical visits!). In Figure 4, the two main axes (Styling and Seduction) and the four categories (Beautifying and Fashion; Sex appeal and communication and charm) are represented. A synopsis of the entire items is also available at Open Science Framework (OSF) Url:

https://osf.io/2swta/?view_only=f307556c41e54ac4ababec06edc14704 .

Fig. 4 Reassume categories with grid examples.



Results from the Erotic Capital Grid were compared with the other instrument, "Body Image and Schema Test of the Somatic-Psychic Imaginary". As presented above, this tool is intended to analyse the "Body schema", which differs from the body image. The body schema refers to implicit, interoceptive knowledge. It is closely related to the innervations projected on the plane of the body's brain representation (i.e. the sensual and motor homunculus), with integration with, among others, the proprioceptive system.

The body schema is the result of the elaboration of our experiences in life and the interaction between one's body and the surrounding environment throughout the years of psychomotor development. The Body image and Body schema may differ, not infrequently causing some degree of suffering due to the discrepation between the implicit knowledge of the

body's schema and the culturally mediated knowledge according to the aesthetic and functional values transmitted by the female psychosocial models.

The Somato-psychic Body Image Test consists of 26 items composed only of images, sorted like a Likert scale with four values.

Four images are ordered according to a growing image element complexity (logical criterion) and according to a psycho-evolutionary progression (ontogenic criterion). The Body Image and Schema Test subjects sample now consists of 8175 respondents to the Mechanical Turk platform. These respondents are the baseline (see Figures 5 and 6, blue line) toward which they are confronted with the two case study subjects. Tables 1, 2 and 3 show the whole sample by gender, age and family culture.

Tab. 1 sample gender distribution.

Gender distribution		N.	%
	Female	4245	51,9
	Male	3897	47,7
	Tot.	8142	99,6
Missing		33	,4
Tot.		8175	100,0

Table 2 sample by age distribution.

Age distribution		N.	%
	0 19 years	279	3,4
	20 - 32 years	4197	51,3
	33 - 49 years	2793	34,2
	50 - 80 years	829	10,1
	Tot.	8098	99,1
Missing		77	,9
Total		8175	100,0

Table 3 sample by family culture distribution.

Family Culture distribution		N.	%
	Mediterranean	1114	13,6
	North American	157	1,9
	Middle Eastern	149	1,8
	Hebrew	80	1,0
	Centre African	87	1,1
	South African	86	1,1
	Latin American	747	9,1
	North African	2090	25,6
	East European	329	4,0
	Russian	49	,6
	Far East	81	1,0
	Chianese	119	1,5
	Indian	1320	16,1
	Others	472	5,8
	Europe (North-Centre)	453	5,5
	Totale	7333	89,7
Missing	Sistema	842	10,3
Total		8175	100,0

A sub-sample of 13 girls was evaluated for this initial explorative research. Both BIST and the Grid of the Erotic Capital were applied (Erotic Capital Grid is available at OSF URL: https://osf.io/2swta/?view_only=f307556c41e54ac4ababec06edc14704). Moreover, a group of 16 male boys rated on a

scale from 1 to 4 the 13 girls' pictures from the "beauty" point of view (their "male view"). Male judges produced a rank of the 13 sub-sample girls.

In the end, this research is based on three independent evaluations and a popular indicator like the number of Facebook friends:

- 1) The evaluation made with the application of the Erotic Capital Grid to 10 photos taken randomly by Facebook of each subject, with the corresponding number of "likes";
- 2) The evaluation of each girl's Somato-psyhic Body Image Test;
- 3) The evaluation received by the group of 16 young males;
- 4) Number of Facebook friends.

A larger Cross-validation of the two main tests (Erotic Capital Grid and Body Image Test) is still underway. Here, we want to present the first results on the possible meaning of digging into Body image and schema tests taken on a deep analysis of two single girls extracted from the sub-sample.

RESULTS AND DISCUSSION

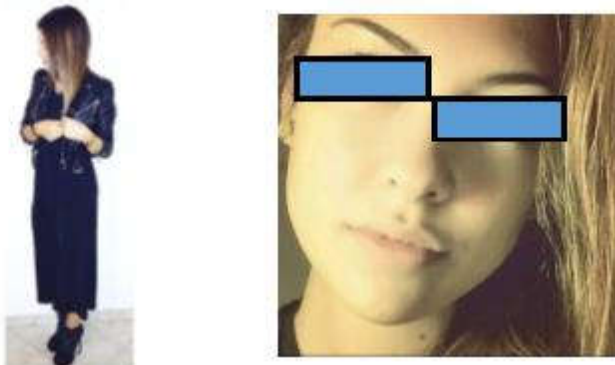
For each of the two subjects presented here will be shown: 1. the number of Facebook friends (assumed as a popularity indicator); 2. The so-called "male attraction point" due to votes given by the male "judges" to the girl's picture ("How do you evaluate her beauty on a 1 to 4 scale?"; max score: 64); 3. the profile obtained in the Body Image and Schema Test compared to the average of the entire sample (see Figures 5 and 6); 4. a correlation between the four Erotic Capital Dimensions calculated with the specific Grid elaborated by authors and the likes received in that photos (see Tables 4 and 5).

In Figures 5 and 6, the blue line indicates the sample averages. The red line shows the values obtained by the subjects. Deviations greater than or equal to two points out of the mean are analysed, especially when they coincide with a whole Somato-psyhic apparatus. Items are on the abscissa axe. With numbers, here are indicated references between test variable pictures and underlined independent meaning: 1 – 2 cardiovascular apparatus; 3 -5 respiratory apparatus; 6 – 7 skin; 8 – 10 oro-digestive apparatus; 11 – 14 Self; 15 – 17 sexual apparatus; 19 – 22 psychomotor system; 23 – 24 Female Male gender symbolic pictures; 18, 25 and 26 items are not relevant.

Table 6 shows the correlation between the number of likes a subject receives for her photos on Facebook, 6rganized according to the four aspects of Embellishment and Fashion (related to the Styling axis) and the category Communication and Sex appeal (enclosed in the Seduction axis).

Comments and interpretations will be elaborated, taking concepts from phenomenology, psychoanalytic, and psychosomatic theories (see 21, 22, 23).

Case 1. Vara (fantasy name) – 2832 friends; Male attraction points 57/64. Alias: “The Wax Doll” (Pictures 1 and 2 are Facebook Vara’s self-representation.)



Pic.1, 2.

Fig. 5 Vara’s Body Image Test Profile vs Sample Average

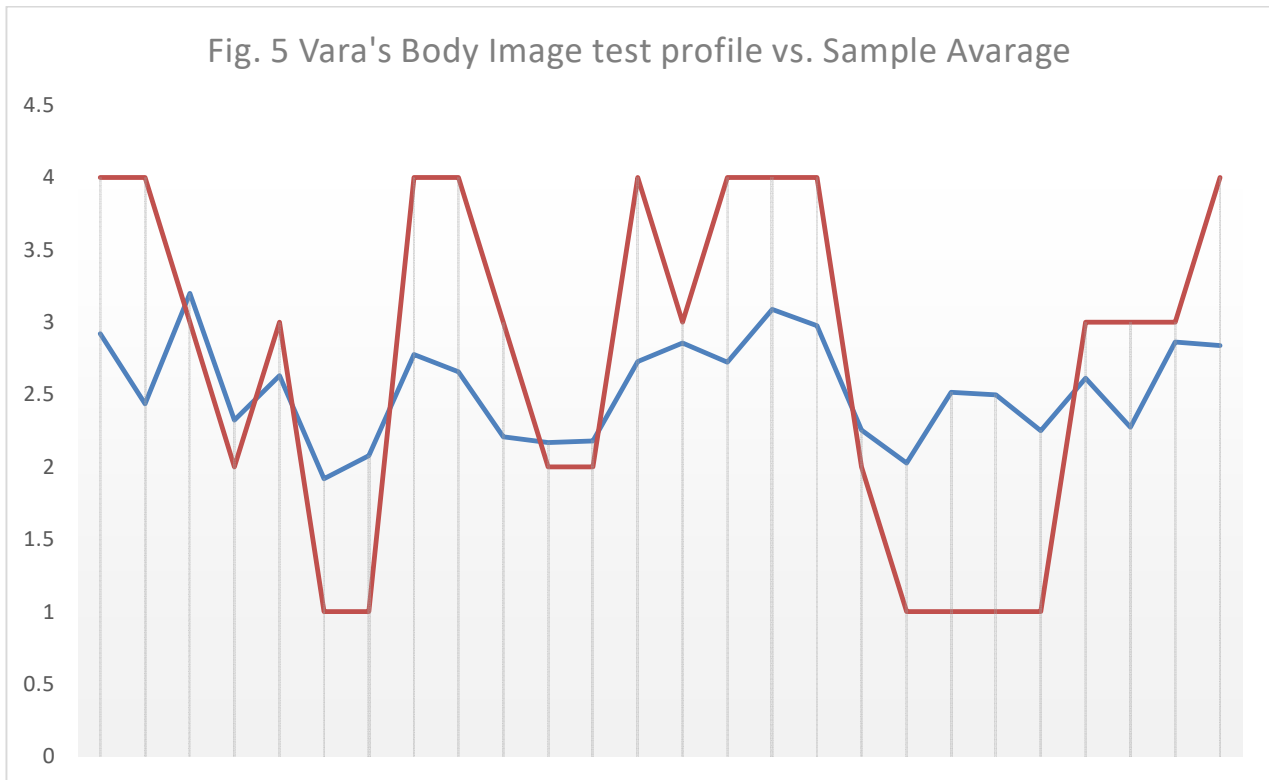


Table 4: Correlation between Facebook Vara’s Like and Erotic Capital Grid.

Correlation between FB Like & “Beautifying” category.	0,61
Correlation between FB Like & “Fashion” category.	-0,35
Correlation between FB Like & "Communication and Charm" category.	-0,10
Correlation between FB Like & “Sex Appeal” category.	-0,23

As it is possible to observe from Fig. 5, in Vara's Body Image and Schema Test, there is a subsidence of values at the epidermic apparatus. In contrast, the importance of the oral-digestive device is high compared to the average. The configuration suggests a developed control system to counteract a deficiency in the epidermal apparatus: the distance may occur during the seduction process since the intimate skin dimension seems to be fragile in the examined subject (one could even assume some form of skin allergy predisposition, to be validated with an in-depth interview with the subject herself).

However, Vara was the most appreciated girl by the male sample group. The "vitality" reported by the circulatory system is average. Above the average is the item related to self-representation as if it were a house (in this case, a skyscraper house). Instinctual sexuality is also above the average, while four items are devoted to psycho-sense-motor development at the lowest level.

The correlation between the number of "likes" and the components of the erotic capital shows that in this specific case study, the "beautification" process (makeup, etc.) is a crucial factor in getting "likes" from her friends. Negative and irrelevant correlations can be found in the other three poles of erotic capital. Vara seems to be high on the list of approved, mainly if not almost exclusively, based on her facial care. She seems flattered by her appreciation and takes more care of her looks. The other component, which we will call communicative intent, is missing, as the "seduction" component does not seem to be one of her weapons.

To sum up, the below-average placement of the body diagrams affecting the skin and psychomotor development may indicate some form of development block in terms of peri-personal space between the individual and his environment. A "silky", exemplary, delicate epidermal system could limit the ability to "get close" to others. High values in the oral-digestive apparatus associated with control and consideration above the average of the genital device associated with sexuality might indicate a form of "algid" attitude: sexuality that acts more in a "remote" approach rather than in intimacy. In their peers' eyes, she was the most appreciated girl, receiving a score of 57 out of 64 as a maximum, and, in addition, the pictures of Vara on Facebook received compliments almost exclusively on her ability to present her face as if she were statically "perfect". She has been labelled a "wax doll", a title that brings together a "distance" of that beauty and diaphanic perfection concentrated on the oval of the face and nothing more.

Case 2. Bora (invented name) – 691 friends; Male attraction points 54/64. Alias: Miss "I would like to be a show-girl, but ...". (Pictures 3 and 4 are Facebook Bora's self-representation.)



Pic. 3, 4.

Fig. 6 Bora's Body Image Test Profile vs Sample average

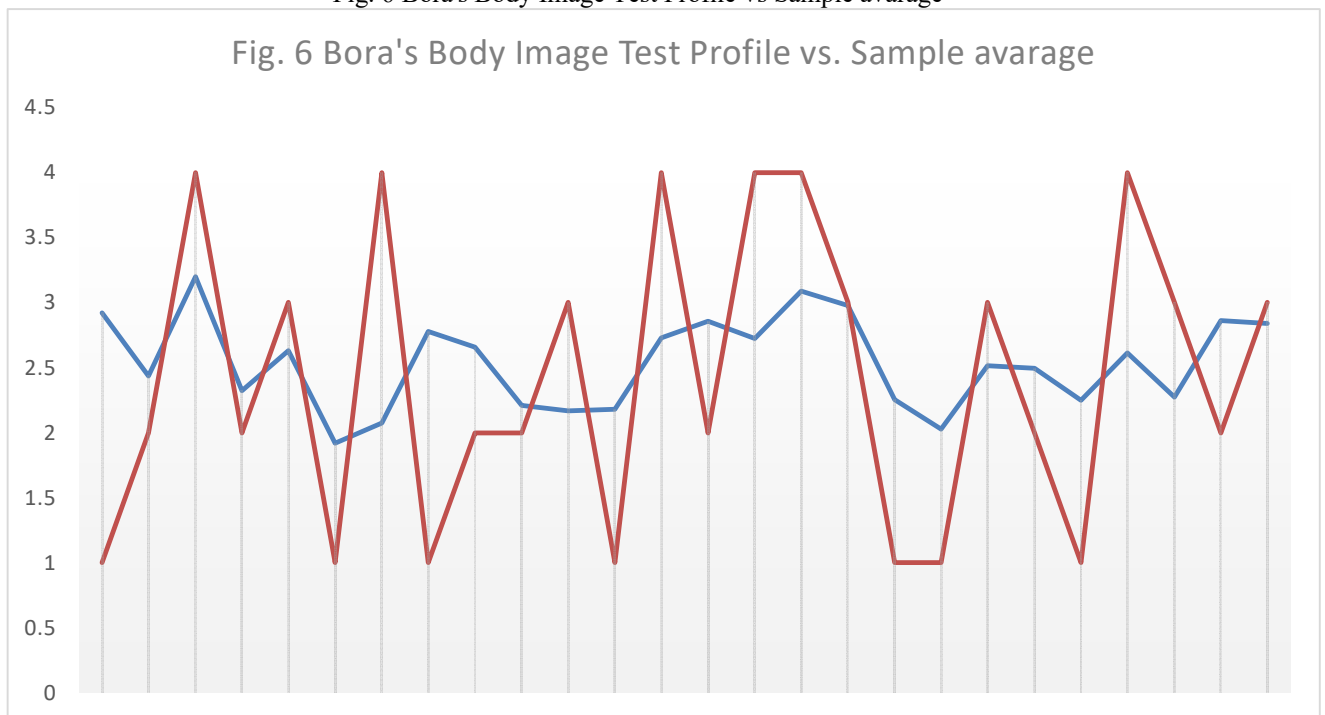


Table 5: Correlation between Facebook Bora’s Like and Erotic Capital Grid.

Correlation between FB Like & “Beautifying” category.	0,58
Correlation between FB Like & “Fashion” category.	-0,06
Correlation between FB Like & "Communication and Charm" category.	-0,23
Correlation between FB Like & “Sex Appeal” category.	-0,25

From Fig. 6, it is possible to say that the Bora profile generally looks livelier than the other girls' profiles. Many items are above or below the population's average so far.

The apparatus that receives "contrasting" choices (above or below the average) are, in particular, the cardio-circulatory apparatus, the epidermal, the oral-digestive apparatus and the psychomotor development system.

Such considerations suggest that the subject may be disharmonised in many major psychosomatic systems (of the body). Observing now the axes of the erotic capital examined with the Grid, we notice that the only pole that has some correlation between the likes and photographs is the Embellishment factor, i.e. makeup and clothing. For the rest, Bora does not seem to get compliments for other erotic poles investigated by Facebook Grid (all negative and modest value correlations). Such a framework allows considering the individual still partially unripe on balance between the body's complexity (the scheme-image equilibrium) and the "instruments" available to a woman to increase the overall erotic capital.

It is pointing to this intrinsic potency of a body taken more by opposing polarities and perhaps still to blend as a whole that has been coined the appellative Miss "I would like to be a show-girl, but ..." Dots of suspension are indicative of a state of immature-maturation of the body apparatus and systems as a whole.

CONCLUSION

The human body is discovered every time a discovery. Embodied movement in cognition (24), theory of mind (25), artificial intelligence (26), etc., are recent scientific approaches to an "object" that we can consider as "old" as humankind. In psychology, social theories and clinical theories are mostly apart from each other. This tradition is changing because of the widespread of some cultural-based disturbs, like eating disorder behaviour. Female image, but more general, self-image, is a perception product. As with all perception processes, it consists of a syncretisation of different cognitive sources: icon memory, imagination, sensory stimulus, social context expectations, self-belief about social context adequacy, etc.

As a cultural species, humankind adjuncts a very complex dimension to one presentation, like dress, fashion, maquillage, etc. Body image is quite never a "flesh fact". Maybe just for medical personnel, the body has to be presented in its nudity, but our body is exhibited naked in no other social place. Body image is always a construction made by organic structures and cultural artefacts.

A different discourse can be done for what neurology intends for body schema. Body gesture, movement, and action are the results of very complex different neural systems cooperation, combining both sensory and motor brain centres. Training to build neuro-motor schemas requires a very long time and effort, as in each human art like dance, sports, playing drama, art crafts competencies, etc. Our body schema permits our ability to cope with issues an individual finds in his/her world.

Social images influence personal imagery. How a social model goes deeply into a mind also depends on the inexperience of one's body. How to present one's body, its effect on others, and how much control one can have of its expressiveness are dimensions that affect the individual "agentivity". Body image's cultural inscription is referred to as an embodied process. The critical factor that influences if the social body image pressure will be total mimesis or an original interpretation is here attributed to the embodied capacity coming from body schema structure (27).

Embodied and embodied mind-body personal structures are supposed to be in circular causality. It is known that some anorexia nervosa patients are frequently engaged in intense physical activities. In our interpretation, their conscious control of the body, coming from the colonisation of embodied images, stands for a disequilibrium between body image and body schema, which is last treated as an organic machine to win.

The research presented here is an attempt to face the body study from a psychosocial point of view, considering it (the body) in both its part: a cultural construct and an organic structure. Noticing how, recently, individual action has been reduced (see the range of possibility in mass-urban societies as quiet as all Western societies are), imagery has come to the front stage. In our approach, this is translated into a loss of equilibrium between body image (occupying more and more mental space) and body schema. Via two original instruments, the Psychosomatic Body Image and Schema Test and Erotic Capital Grid, this research has shown in two cases their potential to describe and confront the image and schema sides of the body.

The research's first results showed that Vara's success in social media and boys-judges' eyes is very body image-based. For the other case, Bora, at Erotic Capital Grid, points out her presentation in more dynamic terms. Still, the Psychosomatic Body Image and Schema Test indicate a not-yet-mature integration between different body schema systems (interceptive and psychomotor ones).

Our search is under broad development via cross-validation with other tests, such as human drawing, single case stories, focus groups and clinical conversation, personality tests such as the Big Five, etc. But from these exploratory two single case research, it is possible to consolidate Embodied self-image and Embodied auto expression as the columns to consider in the psychology of the contemporary bodies.

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DECLARATION

Ethical Approval and Consent to participate

Informed consent was obtained from all individual participants included in the study.

Consent for publication

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Availability of supporting data

The whole data supporting this study's findings is available from the corresponding author upon request. At the Open Science Framework URL, main research data are available:

https://osf.io/2swta/?view_only=f307556c41e54ac4ababec06edc14704

Competing interests

The authors have no competing interests to declare relevant to this article's content. Specifically, the authors have no competing interests as defined by BMC or other interests that might be perceived to influence the results and/or discussion reported in this paper.

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Authors' contributions

Alberto Zatti wrote the main manuscript text and prepared all figures and statistical analysis. Nicoletta Riva participated in planning the hypothesis and monitoring the entire research. All authors reviewed the manuscript.

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