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## Artigo Científico

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# Representations of internal body image: a study of pre-adolescents and adolescent students in Araucaria, Paraná, Brazil

*Representações da imagem corporal interna: um estudo sobre adolescentes e pré-adolescentes em Araucária, Paraná, Brasil*

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### Resumo

O objetivo desse estudo exploratório é analisar as representações gráficas da imagem interna do corpo de estudantes pré-adolescentes e adolescentes e caracterizar como a imagem corporal interna e os conhecimentos anatômicos são adquiridos e estabelecidos durante a adolescência. Secundariamente, como se dá a integração dos órgãos sexuais na imagem corporal interna. Foram analisados desenhos representando a concepção interna do corpo de 143 estudantes brasileiros de ambos os sexos, entre 10,5 e 18 anos completos. As análises foram feitas por meio de um guia para escala qualitativa e alguns critérios quantitativos. A integração dos órgãos sexuais encontrada nos desenhos do contorno do corpo foi equivalente para estudantes de ambos os sexos. Pode-se observar que uma imagem interna parcial do corpo foi encontrada na maioria dos desenhos dos estudantes, mostrando uma precária conceituação na integração dos órgãos internos. © Cien. Cogn. 2008; Vol. 13 (2): 139-159.

**Palavras-chaves:** imagem corporal; desenho; órgãos; sistemas; desenvolvimento.

### Abstract

*The purpose of this exploratory study is to analyse the graphic representation of the inside the body of pre adolescents and adolescents students and to characterise how the internal body image and anatomic knowledge is acquired and turn permanent during adolescence. Secondly, to inquire whether there is an integration of sex organs into the internal body image. The drawings representing the inside of the body in the conception of 143 Brazilian pre adolescents and adolescents students from a rural area, of both sexes aged 10,5 to 18 yr. were analysed according to a guide for qualitative scoring and some quantitative criteria. The integration of sex organs into the drawings representing body image was equally evident with pre-adolescents and adolescents of both sexes. It was noticed that a partial inner body image was found in most of the students' drawings, showing a misconception in the integration of body organs. © Cien. Cogn. 2008; Vol. 13 (2): 139-159.*

**Keywords:** body image; drawings; organ; organ systems; development.

## 1. Introduction

### 1.1. Body image: external and internal formation

Body image is an important developmental aspect in all human beings related to psychological imprint of individuality and to inclusion into social group. The body and corporality are linked to human psychology due to the interface with personality organisation. Although the body is immersed in the culture manifestation and has a social use (Mauss, 1936/1956; Le Breton, 1992), it is not only a universal and social experience but also an individual process of construction and differentiation.

Piaget (1937/1973), Wallon (1931), Zazzo (1948), and De Ajuriaguerra (1970/1994) have shown that the body consciousness is not an original data but it is constructed during the course of a dialectic process when interacting with others, gradually developing the sense of self in children.

Traditional psychoanalytical theory and research in its origin has viewed sexual development in terms of fantasies and sensations and has given substantial importance to libidinal drives and to erogenous zones of the human body. Psychoanalysis postulates that human sexuality obeys significant laws and that the anatomic sexual differences between individuals have psychic consequences (Lima, 2002; Stoller, 1993).

The human psychic is divided, according to some scientific currents, in id, ego, and superego. The human ego is responsible for the contact with reality, controls the motility, the perception, and the modulation of the libidinal drives (Freud, 1923; Kaplan, 1994/2002). Ego is primarily a embodied ego due to the limits between the self and no-self which are initially established as sensorial, affective and motor experiences (Bloss, 1988; Dolto, 1984). "The ego is first and foremost a body-ego. It is not merely a surface entity, but is in itself a projection of a surface" (Freud, 1923: v.XIX).

The body image is defined as "lived-body", throughout the affective experiences and as "perceived-body" when it is involved with the tactile and kinaesthetic sensations, through the embodied schema (Le Bouch, 1986).

For Lacan (1949/1998), in the beginning of life, the child experiences his or her body as a disrupted entity and only with experiences and the interchange with the world he or she will experience to be unitary. The recognition of his or her proper image promotes the feeling of unification. This is the base for the constitution of the embodied image of itself.

The body image is referred to as the exterior appearance of the body and its social connotation is formed gradually during infancy reaching a certain balance in pre-adolescence. In adolescence, due to morphological and sexual transformations, the body undergoes a deep mutation in its dimension, weight, muscular force and movement agility, as well as in sexual characteristics and functions. This causes instability and the need to reorganize the body image that was formed during childhood (Amann-Gainotti *et al.*, 2004)

The consciousness of body sensation experiences originate both from the unconscious and from the external world. This difference between the inner and the outer world, the anatomic and the psychic reign generates a cleavage, where the distinction of what is perceived is not what is impressed on the psychic level. (Harris, 1998)

The erogenous zones are stimulated since the time when a person is born, changing the focus along the child's life. Boys and girls enter the genital phase with a different drive. Meanwhile boys have the penis as the centre of the erogenous drive and this will be stable until the adult life, girls have two possibilities: the clitoris, the most important erogenous area in the infant phallic phase, and the vagina. The vagina is highlighted in the traditional Freudian view only during puberty. Freud (1931) suggested that both girls and boys do not

have knowledge of the vagina as the centre of the sexual drive but are aware of the existence or the non-existence of the penis.

However, a more contemporary approach has stressed the meaning of female “genital inner space” comprising women’s sexual organs such as the vagina, clitoris, uterus, ovaries and Fallopian tubes. These define the cavity covered by internal structures that is included in girls’ whole body image (Erikson, 1964; Hägglund e Hägglund, 1978; Hägglund, 1981). These authors postulated that the psychological basis of girls’ genital inner space is present in the early stages of psychosexual development. Some authors agree that not only girls but also boys have an initial knowledge of the vagina (Breen, 1998). However, they have postulated that as the body image is a reflex of the physical state of the genital organs and considering that the female genital organs are invaginated, its anatomic structure prevents its sensorial, visual and tactile access making the observation of her sexual organs less concrete and direct than is the case for boys (Bloss, 1988; Gibeault, 1998; Bernstein, 1998; Brandão, 2004).

Dolto (1984) said that the initial perception of the genital organs is involved with the urinary perception in boys contrary to those in girls who from very early age distinguish the urinary sensation from vaginal and clitoral sensations. However, the sensations of the genital area of the girls are diffuse, involving other areas as pelvis, urethra, and anus (Bernstein, 1998). Girls experience the genital area without consciousness of its origin because of the diffuse sensations of the genital area, without visible or tactile access when they can not control the access. This is the centre of the anguish reported by Bernstein and other authors (Bernstein, 1988, Squitieri, 2001).

Stimuli are concentrated on the external genitalia of children. The possibility to touch and observe the vulva, the clitoris and the external genitals can be the precursors of the vagina concept, driving the girl to perceived her as having an open and an a potential inner space (Mayer, 1985).

For Freud, in the “*Three Essays on the Theory of Sexuality*”, although he did not postulate the idea of inner space in girls, he expressed the idea that children’s curiosity about the phenomena of birth and conception could be a manifestation of infantile sexuality ; also he considered the knowledge drive to be extremely connected to children’s sexual life (Freud, 1905).

As the body image is the “alive body”, it is formed by the experiences joining the inner and the outer world, putting together the sensations, perceptions and drives of the subject. Jones (1992) conceptualised the inner body image as a function of knowledge of internal anatomy and an understanding of physiological functioning of the body parts (Jones *et al.*, 1992).

The systematic study of the development of internal body image owns a great deal to early concepts proposed by Schilder and Wechsler (1935). More recently the interior of the body was investigated on male adults by Tait and Acher (1955) and in children and adolescents using the technique of drawings by Gellert (1962) and Brumback, (1977); in different cultures by Steward and colleges (1982), with deaf children Gibbons (1985) as well as in cross-sectional studies with children and adolescents (Amann-Gainotti,1988; Amann-Gainotti *et al.*, 1989; Amann-Gainotti and Antenore, 1990).

On the other hand, a more clinical concern is expressed on numbering and identification by means of labelling the internal body parts (Porter, 1974; Williams, 1979; Bibace and Walsh, 1981; Glaun and Rosenthal, 1987).

Our understanding of how children become progressively aware of the development of their body schema was increased by preliminary studies carried out by Zazzo (1948) and Piaget (1937/1973). Drawings of the human figure by children and adolescents have been

adopted in psychological, development of body image and emotion studies (Di Leo, 1970) and it seems to follow precise development patterns.

Drawing as a research technique is a useful tool to probe understanding and collect large amount of data without disturbing subjects during their regular activities. Therefore, among other goals, drawings depicted human figures done by children (Goodnow, 1977; Cox 1992, 1993, 1997), and in different cultures (Cox *et al.*, 2001), evaluated psychological aspects with adolescents (Eng, 1931), verify development of body image and emotion (Di Leo, 1970; 1983), dealt with women's sexual organs (Blum,1978; Amann-Gainotti *et al.*, 1989).

We examined student's drawings as a means of investigating a school-based experience, namely the human body. The purpose of this study, adopting a cross-sectional approach, is to investigate qualitatively, through graphic representations, the developmental patterns related to what pre-adolescents and adolescents think is inside them. We are unaware of any other study carried out in this direction in Brazil in our perspective. The data basis researched was Scielo, Bireme, Google, and LILACS Data Base.

## 1.2. Social geographic characteristics of the area sampled

The research was done with pre-adolescents and adolescents attending a public school in Guajuvira District, located in the rural area of Araucaria City, Paraná, Brazil. Most of these students are children of farming workers, typically offspring of Polish immigrants. The city still suffering strong influence of the immigration started more than 130 years ago.

The colonisation of the district started on 1.876 by Polish and later by German and Ukrainian immigrants. Until nowadays the immigrant descendants preserve parts of the culture being possible to find, in some homes, the original language as primary spoken idiom, so the culture of the region is very influenced by the Polish culture (Araucária, Prefeitura Municipal, 1990). Druszcz (1984), noticed a great number of children still learning Polish language at home and the Portuguese is inserted only when they start the formal education at school.

The earnings of these families comes mainly from agriculture and cattle raising , producing beans, corn, tobacco, bacon, flour, and erva-mate (a typical tea leaf of the region).The city economy was based in the production of the erva-mate and wheat until the de decade of 1940's where only males would work in the fields. Women were responsible for the family duties (Araucária, Prefeitura Municipal, 1990).

In 1972 a state oil refinery and the creation of the industrial area in the outskirts of the city with the installation of all sorts of industrial plants promoted the economic development and the population changed its characteristics. A huge migration from the rural area to the urban one was noticed. Nowadays, there are 104000 inhabitants (Censo,2000), living 91.36% in the urban area and 8,64% in the rural area which compose the city population. The geographic space is divided into 18.23% belonging to the urban area and 81.77% to rural area which is formed by 39 small districts (Araucária, Secretaria Municipal de Urbanismo do Município, 2003). Although Araucaria is a city integrated to the metropolitan area of Curitiba (capital of the Province), the rural area keeps the typical characteristics of agricultural villages and distinct Polish culture influence (Wachowicz, 1981). The city was developed close to the banks of Iguaçu River and Guajuvira is 37 kilometres away from Curitiba. At present Araucaria is an important industrial & agricultural municipality of Paraná state. The industrial area holds large industries linking Curitiba to Araucaria in common business and the agricultural area is made by small and familiar productive properties (Araucária, Secretaria de Cultura e Turismo do Município, 2003).

## 2. Methodology

### 2.1. Procedure

Fieldwork was carried out in southern Brazil, in a rural district of Araucaria city, Paraná State at a Public Junior School (municipality funded - non-fee paying). The sample comprised of 143 students both sexes aged between 10,5 to 18 years old, in a sample of 74 male and 69 female. All subjects of this study were attending formal education, having 5 to 8 years of coursework, not including in this figure kindergarten education years. The kindergarten pupils were not included because it was not part of the formal education when the data was collected, as not every child attended it.

Students were told to write their first names, age with a black pencil on the top of an A4 sheet of blank paper. Then, they were asked to draw how they thought was inside their body taking them as models. They were given 15 to 20 minutes to complete the drawing.

### 2.2 Drawing analysis

A total of 143 drawings were collected and scored using the scale proposed by Amann-Gainotti (1988) to evaluate the different levels of the biological internal structures attained by these students sample. The scoring was done independently by the first two authors following criteria developed in the ranking protocol are presented on Table 1.

<b>Level 1</b>	Scattered organs without an outline of the body. Internal organs inside or outside the body outline. Subjects appear not to understand the instructions given (Additional Figure 1)
<b>Level 2</b>	One or more internal organs placed at random inside body walls. Drawings may include external parts (hair, navel) or decorative elements (flowers, ear-rings) (Additional Figure 2).
<b>Level 3a</b>	Four or more internal organs placed inside body walls without appropriate positions. External or decorative elements often absent (Additional Figures 3 and 4).
<b>Level 3b</b>	Four or more internal organs placed inside body walls with approximately appropriate positions, no organ system connection. (Additional Figures 5 and 6).
<b>Level 4a</b>	Representation of organ systems but in a partial or non-functional way (Additional Figures 7 and 8).
<b>Level 4b</b>	At least one organ system indicated (e. g. respiratory: two lungs, two bronchi, windpipe which joins to mouth and/ or nose) (Additional Figure 9).

**Table 1** - Qualitative system adopted to score the biological quality of each drawing.

## 3. Results

Age range of female and male sample in this study is presented respectively on Table 3a and Table 3b. The average years of formal education both sexes is indicated on Table 2.

	<b>Average Age</b>	<b>Average Years of Education</b>	<b>Average Number of Organs spontaneous drawn</b>
<b>Male</b>	13,38	6,23	7,51
<b>Female</b>	12,51	6,33	4,33
<b>Mean</b>	12,95	6,28	5,92

**Table 2** - Average age, education and number of organs drawn data from students.

Students Age	Female		Male	
	N	%	N	%
10	10	14,49	2	2,70
11	12	17,39	11	14,86
12	14	20,29	15	20,27
13	12	17,39	10	13,51
14	12	17,39	15	20,27
15	5	7,25	12	16,22
16	4	5,8	5	6,76
17	0	0	3	4,05
18	0	0	1	1,35
Total	69	100	74	100

**Table 3a** - Age distribution of female and male students' sample (in percentage).

Age	Total	%	Male	%	Female	%
10	12	8,39	2	1,40	10	6,99
11	23	16,08	11	7,69	12	8,39
12	29	20,28	14	10,49	15	10,49
13	22	15,38	10	6,99	12	8,39
14	27	18,88	15	10,49	12	8,39
15	17	11,89	12	8,39	5	3,50
16	9	6,29	5	3,50	4	2,80
17	3	2,10	3	2,10	0	0,00
18	1	0,70	1	0,70	0	0,00
Total	143	100	74	51,75	69	48,25

**Table 3b** - Distribution by age and sex of students sample in percentage.

Evaluation of the drawings revealed that all internal organs were depicted inside the contour of the body in approximate correct positions as indicated on Tables 4a and 4b. The heart, lungs, intestine were proportionally the most represented organs as indicated on Table 4c.

Organ	N	%
Intestines	62	89.86
Heart	59	85.51
Lung	52	75.36
Respiratory tube/trachea	43	62.32
Digestive tube/esophagus	39	56.52
Stomach	38	55.07
Brain	32	46.38
Arm and leg bones, joints, rib bones	28	40.58
Arteries/veins	21	30.43
Kidney	19	27.54
Rectum/anus/colon	16	23.19
Liver	12	23.19

Mouth/tongue	11	17.39
Uterus	10	14.49
Bronchi	8	11.59
Bladder	7	10.14
Ovaries/ovuloun	6	8.7
Breast	5	7.25
Fallopian tubes	5	7.25
Vagina	5	7.25
Vulva	4	5.8
Larynx, pharynx	4	5.8
Nerves	3	4.35
Pancreas	2	2.9
Spleen	2	2.9
Muscle	2	2.9
Penis/testes	2	2.9
Vocal cords	1	1.45
Ureter	1	1.45

**Table 4a** - Spontaneous organs representation of female (N) students (in percentage).

<b>Organ</b>	<b>N</b>	<b>%</b>
Heart	73	98.65
Lung	54	72.97
Intestine	54	72.97
Stomach	42	56.76
Trachea, respiratory tube	37	50
Bones and joints	34	45.95
Digestive tube/esophagus	32	43.24
Veins/arteries	32	43.24
Kidney	30	40.54
Brain	25	33.78
Rectum/anus	22	29.73
Bronchi	21	28.38
Penis	20	27.03
Bladder	18	24.32
Testis	17	22.97
Nerves	11	14.86
Mouth	8	10.81
Liver	8	8.11
Urethra	8	8.11
Pancreas	5	6.76
Uterus	4	5.41
Tongue	4	5.41
Glottis, vocal cords	4	5.41
Ureter	4	5.41

Duodene	3	4.05
Pharynx, larynx	3	4.05
Fallopian tubes/ovaries	3	4.05
Breast	3	4.05
Gall bladder	2	2.7
Vulva	2	2.7
Vagina/vagina opening	2	2.7
Auditory canal	1	1.35

**Table 4b** - Spontaneous organs representation of male (N) students (in percentage).

Organ	total	%	Male	%	Female	%
Heart	132	92.31	73	51.05	50	41.26
Trachea/ respiratory tube	79	92.31	36	25.17	43	30.07
Intestine	116	81.12	54	37.76	62	43.36
Lung	106	74.13	54	37.76	52	36.36
Stomach	79	55.24	41	28.67	38	26.57
Digestive tube/esophagus	71	49.65	32	22.38	39	27.27
Bones and joints	61	42.66	33	23.08	28	19.58
Brain	57	39.86	25	17.48	32	22.38
Veins/arteries	52	36.36	31	21.68	21	14.69
Kidney	49	34.27	30	20.98	19	13.29
Rectum/anus	38	26.57	22	15.38	16	11.19
Bronchi	27	28.88	19	13.29	8	5.59
Bladder	25	27.48	18	12.59	7	4.90
mouth/tongue	23	26.08	12	8.39	11	7.69
Penis	22	15.38	20	13.99	2	1.40
Liver	18	12.59	6	4.20	12	8.39
Testis	17	11.89	17	11.89	0	0.00
Nerves	14	9.79	11	7.69	3	2.10
Uterus	14	9.79	4	2.80	10	6.99
Fallopian tubes/ovaries	14	9.79	3	2.10	11	7.69
Pancreas	7	4.90	5	3.50	2	1.40
Pharynx, larynx	7	4.90	3	2.10	4	2.80
Vagina/vagina opening	7	4.90	2	1.40	5	3.50
Breast	7	4.90	2	1.40	5	3.50
Urethra	6	4.20	6	4.20	0	0.00
Vulva	6	4.20	2	1.40	4	2.80
Glottis, vocal cords	5	3.50	4	2.80	1	0.70
Ureter	5	3.50	4	2.80	1	0.70
Duodene	3	2.10	3	2.10	0	0.00
Muscles	3	2.10	0	0.00	3	2.10
Spleen	2	1.40	0	0.00	2	1.40
Gall bladder	2	1.40	2	1.40	0	0.00
Auditory canal	1	0.70	1	0.70	0	0.00

**Table 4c** - Spontaneous total organs representation of students (in percentage).



The percentage of the level attained by female students is represented on Table 5a and on Table 5a. The major part of the graphic representation of the inside the body was distributed in levels 3a and 3b both sexes. Females and males attained almost equivalent distribution of level 4a, and very few students both sexes were distributed on level 4b.

Level	N	%
1	0	0
2	4	5,80
3a	22	31,88
3b	22	31,88
4a	20	28,99
4b	1	1,45
total	69	100,00

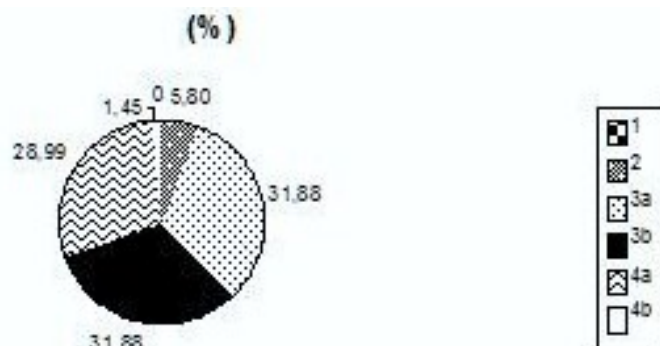
**Table 5a** - Distribution level attained by female students (in percentage).

Level	N	%
1	3	4,05
2	5	6,76
3a	26	35,14
3b	23	31,08
4a	14	18,92
4b	3	4,05
total	74	100,00

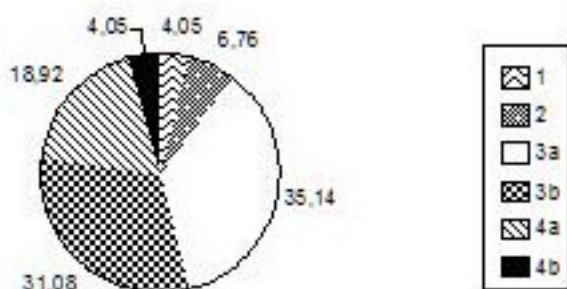
**Table 5b** - Distribution of level attained by male students (in percentage).

Level	students	%	male	%	female	%
1	3	2,10	3	2,10	0	0,00
2	9	6,29	5	3,50	4	2,80
3a	48	33,57	26	18,18	22	15,38
3b	45	31,47	23	16,08	22	15,38
4a	34	23,78	14	9,79	20	13,99
4b	4	2,80	3	2,10	1	0,70
Total	143	100	74	51,75	69	48,25

**Table 5c** - Distribution of total level attained by students (in percentage).



**Figure 1a** - Distribution of level attained by female students (in percentage).



**Figure 1b** - Distribution of level attained by male students (in percentage).

## 2.1. Integration of sex organs into drawings

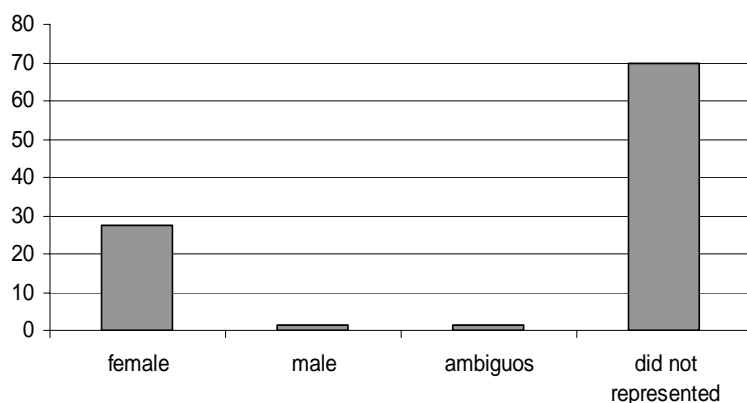
An analytical description of the percentage of subjects who spontaneously represent sex organs in their drawings of the inside the body is indicated on Table 6a. In a few drawings sex organs were ambiguous. Almost 70% of either male or female students did not represent sex organs in their drawings as indicated on Table 6b. Females tend to represent their own sex organs and which also happens with male students. It is amazing why a large percentage both sexes did not represent sex organs in their drawings.

Genital Representation	Students	%	Male	%	female	%
Male	17	11,89	16	11,19	1	0,70
Female	25	17,48	6	4,20	19	13,29
Ambiguous	1	0,70	0	0,00	1	0,70
Did not represent	100	69,93	52	36,36	48	33,57
Total	143	100	74	85,31	69	48,25

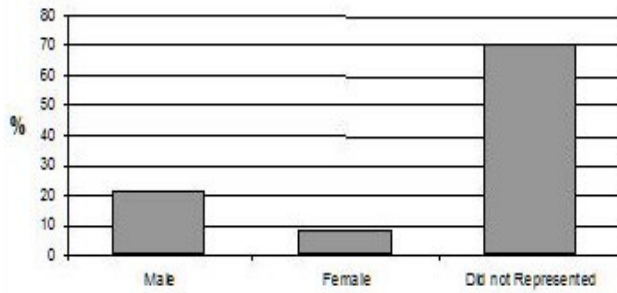
**Table 6a** - Genital spontaneous representation by students (in percentage).

Genital representation	male	%	female	%
Female	6	8,11	19	27,53
Male	16	21,26	1	1,45
Ambiguous	0	0	1	1,45
Did not represent	52	70,27	48	69,57
Total	74	100	69	100

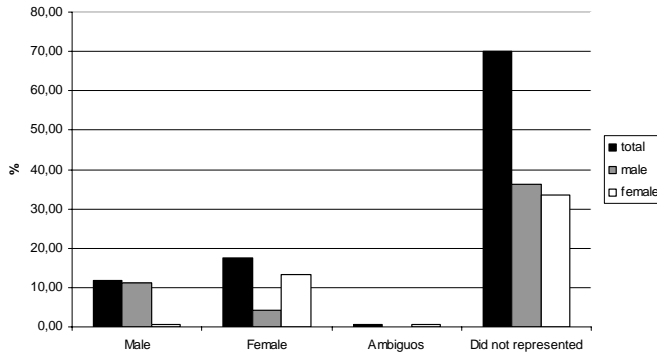
**Table 6b** - Gender comparison of genital spontaneous representation by students (in percentage).



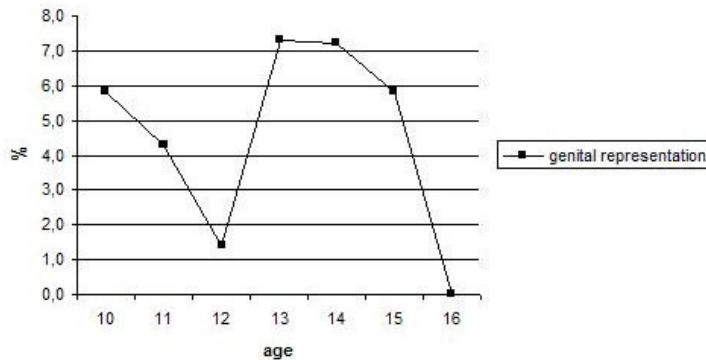
**Figure 2a** – Genital spontaneous representation of female students (in percentage).



**Figure 2b** - Genital spontaneous representation of male students (in percentage).



**Figure 2c** - Gender comparison between genital spontaneous representation of students.



**Figure 3** - Genital spontaneous representation of female students distributed by age (in percentage).

Figure 3 represents the distribution by age of the genital spontaneous representation by female students showing that the representation of sex organs increases on the ages of 13 and 14 but decreases on the age of 12, not being represented after the age of 15.

#### 4. Discussion

Drawings scored as Level 4b, which include at least one organ system rarely appeared as well as Level 1, although both of Level 1 and 2 still persists in many adolescents drawings. At no age there was a significant difference between boys and girls drawings regarding the levels attained. They were largely equivalent and the authors decided not to carry out further statistical analysis.

An analytical description of the numbers of subjects who indicated sex organs in their drawings of the inside body is presented in Table 6. The percentage of the students in our sample who represented sex organs in their drawings, started to increase around ages 10 and 11 for girls, having a notable manifestation into ages 13 to 14, but no sex organs representation appear after the age of 15 on females.

Boys seem more likely to draw sex organs in the range of 10 and 11 years old, but are equivalent between boys and girls on the this age range, boys representation turned to be a little later, between 14 and 15 years old, than those which appear in girls.

Although contrary to what happens with girls, the sexual organs representations did not stop with the ages and still present in the oldest students.

Most of the students, independent of gender, did not spontaneously draw sex organs. Although most of the students which represented sex organs did their own, few has drawn the opposite gender in both sex, but more noticeable in males than in females.

The most common organs represented by students as shown on Tables 4 were heart; lung, intestine, stomach, and trachea are mainly depicted. In the most represented organs there's no significant difference on percentage representation by organ when considering the gender of the students, in between 0% and <4 %. Besides these, the male students represented 13% more the heart than female, and female had represented near 13% more the trachea, the esophagus, and the brain, and 9% more the liver than male students did.

In both sex the most represented organ systems were the digestive, respiratory and cardiac systems.

Although the difference of the number of educational years was not relevant between genders, male students have represented 3 organs more than girls have. This difference we suspect may be is related to age, considering boys were on average almost 1 year older than girls were.

## 5. Final remarks

The results of this exploratory study characterising qualitatively & quantitatively the development patterns of internal body image, by means of identification of organs & organs systems by South American subjects living in a rural area of developing country with a proper culture, allow some remarks.

The inspection of the drawings of our teen-age students revealed the same difficulties shown by adolescents of previous studies (Munari *et al.*, 1976; Amann-Gainotti and Antenore, 1990; Reiss and Tunnicliffe, 2001; Manokore and Reiss, 2003) to draw the human body and it's internal structures .

Most of the students were able to place organs and organ systems inside the body walls, many of them in appropriate positions. However, few subjects represented overall complete organ systems, when they did it was particularly the digestive and the respiratory system . Besides, most pupils drew isolated organs instead of organ systems.

As for the representation of sexual organs, contrarily to what was expected ,on the basis of the results of previous studies , and considering adolescence and the sexual drive to genital organs, very few students spontaneously depicted sex organs. Both older boys and girls represented almost equally their sex organs, as in earlier studies (Amann-Gainotti *et al.*, 1989; Reiss and Tunnicliffe, 2001). Though the representation of sex organs by girls seemed to stop after the age of 15 , whereas this did not happen in males. An explanation could be that the average menarche age of the studied girls was 12 years old, and after an increase of the sexual organs representation in the first and second year after menarche, it ceased as a sign of repression according the cultural behaviour in women.

The decrease of the sexual representation on the age of 12, the same age of the girls menarche on the sample, can be reflex of the students necessity to reformulate its body image on the new status of the development life cycle, being the temporary stop of the genital organs a defence from the anguish of this remarkable period . Authors has shown that the menarche

period is intensive and it is lived as an anguish and depersonalization period (Aberastury, 1978/1980; Quintana, 2005; Campagna and Souza, 2006)

The heart was the organ most represented, but rarely in anatomic or similar shape. It was massively drawn in metaphoric or stereotypical shape, as in Valentine card, or was depicted as that of Holy Mary, showing the influence of the religious culture. The Catholic faith is very strong among Polish immigrants and their off-springs, an important cultural heritage influence (Gil Filho, 1994).

The food is very important in Polish and Catholic cultures. The religious hymns still presents in some rituals as the Bread Share and Food Blessing which has the propose to provide a good digestion according to Polish beliefs (Gil Filho, 1994) showing the cultural influences on the frequency of the digestive system drawings.

The digestive and the respiratory systems, predominantly represented by lung, trachea, intestines and stomach may show the influence of the food culture environment and also of the sudden change in the social demographic data of the region. The students are children of parents who testified the city metamorphosis from an exclusively agriculture economy to an industrial economy, with massive migration of the population from the rural area to the urban one. The changes of the space distribution and the pollution, mainly on air quality and water sources, from the industrial plants, forced the population to deal not only with actual but also with imaginary concepts.

The increase of the urban zone, although has generated empowerment to the local economy, has submitted other forms on space occupation and production, making the agriculture to diminish its economic power (Ribas *et al.*, 2006; Gualda *et al.*, 2005; Gil Filho, 1994). All this new confrontation creates anguish and uncertainty to the small family farmer, who has not only to deal with the spatial and economic changes but also learn how to deal with frequent risk of environmental hazards from industrial refuses involving the Iguazu River, the principal source of water for plantation and air quality (Ribas *et al.*, 2006). A study by Souza (2006) has detected that although the city has programs to control pollution levels, respiratory diseases are increasing among citizens.

This could be one of the reason why the digestive and respiratory systems were mostly represented in a different circumstance but in a similar way as data reported from Zaire and Togo in Africa (Amann-Gainotti and De Stefano, 1992; Amann-Gainotti *et al.*, 1993) and England (Reiss and Tunnicliffe, 2001)

Our results agree with other authors conclusions that could be summarised with Le Breton's (1985) words when he claimed that rare are the persons who know the real localisation of their organs and the principles that structure the body functions. It was also possible to observe that culture can influence the conceptions and the symbolic representations of the inner body image.

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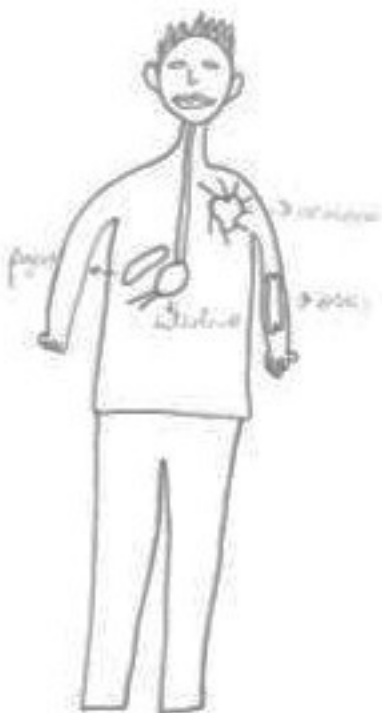
**Additional Figure 1** - A drawing by a 15 years-old boy which scored as Level 1.



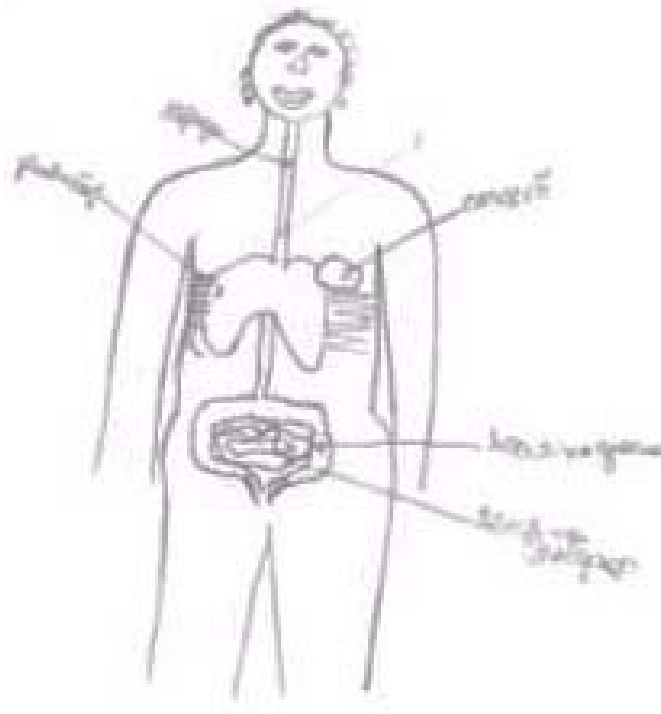
**Additional Figure 2** - A drawing by a 18years-old boy that scored as Level 2.



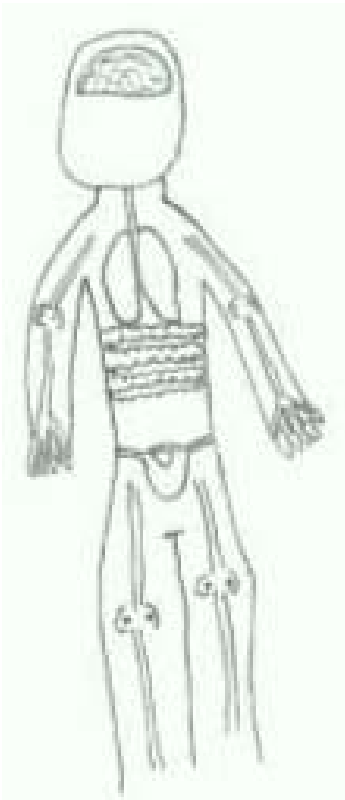
**Additional Figure 3** - A drawing by a 12 years-old boy which scored as Level 3a.



**Additional Figure 4** - A drawing by a 12 years-old girl which scored as Level 3a.



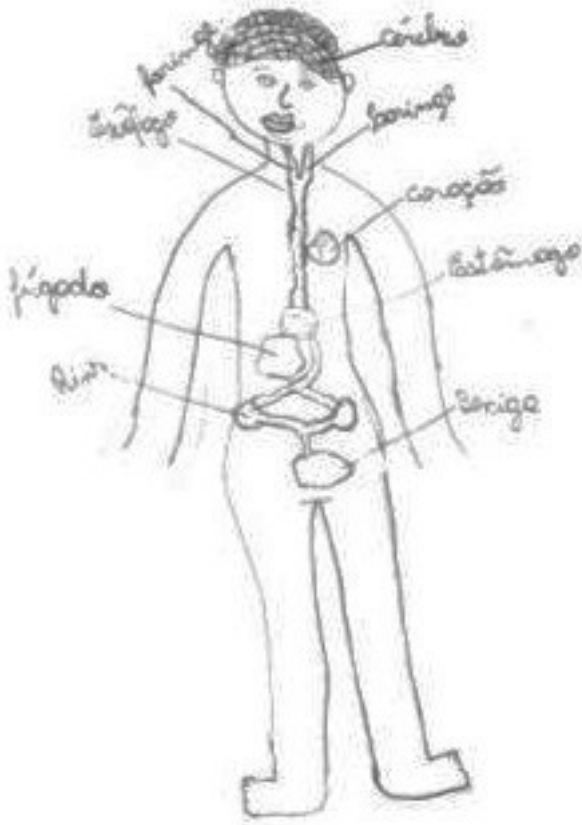
**Additional Figure 5** - A drawing by a 13 years-old girl which scored as Level 3b.



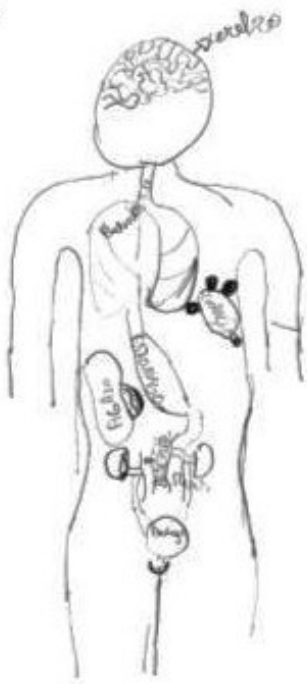
**Additional Figure 6** - A drawing by a 11 years-old girl which scored as Level 3b.



**Additional Figure 7** - A drawing by a 12years-old girl which scored as Level 4a.



**Additional Figure 8** - A drawing by a 11 years-old girl which scored as Level 4a.



**Additional Figure 8** - A drawing by a 11 years-old boy which scored as Level 4b.