Validation Study of Human Figure Drawing Test in a Colombian School Children Population

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The aim of this article was to assess the validity of the emotional and developmental components of the Koppitz human figure drawing test. 2420 children's drawings available in a database resulting from a previous cross sectional study designed to determine the prevalence of neurological diseases in children between 0 and 12 years old in Bogota schools were evaluated. They were scored using the criteria proposed by Koppitz, and classified into 16 groups according to age, gender, and presence/absence of learning or attention problems. The overall results were then compared with the normative study to assess whether descriptive parameters of the two populations were significantly different. There were no significant differences associated with presence/absence of learning and attention disorders or school attended within the overall sample. An Interrater reliability test has been made to assure the homogeneity of scoring by the evaluator team. There were significant differences between this population and that of the original study. New scoring tables contextualized for our population based on the frequency of appearance in this sample are presented. We can conclude that various ethnic, social, and cultural factors can influence the way children draw the human figure. It is thus important to establish local reference values to adequately distinguish between normality and abnormality. The new scoring tables proposed here should be followed up with a clinical study to corroborate their validity.
Keywords: children, validation, concordance, human figure drawing test.

El trabajo tiene como objetivo fue validar los componentes evolutivos y emocionales del test de Koppitz del dibujo de la figura humana. Se revisaron 2420 dibujos de niños de la base de datos de un estudio de corte transversal realizado previamente para evaluar la prevalencia de enfermedades neuropediátricas en niños de 0 a 12 años de colegios de Bogotá y fueron divididos en 16 grupos organizados de acuerdo a edad, género y de presentación o no de problemas del aprendizaje o de la atención y evaluados bajo los parámetros propuestos por Koppitz. No se encontraron diferencias entre los grupos por la presencia o no de trastornos, ni entre el tipo de establecimiento educativo. Se realizó una prueba de concordancia interevaluador para homogenizar la calificación. Se encontraron diferencias con la clasificación propuesta por Koppitz por lo que se construyeron nuevas tablas de calificación, teniendo en cuenta los porcentajes de presentación en el presente estudio. A manera de conclusiones se puede decir que diferentes factores socioculturales y étnicos influyen en ítems específicos del dibujo de la figura humana en el niño. Es de gran importancia tener valores referenciales locales para poder establecer diferencias reales entre lo normal y lo anormal. Se debe realizar un estudio para validar clínicamente las tablas propuestas.
Palabras clave: niños, validación, concordancia, test del dibujo de la figura humana.

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The development of the ability to draw the human figure in children is closely allied with neurodevelopment in general, especially the development of the visual and motor skills associated with drawing and writing (Goodenough, 1964).

The evaluation of the Human figure drawings (HFD) in children dates from several centuries back and has served not only as a tool for assessment of maturity, with the idea of characterizing the relation between drawing and intellectual capacity, but also to evaluate some traits and projective aspects of personality (Cox, 1993; Goodenough, 1964; Koppitz, 2004).

One of the most influential works in this context has been the Human figure drawing *Test* (HFD) designed by Elizabeth Koppitz (2004), whose results correlated significantly with other tests and Intellectual Quotient (IQ) percentiles. In general, the correlation between the developmental items with mental maturity (Groves & Fried, 1991) and the validity of the test as an approximate measure of a child's intelligence has been corroborated in various studies in which the test has been used as part of a child neuropsychological evaluation (Abell, Von Briesen, & Watz, 1996; Brito, Alfradique, Pereira, Porto, & Santos, 1998; Rae & Hyland, 2001). Nevertheless, several studies have questioned this connection, considering a potential confounding effect of early enriching experiences, social stereotypes, socioeconomic differences (Colom, Flores-Mendoza, & Abad, 2007; Flores-Mendoza, Abad, & Lele, 2005), presence of external stressors in the child's history, learning experiences and formal or informal educational stimulation, among other factors (Merino Soto, Honores Mendoza, García Ramirez, & Salazar Alvarez, 2007).

The emotional indicators were defined by Koppitz (2004) as objective signs reflecting children's worries or anxieties. To be considered as valid they have to meet the following characteristics: they are clinically valid, that is, they differentiate children with and without emotional problems; they are considered as exceptional according to the child's age, that is, they occur in 15% or less of all drawings; and they are not related to developmental stage hence they do not increase with age. The normative study found that 30 items of a group of 38 initially proposed (derived from the work of Machover (1949) and Hammer (1958) and the author's own clinical experience) have a clinical validity (Koppitz, 2004). In general, emotional indicators do not show a direct correlation with any objective scale (different from the case of developmental items with IQ); nevertheless they have been highlighted as a possible tool in multiple stressful situations, including psychiatric upsets or sexual abuse and some consider their usefulness in screening for anxiety and depression and even as a tool in the initial pediatric consultation (Skybo, Ryan-Wenger, & Su, 2007; Sturner, Rothbaum, Visintainer, & Wolfer, 1980; Tielsch & Allen, 2005).

Even so, Catte and Cox (1999) are emphatic that the interpretation of the emotional items should be done with caution. They emphasize that despite the statistically greater number of indicators in the drawings of children with some emotional disturbances, the differences between the drawings of emotionally affected and well-adapted children are not sufficiently significant to be used clinically. It is more important to analyze how the items are integrated into the drawing, their occurrence in several drawings separated in time, and compare the findings with additional psychological tests as well as the children's own commentaries about the drawing. It is essential as well, to take into account potential cultural differences before diagnosis (Colom et al., 2007; Skybo et al., 2007).

Notwithstanding that the Human figure drawing test is widely used in Colombia and has been used in previous studies (Aptekar, 1989; González, 1982; Pérez-Olmos, Pinzón, Gonzalez-Reyes, & Sánchez-Molano, 2005), there is no validation or standardization of the test in this context. The aim of this study was to evaluate whether the normative values and parameters are valid in a population geographically, linguistically and culturally different from that of Koppitz's (2004) original work.

Methods

Participants

A preliminary group of 3802 children between 5 and 12 years old who had been suspected by parents or teachers of some neurological disturbances was studied. This non-probabilistic cross sectional sample was derived from a previous analysis of the prevalence of pediatric neurological diseases in an overall population of about 10,500 from Bogotá schools. This group was studied with a battery of neuropsychological tests selected for the purpose of this investigation, composed of: screening checklist for TDAH of the DSM IV (Pineda et al., 1999; Pineda et al., 2001), Test of Visual Motor Integration VMI (Beery, Buktenica, & Beery, 2004), BADYG differential and general aptitude test (Yuste Herranz, 1998), and a clinical evaluation by a neurologist, occupational therapist, and audiologist.

According to the results of the tests and the clinical evaluations, a subgroup of 939 children was identified as "with disorders". A random sample of the children of the same age and sex with normal performances constituted a control group of 1481 designated "without disorders". The overall group on which this analysis is based is thus 2458 school children, whom we classified according to sex, age, and with disorder/without disorder (Table 1). An uncorrected Pearson's Chi –squared test was used to evaluate the homogeneity of the sample; there were no significant differences between groups when evaluated for age, sex, disturbance, and type of school attended.

Sample size

The calculation of the sample size for this group was carried out by the hypothesis method for a proportion of a population for boys and girls in each grade between 5 and 12 years, based on the following criteria: variability measured by the variance by estimators of the proportions, taking as interval the minimum and maximum value of the Koppitz proportions and as a reference value to evaluate the hypothesis of goodness of fit, the maximum sample size. The minimum expected difference was made based on the difference in the value of the normal parameter (null hypothesis) and the expected value according to the null hypothesis ($\partial = \left| P_o - P_a \right|$), which was .07 (7%). For the estimation processes, the relative precision of the estimators and the relative standard error (er) were taken into account. This estimation precision indicator was defined as the quotient between the standard error and the estimation obtained. An er ≤ 20% was expected to be considered a precise estimator with a 95% confiability and a power of 83%. There was an adjustment of 10% for the expected losses.

Instruments

In this study we used the Human figure drawing *Test* designed by Elizabeth Koppitz (2004), as a simplification of the test initially proposed by Goodenough (1964), which has been used widely in several countries. Then main characteristics evaluated with the Koppitz test are: A set of items mostly related to the level of mental maturity of the child without taking into account school level or artistic aptitude, denoted "Developmental Items"; and a series of characteristics or attributes of the drawings which correspond to attitudes, fears or worries denoted "Emotional Indicators". In this author's study 30 Developmental Items were selected for evaluation in 1856 drawings with the purpose of analyzing the frequency of appearance according to age (5-12 years) and to gender. According to the percentage found, each item was classified in one of four categories: Expected (86-100%), Common (51-85%), Fairly Common (16-50%), and Exceptional (0-15%). It was proposed that the absence of an expected item indicated immaturity, developmental delay or cognitive disorder. It was considered that the Common and Fairly Common

Table 1
Relationships among age, gender, and presence/absence of disorders

Age group	Gender	Without disorder		With disorder		Total	
		N°	%	N°	%	N°	%
5 years	M	84	5.7	62	6.6	146	6.0
	F	74	5.0	41	4.4	115	4.8
6 years	M	120	8.1	70	7.5	190	7.9
	F	80	5.4	50	5.3	130	5.4
7 years	M	137*	9.3	56	6.0	193	8.0
	F	80	5.4	64	6.8	144	6.0
8 years	M	128	8.6	86	9.2	214	8.8
	F	96	6.5	62	6.6	158	6.5
9 years	M	118	8.0	76	8.1	194	8.0
	F	116	7.8	72	7.7	188	7.8
10 years	M	107	7.2	75	8.0	182	7.5
	F	109	7.4	60	6.4	169	7.0
11 years	M	76	5.1	60	6.4	136	5.6
	F	76	5.1	49	5.2	125	5.2
12 years	M	45	3.0	34	3.6	79	3.3
	F	35	2.4	22	2.3	57	2.4
Total		1481		939		2420	

* p = .003

categories were not important for the diagnosis and that the final category, Exceptional, was important as a potential indicator of above-average mental maturity.

Each child was asked for a drawing according to Koppitz's instruction (2004). The evaluator gave the following order: "Please draw a whole person on this sheet of paper. It can be any person you want to draw, as long as it is a whole person, and not a cartoon or a stick figure." Each child was given a pencil, an eraser and a piece of letter-size paper. The questions that arose from the children were answered vaguely.

The author's hypothesis was that the scores obtained with the test can be considered equivalent to IQ ranges. These results correlated significantly with the scores obtained in different test and formal IQ percentiles (Groves & Fried, 1991). This validity of the HFD analysis to estimate intelligence quotient or as an approximate measure of a child's intelligence proposed initially by Koppitz (2004) has been corroborated in several studies in which the test has been used as part of children's neuropsychological assessment (Abell et al., 1996; Brito et al., 1998; Rae & Hyland, 2001). Abell's (1994) study shows a significant correlation between the HFD score analyzed with Koppitz's and Goodenough's (1964) systems with the IQ scores using specific tests like WISC-R or Stanford-Binet. As a first step in evaluating validity, an inter-scorer reliability must be made. (Abell et al., 1996). Hyland and Rae (2001) carried out a study with the test proposed by Koppitz(2004) and found a high inter-observer concordance.

Data analysis

Drawings were evaluated using the Koppitz test parameters. First, four evaluators were trained to score the drawings. Then they evaluated a random subsample of 347 drawings as a pilot study, to analyze inter-observers concordance for each of the 30 developmental and 30 emotional items, applying the unweighted Kappa coefficient and a confidence interval of 95%.

After scoring all the drawings, the validity of the test was assessed by an adjusted goodness of fit test for each developmental item, relating Koppitz's (2004) results with the findings of the general sample by direct calculation of exact binomial probabilities or binomial approximation of the normal distribution for one sample ($n > 100$). Then, using the same methodology, the Koppitz table and the general sample were analyzed with the subgroups of children classified as "with disorder" or "without disorder" to evaluate whether there might be significant differences between them. Adjustment for the multiple hypothesis in the study group of 5-12 year olds of both sexes, (16 groups for each item of the human figure) was done using the Bonferroni adjustment, in which each individual hypothesis increases the significance level from 5% ($p < .05$) to $p = .55$. Thus the equivalent Bonferroni-adjusted significance level, instead of 5%, is $p = .0031$, or $p \leq .003$.

For the emotional indicators, a frequency analysis of the appearance of each item has been used and the results of the general sample with those of the subgroups were analyzed for possible differences.

Results

From the initial total sample of 2458 children, 38 drawings were excluded for the following reasons: absence of the drawing, one of the psychological tests missing or insufficient personal information. These lost data were analyzed by sex, grade level, and disturbance category and no significant reduction was found in the number of drawings needed for the analysis in any of these categories; the numbers were within the expected losses and were adjusted for in the design of the sample.

The study sample comprised 2420 children, 1086 girls (44.9%) and 1334 boys (55.1%) with an average age of 8.27 +/- 2.04 years (range 5-12 years). 1265 attended public schools and 1155 attended private schools (or public schools in concession to private education enterprises). There was no difference in the presence or absence of disorders with relation to this parameter ($p = .44$).

The statistical analysis of the evaluator consistency was initially less than the minimal acceptable standards (Kappa coefficient of .80) in some of the developmental items and in all of the emotional items. Therefore, the drawings with the greatest number of discrepancies were selected and evaluators re-scored them; at the same time, weekly meetings to discuss the criteria for each item of the test were carried out. Later on, another concordance analysis in a sample of 25 drawings was done and there was an improvement in Kappa indices to good or to very good in 83% of the developmental items and in 70% of the emotional items. Only three developmental items and five emotional items had Kappa values less than 40%. Nevertheless, with only one exception, all items had concordance scores greater than 80%, which was considered adequate to begin the scoring of the total sample, with weekly team meetings to discuss cases in which there were ambiguities in the score and collectively define them more precisely. The Colombian sample and the normative Koppitz sample were compared with reference to each item by age group and gender. An overall analysis of all individual items and independently for age group and gender yielded strong and significant Spearman rank correlation coefficients ($rs > .80$; $p < .001$) in the majority of the groups; two groups were slightly lower with values of .765 and .799 (Table 2).

There were significant differences in the percentages of occurrence of developmental items in the Colombian and Koppitz populations (Appendices A and B). There were some small but significant differences between Colombian children classified as "with disorder" or "without-disorder", but we felt these were not large enough to account for the former differences.

Table 2
Spearman rank correlation coefficients between age group and gender

Age (years)	Girls	Boys
5	.813	.855
6	.800	.838
7	.855	.888
8	.813	.878
9	.840	.876
10	.846	.849
11	.799	.856
12	.765	.838

Note: p < .001 for all correlation coefficients.

Taking into account the assignment of categories and percentages of occurrence of items in the population described by Dr. Koppitz, a new table of data and qualification is proposed according to the results obtained from the sample of the present study (Appendices C and D).

For the normative study of emotional items, two of the three premises proposed by Koppitz were considered: occurrence in 15% or less of studied individuals and no increase with age. The third premise, (there must be clinical validity in order to discriminate children with and without emotional problems), was not taken into account since there was no psycho-behavioral study of the children in the sample. Differences between general, "with disorder" and "without disorder" groups were analyzed. Homogeneity was found, with some small exceptions that did not interfere with the general scoring or alter the inclusion of each item as an emotional indicator (Appendices E and F).

In both boys and girls there were four items that exceeded the proposed limits: short arms, Legs pressed together, no nose, and no neck; for this reason these items were excluded from the final table. Other items occurred at different ages from the Koppitz group (Table 3). "Arms clinging to body" behaved as an emotional indicator before 12 years of age, although in the group of nine-year old boys there was a percentage greater than 16.

Discussion

Since drawing is an activity that usually delights children, it provides an easily-applied study method for evaluating skills or emotions. Specifically, the Human figure drawing Test has frequently been used for clinical psychological evaluation or to study learning disabilities. Its use can be extended as a screening tool in primary care consultations or at school, since it does not involve complicated procedures or techniques. Nevertheless, baseline studies contextualizing the test are necessary, since results can vary depending on the population under study (Merino Soto et al., 2007).

The differences found in Koppitz's (2004) normative study and the present sample might be due to a variety of factors. The following aspects were taken into account when the validation was considered: the evaluation team consisted in a group of professionals and medical students trained by an experienced psychologist in the application of the test. By the end of an initial period for clarifying criteria, an inter-observer correlation coefficient of 80% was achieved, similar to others studies (Williams, Fall, Eaves, & Woods-Groves, 2006). Lack of precision in the criteria for some of the items (for example "good proportions") and resulting differences in interpretation can probably account for some of the remaining inconsistencies.

On the other hand, there might be some variations attributable to ethnic or cultural differences between the Colombian children evaluated and the white North American children characterized in Koppitz's (2004) study. Although not considered in Koppitz's (2004) original work, it has been demonstrated that those differences, are important in the interpretation of intelligence or developmental tests (Catte & Cox, 1999). In addition, our results and Merino Soto reports (2007) could be explained by the Flynn effect (Flynn, 2007), which consider changes in cognitive skills, across time, influenced by social, cultural, and environmental factors. As a result, this is a hypothesis that can be the basis for future studies.

We agree with Merino Soto (2007) that other condition which can explain the variations, is that the first study (Koppitz) was carried out and normalized at the end of the 1960's and the other two in the first decade of the 21st century. Television, internet access, and various socio-cultural situations are clear and decisive influences on a child's development and, concomitantly, in the human drawing figure and its evolution (Colom et al., 2007; Flores-Mendoza et al., 2005). Tanaka (2004) shows that even children's physical characteristics can affect their drawing and according to statistics, the height and weight of children has increased in recent decades.

Table 3
Modifications in the age of occurrence of emotional indicators

Emotional Indicators in the HFD	Koppitz		This Sample	
	Boys	Girls	Boys	Girls
Poor integration of parts	7	6	8	8
Shading of Face	5	5	5	5
Shading of body and limbs	9	8	5	5
Shading of hands and neck	8	7	5	5
Gross asymmetry of limbs	5	5	5	5
Slanting figure	5	5	8	8
Tiny figure	5	5	6	6
Big figure	8	8	5	5
Transparencies	5	5	5	5
Tiny head	5	5	5	5
Crossed or diverted Eyes	5	5	5	5
Teeth	5	5	5	5
Long arms	5	5	5	5
Arms clinging to body	5	5	<12	<12
Big hands	5	5	5	5
Hands cut off	5	5	8	8
Genitals	5	5	5	5
Monster or grotesque figure	5	5	5	5
Three or more figures Spontaneously drawn	5	5	5	5
Clouds	5	5	5	5
No eyes	5	5	5	5
No mouth	5	5	5	5
No body	5	5	5	5
No arms	6	5	5	5
No legs	5	5	5	5
No feet	9	7	6	6
Legs pressed together	5	5	EXCLUDED	
Short arms	5	5	EXCLUDED	
No Nose	6	5	EXCLUDED	
No Neck	10	9	EXCLUDED	

Overall, children develop their execution of the human drawing figure, including universal items of the structure of the human body and successively add specific items as they advance in their recognition of themselves (Merino Soto et al., 2007). There are elements that count in the scoring that are the product of the environment in which the child lives (dresses, accessories, hair, etc.) and that vary among cultures, which could be responsible for some differences found (Colom et al., 2007; Merino Soto et al., 2007).

In this sense, the results of the present study, as well as those carried out in London by Catte and Fox (1999) and in Peru by Merino Soto (2007) corroborate that the use of the Human figure drawing Test, as an important evaluating tool for children, should be interpreted with reference to current and locally validated scoring parameters.

It is necessary to mention as well, the possible methodological differences in the conformation of Koppitz's normative sample and this one: the former included all the boys and girls in selected public schools from all socioeconomic strata while ours evaluated boys and girls from low and middle-class public and private schools. In both studies, convenience samples were used: in the original study, the entire school group comprised the sample; the present one is based on a group identified with learning or attention disorders using specific tests, and another without these disorders selected by random sampling in a proportion of 1:1.5. Although the distribution by sex and age was similar to Koppitz's (2004), it would be necessary to know the prevalence of these problems in the author's group to confirm that the samples were truly

similar. It is worth mentioning that all the children included in our study are in regular schools and had undergone the Human figure drawing Test before the diagnosis of their learning and attention difficulties; therefore all of them might have been included in the sample "without disorder". Moreover, according to these evaluations there were no children with severe learning or attention disorders or with incapacitating neurological syndromes.

When we first found out that our results were different from Koppitz's (2004), we decided to evaluate whether or not the results obtained from the children with and without disorders would account for this. We found that there were no significant differences between the subgroups in the percentages of the appearance of developmental items. In the case of the emotional items we did the same comparison with the total sample and the groups with and without disorders. There were some small disparities, but there were no overall significant differences between the subgroups and the general sample.

We present a new table of normalized data based on the results of this study. This would result in a new index following the steps described by Koppitz (2004) to establish a score for mental maturity. Her original index of intellectual function was found to be highly correlated with intellectual quotients as measured by the WISC test.

Some of the emotional items were present at different ages in relation to Koppitz's normalization, so they have been modified; others were withdrawn because the frequency exceeded the established percentage. As a result, it would be necessary to verify the criterion of clinical validity through an analysis of a group of normal and psychologically disturbed children to determine the usefulness of these emotional items' modifications. Catte and Cox (1999) described in a similar way their modifications in emotional items: only 16 items remained unchanged; five (shading of the face, shading of body and limbs, big figure, short arms, and Legs pressed together) had unusual distributions and were considered not valid, two indicators (teeth and omission of the neck) did not fulfill the criteria in boys and so were only considered in girls; and eight items changed the age at which they could be considered as indicators.

Conclusions

The Human figure drawing test continues to be a basic evaluation instrument because of the information it provides with regards to maturity and emotional states, as well as the natural tendency of children to draw. This easy to apply test can be a useful tool for teachers and professionals of child development to screen children suspected of maturational, emotional, attention, or learning problems. Nevertheless, several different socio-cultural and ethnic factors influence the evolution of specific items in the human drawing figure in a child. It is therefore important that clinicians and

investigators keep in mind the results presented, and carry out a local validation in order to have appropriate normative data, since the parameters set by Dr. Koppitz may not be valid at the time of evaluating our children

These local reference scores are of great importance for perceiving real differences between normal and abnormal. In the present work we propose new tables that will serve as a basis for analysis of potential correlations between the human figure drawing test and other intelligence, learning, and developmental tests.

Even so, it is important to emphasize that interpretation must be done cautiously, due to the large subjective component that exists in the scoring of Koppitz's criteria.

It is also important to continue working in this area in order to validate clinically the potential association among the findings of the human figure drawing test and other specific tests of cognitive, linguistic, and learning skills, as well as those directly related to affective aspects of neuropsychological development.

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APPENDIX A

RESULTS OF THE VALIDATION STUDY OF DEVELOPMENTAL ITEMS IN BOYS FROM THE HUMAN FIGURE DRAWING TEST ACCORDING TO KOPPITZ (K) AND THIS SAMPLE (HFD).

Developmental items	5 years			6 years			7 years			8 years			9 years			10 years			11 years			12 years		
	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p
n	128	146		131	190		134	193		138	214		134	194		109	182		105	136		52	79	
Head	100	97	1	100	100	1	100	100	1	100	99.5	1	100	99	1	100	100	1	100	100	1	100	100	1
Eyes	98	95	.009	99	98	.124	99	97	.046	99	98	.168	100	99	1	100	99	1	100	100	1	100	100	1
Nose	87	59	.000	91	79	.000	91	73	.000	91	80	.000	100	82	.000	97	87	.000	97	90	.000	100	89	.000
Mouth	92	88	.044	97	95	.062	97	96	.359	95	98	.016	99	97	.014	98	97	.301	97	99	.083	100	100	.999
Body	89	93	.064	97	96	.345	98	97	.192	99	99	.361	100	98	.000	100	99	.000	99	99	.156	100	97	.000
Legs	97	92	.005	98	98	.528	99	98	.13	97	99	.043	99	99	.579	99	100	.161	98	96	.138	100	95	.000
Arms	84	86	.264	95	96	.262	96	98	.048	96	98	.068	100	98	.000	98	98	.505	99	98	.156	100	95	.000
Feet	73	73	.512	80	90	.025	87	85	.229	86	94	.000	90	90	.176	96	98	.144	95	88	.001	94	91	.195
Fingers	61	61	.527	60	80	.000	86	95	.000	96	95	.354	98	97	.195	97	96	.183	99	95	.000	100	95	.000
Hair	54	62	.026	72	83	.000	84	93	.000	93	95	.177	98	98	.545	99	99	.544	97	94	.053	100	94	.000
Arms in two dimensions	48	64	.000	62	90	.000	76	87	.000	78	84	.016	81	93	.000	89	92	.141	88	96	.002	90	90	.186
Legs in two dimensions	37	62	.000	70	90	.000	57	65	.017	71	75	.097	78	84	.023	86	79	.007	93	82	.000	94	84	.001
Arms pointing downwards	21	32	.001	35	55	.000	55	63	.013	60	70	.000	81	74	.008	89	74	.000	93	76	.000	98	78	.000
Neck	26	36	.006	27	59	.000	76	78	.263	72	82	.000	81	87	.025	84	86	.304	83	77	.050	94	84	.001
Hands	33	36	.222	42	48	.058	50	63	.001	55	70	.000	70	70	.186	58	76	.000	69	80	.002	56	71	.005
Ears	25	20	.088	33	22	.001	42	27	.000	40	20	.000	52	60	.018	54	64	.005	79	64	.000	77	84	.103
Eyebrows or eyelashes	21	7	.000	28	12	.000	37	19	.000	37	21	.000	59	28	.000	59	35	.000	67	29	.000	65	29	.000
Pupils	11	36	.000	22	34	.001	38	40	.267	38	51	.000	69	92	.000	52	40	.001	54	41	.002	58	41	.001
Feet in two dimensions	8	67	.000	22	86	.000	43	84	.000	50	95	.000	56	59	.199	51	63	.001	57	68	.007	58	56	.380
Correct number of fingers	13	5	.001	26	9	.000	38	12	.000	40	20	.000	50	24	.000	72	98	.000	74	88	.000	75	90	.001
Arms correctly attached to shoulders	3	8	.005	14	22	.002	24	39	.000	40	50	.014	42	34	.009	50	20	.000	55	21	.000	46	25	.000
Good proportions	2	82	.000	5	95	.000	23	95	.000	26	96	.000	31	96	.000	42	99	.000	38	98	.000	50	97	.000
Nostrils	2	3	.335	5	7	.096	15	0	.000	25	2	.000	18	5	.000	29	3	.000	29	3	.000	29	0	.000
Profile	1	2	.181	3	1	.074	10	0	.000	15	6	.000	15	7	.001	28	9	.000	16	15	.394	21	14	.075
Elbows	1	1	.571	6	2	.010	4	5	.368	11	4	.000	15	5	.011	23	8	.000	20	10	.000	35	9	.000
Two lips	2	0	.052	2	1	.105	6	1	.001	8	2	.000	8	4	.001	15	8	.002	17	7	.001	19	5	.000
Knees	0	0	1	3	1	.074	1	0	.144	4	1	.027	10	0	.000	10	0	.000	11	0	.000	15	1	.000
Clothing: 0–1 items	90	89	.389	70	83	.000	46	70	.000	37	74	.000	32	56	.000	30	52	.000	23	43	.000	4	52	.000
Clothing: 2–3 items	9	11	.241	25	14	.000	31	25	.052	37	22	.000	37	37	.486	27	41	.000	39	50	.006	46	43	.340
Clothing: 4 or more items	1	0	.231	5	3	.083	23	5	.000	26	5	.000	31	8	.000	43	7	.000	38	7	.000	50	5	.000

APPENDIX B

RESULTS OF THE VALIDATION STUDY OF THE DEVELOPMENTAL ITEMS IN GIRLS FROM THE HUMAN FIGURE DRAWING TEST ACCORDING TO KOPPITZ (K) AND THIS SAMPLE (HFD).

Developmental items	5 years			6 years			7 years			8 years			9 years			10 years			11 years			12 years		
	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p	K	HFD	p
n	128	115		131	130		134	144		138	158		134	188		109	169		105	125		52	57	
Head	100	100	1	100	100	1	100	100	1	100	100	1	99	100	1	100	100	1	100	100	1	100	100	1
Eyes	100	100	1	100	100	1	100	100	1	100	98	1	99	100	1	100	100	1	98	100	.080	100	100	1
Nose	90	70	.000	95	63	.000	92	74	.000	92	72	.000	93	78	.000	95	80	.000	97	85	.000	98	82	.003
Mouth	91	96	.047	100	95	.000	100	100	1	98	97	.211	99	98	.291	99	99	.505	97	99	.108	98	100	.316
Body	91	97	.006	94	97	.104	100	100	1	99	99	.530	99	99	.019	100	99	1	100	100	1	100	98	1
Legs	97	92	.008	93	98	.005	99	96	.003	94	99	.003	99	98	.516	95	97	.147	96	98	.120	96	98	.329
Arms	91	90	.340	98	95	.016	99	95	.001	100	100	1	99	98	1	100	98	1	100	99	1	100	100	1
Feet	85	90	.104	91	95	.046	94	96	.233	97	97	.906	99	97	.012	98	99	.341	96	98	.120	96	100	.098
fingers	75	77	.400	89	86	.183	94	91	.093	90	100	.008	99	97	.012	94	96	.114	96	100	.006	95	98	.25
Hair	2	70	.000	77	85	.021	91	81	.003	96	89	.004	99	87	.000	99	88	.000	100	86	.000	100	93	.000
Arms in two dimensions	59	59	.529	68	71	.283	86	81	.043	86	88	.280	92	87	.016	92	85	.001	96	86	.001	96	88	.008
Legs in two dimensions	46	66	.000	67	84	.000	71	69	.370	65	81	.000	93	67	.000	94	66	.000	96	68	.000	100	70	.000
Arms pointing downwards	25	37	.004	37	60	.000	62	56	.092	76	65	.001	76	79	.169	94	72	.000	96	82	.000	100	86	.004
Neck	39	47	.050	44	55	.010	59	54	.137	73	70	.192	78	73	.056	71	48	.000	85	50	.000	93	54	.000
Hands	33	24	.028	48	27	.000	57	54	.220	59	74	.000	60	70	.001	63	76	.000	72	79	.042	73	79	.196
Ears	19	37	.000	34	37	.269	60	30	.000	70	40	.000	79	49	.000	74	43	.000	84	49	.000	76	53	.001
Eyebrows or eyelashes	29	30	.482	38	55	.000	51	41	.010	59	45	.001	74	51	.000	78	59	.000	67	57	.011	76	58	.002
Pupils	29	11	.000	19	8	.001	18	8	.000	16	6	.000	53	95	.000	65	95	.000	70	100	.000	75	95	.000
Feet in two dimensions	18	3	.000	24	6	.000	38	15	.000	44	12	.000	52	49	.221	82	83	.357	77	86	.012	71	86	.007
Correct number of fingers	7	71	.000	19	82	.000	34	85	.000	33	94	.000	19	13	.015	19	14	.042	61	99	.000	60	100	.000
Arms correctly attached to shoulders	2	93	.000	2	95	.000	27	27	.523	33	46	.001	46	16	.000	82	22	.000	38	29	.020	27	21	.196
Good proportions	6	5	.460	14	5	.000	17	92	.000	19	98	.000	26	98	.000	43	98	.000	24	20	.173	20	20	.272
Nostrils	4	3	.320	5	5	.475	20	0	.000	21	7	.000	26	11	.000	17	8	.000	19	11	.013	25	4	.000
Profile	0	3	.001	7	2	.005	5	3	.269	17	2	.000	28	4	.000	21	7	.000	25	11	.000	27	11	.002
Elbows	1	1	.680	7	2	.017	11	1	.000	8	0	.000	19	11	.001	24	8	.000	40	10	.000	45	12	.000
Two lips	5	8	.123	11	25	.000	7	4	.058	5	6	.268	13	1	.000	15	1	1.000	9	0	.000	16	0	.000
Knees	2	0	.098	2	1	.264	1	1	.577	3	2	.299	4	4	.480	5	3	.147	12	6	.013	9	5	.234
Clothing: 0-1 items	70	89	.011	52	69	.000	35	62	.000	27	50	.000	16	38	.000	15	30	.000	14	30	.000	9	21	.004
Clothing: 2-3 items	27	11	.019	40	29	.007	42	34	.031	46	45	.426	40	51	.001	35	50	.000	30	54	.000	25	53	.000
Clothing: 4 or more items	3	0	.326	8	2	.001	23	4	.000	27	5	.000	44	11	.000	50	20	.000	56	16	.000	66	26	.000

APPENDIX C

PERCENTAGES OF BOYS THAT INCLUDE EACH DEVELOPMENTAL ITEM IN THE HFD, ACCORDING TO THE RESULTS OF THIS STUDY.

5 years		6 years		7 years		8 years		9 years		10 years		11 years		12 years	
Expected		*Expected*		*Expected*		*Expected*		*Expected*		*Expected*		*Expected*		*Expected*	
Head	97	Head	100	Head	100	Head	100	Head	99	Head	100	Head	100	Head	100
Eyes	95	Eyes	98	Eyes	97	Eyes	98	Eyes	99	Eyes	99	Eyes	100	Eyes	100
Body	93	Body	96	Body	97	Body	99	Body	98	Body	99	Body	98	Body	97
Legs	92	Legs	98	Legs	98	Legs	99	Legs	99	Legs	100	Legs	96	Legs	95
Mouth	88	Mouth	95	Mouth	96	Mouth	98	Mouth	97	Mouth	97	Mouth	99	Mouth	100
Arms	86	Arms	96	Arms	98	Arms	98	Arms	98	Arms	98	Arms	98	Arms	95
Common		Feet	86	2D Arms	95	Feet	98	Feet	92	Feet	98	Feet	88	Feet	91
Feet	73	2D Feet	86	2D Legs	93	2D Feet	95	2D Feet	92	2D Feet	98	2D Feet	88	2D Feet	90
2D Feet	67	2D Arms	90	Hair	87	2D Arms	95	2D Arms	97	2D Arms	96	2D Arms	95	2D Arms	95
2D Arms	64	2D Legs	88	***Common***		2D Legs	95	2D Legs	98	2D Legs	99	2D Legs	94	2D Legs	94
2D Legs	62	***Common***		Feet	85	***Common***		Hair	93	Hair	92	Hair	96	Hair	94
Hair	62	Hair	83	2D Feet	84	Hair	84	Fingers	87	Nose	87	Nose	90	Nose	89
Fingers	61	Fingers	78	Fingers	78	Fingers	82	***Common***		***Common***		***Common***		***Common***	
Nose	59	Nose	79	Nose	73	Nose	80	Nose	82	Fingers	86	Fingers	77	Fingers	84
Fairly common		Neck	59	Neck	63	Neck	72	Neck	74	Neck	74	Neck	76	Neck	78
Neck	36	APD	55	APD	65	APD	75	APD	84	APD	79	APD	82	APD	84
APD	32	*Fairly common*		Hands	63	Hands	70	Hands	73	Hands	76	Hands	80	Hands	71
Hands	36	Hands	48	*Fairly common*		Pupils	51	Pupils	59	Pupils	63	Pupils	68	Pupils	56
Pupils	36	Pupils	34	Pupils	40	*Fairly common*		ACAS	60	ACAS	64	ACAS	64	ACAS	65
Ears	20	Ears	22	Ears	27	Ears	19	*Fairly common*		*Fairly common*		*Fairly common*		*Fairly common*	
Exceptional		ACAS	22	ACAS	39	ACAS	48	Ears	28	Ears	35	Ears	29	Ears.	29
ACAS	8	*Exceptional*		Eyebrows	19	Eyebrows	21	Eyebrows	34	Eyebrows	40	Eyebrows	41	Eyebrows	41
Eyebrows	7	Eyebrows	12	*Exceptional*		CNF	21	CNF	24	CNF	20	CNF	21	CNF	25
CNF	5	CNF	9	CNF	12	*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*	
Nostrils	3	Nostrils	7	Nostrils	3	Nostrils	6	Nostrils	7	Nostrils	9	Nostrils	15	Nostrils	14
Profile	2	Profile	1	Profile	0	Profile	2	Profile	5	Profile	3	Profile	3	Profile	0
Elbows	1	Elbows	2	Elbows	5	Elbows	4	Elbows	5	Elbows	8	Elbows	5	Elbows	9
Two lips	0	Two lips	1	Two lips	1	Two lips	2	Two lips	4	Two lips	8	Two lips	7	Two lips	5
Knees	0	Knees	1	Knees	0	Knees	1	Knees	2	Knees	0	Knees	0	Knees	1
Clothing		*Clothing*		*Clothing*		*Clothing*		*Clothing*		*Clothing*		*Clothing*		*Clothing*	
0-1 item	89	0-1 item	83	0-1 item	69	0-1 item	73	0-1 item	55	0-1 item	52	0-1 item	42	0-1 item	52
Expected		*Common*		*Common*		*Common*		*Common*		*Common*		*Fairly common*		*Common*	
2-3 items	11	2-3 items	14	2-3 items	25	2-3 items	22	2-3 items	37	2-3 items	41	2-3 items	50	2-3 items	43
Exceptional		*Exceptional*		*Fairly common*		*Fairly common*		*Fairly common*		*Fairly common*		*Fairly common*		*Fairly common*	
4 items	0	4 items	3	4 items	5	4 items	5	4 items	8	4 items	7	4 items	8	4 items	5
Exceptional		*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*	

APD: Arms pointing downwards; ACAS: Arms correctly attached to shoulders; CNF: Correct number of fingers; 2D Feet: feet in tywo dimensions; 2D Arm: arms in two dimensions; 2D legs: legs in two dimensions; 0-1 item: clothing 0-1 items; 2-3 items: clothing 2-3 items; 4 items: clothing 4 or more items

APPENDIX D

PERCENTAGES OF GIRLS THAT INCLUDE EACH DEVELOPMENTAL ITEM IN THE HFD, ACCORDING TO THE RESULTS OF THIS STUDY.

5 years		6 years		7 years		8 years		9 years		10 years		11 years		12 years	
Expected		*Expected*		*Expected*		*Expected*		*Expected*		*Expected*		*Expected*		*Expected*	
Head	99	Head	100	Head	99	Head	100	Head	100	Head	100	Head	100	Head	100
Eyes	99	Eyes	98	Eyes	100	Eyes	98	Eyes	100	Eyes	100	Eyes	100	Eyes	100
Mouth	96	Mouth	95	Mouth	100	Mouth	97	Mouth	98	Mouth	99	Mouth	99	Mouth	100
Body	97	Body	97	Body	98	Body	99	Body	99	Body	99	Body	100	Body	98
Legs	92	Legs	98	Legs	96	Legs	99	Legs	98	Legs	97	Legs	98	Legs	98
Arms	90	Arms	95	Arms	95	Arms	99	Arms	98	Arms	98	Arms	99	Arms	100
Hair	90	Hair	95	Hair	96	Hair	97	Hair	97	Hair	99	Hair	98	Hair	100
Common		Feet	86	Feet	91	Feet	96	Feet	97	Feet	96	Feet	100	Feet	98
Feet	77	*Common*		*Common*		2D Feet.	94	2D Feet	95	2D Feet	95	2D Feet	98	2D Feet	95
2D Feet	71	2D Feet	82	2D Feet	85	2D Arms	89	2D Arms	87	2D Arms	88	2D Arms	86	2D Arms	93
2D Arms	70	2D Arms	85	2D Arms	81	2D Legs	88	2D Legs.	87	*Common*		2D Legs	86	2D Legs	88
2D Legs	66	2D Legs	84	2D Legs.	81	*Common*		*Common*		2D Legs	85	Fingers	86	Fingers	86
Fingers	59	Fingers	71	Fingers	69	Fingers	81	Fingers	79	Fingers	83	*Common*		APD	86
Nose	65	Nose	63	Nose	74	Nose	72	Nose	78	Nose	80	Nose	85	*Common*	
Fairly common		APD	55	APD	54	APD	70	APD	73	APD	72	APD	82	Nose	82
APD	30	Hands	55	Hands	53	Hands	74	Hands	71	Hands	76	Hands	79	Hands	79
Hands	47	Neck	60	Neck	56	Neck	65	Neck	67	Neck	66	Neck	68	Neck	70
Neck	37	*Fairly common*		*Fairly common*		*Fairly common*		Pupils	51	Pupils	59	Pupils	57	Pupils	58
Pupils	37	Pupils	37	Pupils	41	Pupils	45	*Fairly common*		*Fairly common*		*Fairly common*		Eyebrows	53
Eyebrows	24	Eyebrows	27	Eyebrows	33	Eyebrows	45	Eyebrows	49	Eyebrows	43	Eyebrows	48	ACAS	54
Exceptional		ACAS	25	ACAS	27	ACAS	46	ACAS	49	ACAS	48	ACAS	50	*Fairly common*	
ACAS	8	*Exceptional*		*Exceptional*		*Exceptional*		CNF	16	CNF	22	CNF	29	CNF	21
CNF	3	CNF	6	CNF	15	CNF	12	*Exceptional*		*Exceptional*		Ears	20	Ears	16
Ears	11	Ears	8	Ears	8	Ears	6	Ears	13	Ears	14	*Exceptional*		*Exceptional*	
Nostrils	5	Nostrils	5	Nostrils	4	Nostrils	7	Nostrils	11	Nostrils	8	Nostrils	11	Nostrils	4
Two lips	3	Two lips	5	Two lips	3	Two lips	2	Two lips	4	Two lips	7	Two lips	11	Two lips	11
Elbows	3	Elbows	2	Elbows	3	Elbows	6	Elbows	11	Elbows	8	Elbows	10	Elbows	12
Profile	1	Profile	2	Profile	1	Profile	0	Profile	1	Profile	1	Profile	0	Profile	0
Knees	0	Knees	1	Knees	1	Knees	2	Knees	4	Knees	3	Knees	6	Knees	5
Clothing		*Clothing*		*Clothing*		*Clothing*		*Clothing*		*Clothing*		*Clothing*		*Clothing*	
0-1 item	79	0-1 item	69	0-1 item	61	0-1 item	50	0.1 item	38	0-1 item	30	0.1 item	30	0-1 item	21
Common		*Common*		*Common*		*Fairly common*		*Fairly common*		*Fairly common*		*Fairly common*		*Fairly common*	
2-3 items	18	2-3 items	29	2-3 items	34	2-3 items	45	2.3 items	51	2-3 items	50	2-3 items	54	2-3 items	53
Fairly common		*Fairly common*		*Fairly common*		*Fairly common*		*Common*		*Fairly common*		*Common*		*Common*	
4 items	3	4 items	2	4 items	5	4 items	5	4 items	11	4 items	20	4 items	16	4 items	26
Exceptional		*Exceptional*		*Exceptional*		*Exceptional*		*Exceptional*		*Fairly common*		*Fairly common*		*Fairly common*	

APD: Arms pointing downwards; ACAS: Arms correctly attached to shoulders; CNF: Correct number of fingers; 2D Feet: feet in tywo dimensions; 2D Arm: arms in two dimensions; 2D legs: legs in two dimensions; 0-1 item: clothing 0-1 items; 2-3 items: clothing 2-3 items; 4 items: clothing 4 or more items.

APPENDIX E

RESULTS OF THE VALIDATION STUDY OF EMOTIONAL ITEMS OF THE HFD TEST IN BOYS BY AGE (YEARS).

Item	5	6	7	8	9	10	11	12
Poor integration of parts	**25.3**	**24.2**	**17.1**	14.0	6.2	8.2	3.7	8.9
Shading of Face	4.8	3.7	9.8	2.8	2.6	2.7	2.2	5.1
Shading of body and limbs	2.1	3.7	3.1	1.4	4.1	4.4	4.4	7.6
Shading of hands and neck	2.7	3.2	2.1	.9	.5	.5	.0	1.3
Gross asymmetry of limbs	5.5	6.8	2.6	.9	.5	1.6	1.5	1.3
Slanting figure	*25.3*	*18.4*		14.0	10.3	7.1	3.7	11.4
Tiny figure	*17.1*	14.7	8.8	9.8	4.6	8.2	8.8	.0
Big figure	2.1	1.6	3.6	4.7	2.6	1.1	1.5	.0
Transparencies	4.1	3.2	1.6	2.3	3.1	3.8	2.2	5.1
Tiny head	1.4	.0	.0	.9	.0	.0	.0	.0
Crossed eyes	1.4	.5	2.6	3.7	4.6	6.0	5.1	5.1
Teeth	2.1	4.2	8.8	7.5	8.2	12.1	8.1	6.3
Short arms		*22.1*	*21.8*	*15.9*	14.4	14.8	8.8	**21.5**
Long arms	2.7	6.3	4.1	7.0	4.1	2.2	2.2	2.5
Arms clinging to body	4.1	3.7	10.4	6.1	**16.5**	11.0	8.8	19.0
Big hands	1.4	1.1	2.1	.0	1.0	.5	1.5	1.3
Hands cut off	**34.9**	**16.8**	**17.1**	14.0	9.3	8.2	8.8	13.9
Legs pressed together	8.2	**15.8**	**3.6**	29.9	38.1	**3.8**	**3.1**	31.6
Genitals	.7	1.1	1.6	1.4	2.1	2.2	.7	3.8
Monster or grotesque figure	.7	.5	2.1	.5	1.5	2.2	.0	.0
Three or more figures Spontaneously drawn	2.7	.0	.0	.0	.0	.5	1.5	.0
Clouds	7.5	8.4	4.1	4.7	4.1	2.2	3.7	1.3
No eyes	5.5	2.1	2.6	2.3	1.0	1.1	.0	.0
No nose	**41.1**	**21.1**	**25.9**	**19.2**	**17.5**	11.5	9.6	12.7
No mouth	12.3	4.7	3.6	1.9	2.6	2.2	.7	.0
No body	6.8	1.6	1.0	.5	1.5	.0	2.2	2.5
No arms	13.7	3.7	1.6	1.4	2.1	1.6	2.2	3.8
No legs	6.8	2.6	2.1	.9	1.0	.0	3.7	5.1
No feet	**25.3**	13.2	15.0	5.6	7.7	2.2	11.8	8.9
No neck	**64**	**38**	**37**	**27**	**24**	**26**	**25**	**19**

APPENDIX F

RESULTS OF THE VALIDATION STUDY OF EMOTIONAL ITEMS OF THE HFD TEST IN GIRLS BY AGE (YEARS).

Item	5	6	7	8	9	10	11	12
Poor integration of parts	**26.1**	**23.1**	**17.4**	13.9	14.9	13.0	11.2	8.8
Shading of Face	1.7	1.5	3.5	2.5	3.7	7.1	4.0	5.3
Shading of body and limbs	1.7	2.3	2.8	1.9	3.2	4.1	1.6	3.5
Shading of hands and neck	.0	.0	.0	1.9	.0	.6	.8	.0
Gross asymmetry of limbs	3.5	1.5	.7	1.9	1.1	.6	.0	.0
Slanting figure	**25.2**	**14.6**	**16.7**	14.6	8.5	6.5	4.8	7.0
Tiny figure	**19.1**	11.5	5.6	7.6	3.7	3.6	4.0	1.8
Big figure	.9	3.8	2.8	.6	.5	1.2	1.6	.0
Transparencies	1.7	1.5	2.8	3.2	3.2	1.2	2.4	1.8
Tiny head	.9		.0	.0	.0	.0	.0	.0
Crossed eyes	1.7	1.5	2.1	4.4	3.2	8.3	5.6	5.3
Teeth	3.5	2.3	2.8	3.8	1.1	2.4	1.6	3.5
Short arms	**27.8**	**36.2**	**34.7**	**31.0**	**26.1**	**16.0**	**17.6**	**15.8**
Long arms	6.1	2.3	2.1	1.3	.0	1.2	.0	1.8
Arms clinging to body	1.7	10.0	10.4	9.5	12.2	13.6	9.6	19.3
Big hands	.9	1.5	.0	.0	.0	.0	.0	.0
Hands cut off	**28.7**	**2.8**	**25.0**	12.0	9.0	8.9	5.6	1.8
Legs pressed together	6.1	13.1	**16.7**	**17.7**	**21.8**	**26.0**	**25.6**	**28.1**
Genitals	2.6	1.5	1.4	.6	.5	2.4	3.2	1.8
Monster or grotesque figure	1.7	.0	.0	.6	.0	.6	.0	.0
Three or more figures Spontaneously drawn	.9	1.5	.7	.0	.0	.0	.0	.0
Clouds	4.3	6.2	6.9	7.6	6.9	7.1	3.2	1.8
No eyes	.9	.8	.0	2.5	.0	.0	.0	1.8
No nose	**33.0**	**36.2**	**25.0**	**27.2**	**2.7**	**19.5**	15.2	**15.8**
No mouth	3.5	4.6	.7	3.2	1.6	1.2	.0	.0
No body	2.6	2.3	1.4	.0	.5	.6	.0	.0
No arms	8.7	4.6	4.9	.6	1.6	1.8	.8	.0
No legs	7.8	2.3	4.2	.6	1.6	1.8	.0	1.8
No feet	**22.6**	13.8	9.0	4.4	3.2	2.4	.0	1.8
No neck	**64.3**	**4.8**	**41.0**	**34.2**	**3.9**	**3.8**	29.6	29.8