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The Development of Gender Identity in Boys with Autistic Spectrum Disorders and in Boys with Mental Retardation

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Abstract

In accordance with the developmental theories, the formation of gender identity is subject to an interactive logic in which biology, social coexistence and culture are considered as an inseparable unit. When studying clinical conditions of multifactorial origin and with specific characteristics it has become essential consider the impact the formation of gender identity, mainly when maintains a direct relationship with the incidence of certain disorders. The purpose of this study was to verify if boys with Autistic Spectrum Disorders (ASD) develop gender identity through the choices of toys and games. The empirical study was carried out on a sample of 99 boys aged four to six years and six months (M=5,24, *DP*=0,80), from cities in the States of São Paulo (66,7%) and Bahia (33,3%). The boys were divided into three groups, considering their clinical characteristics: Control Group - boys with normal development (n=33); Clinical Group - boys with Autistic Spectrum Disorders - ASD (n=33) and Clinical Group - boys with Mental Retardation - MR (n=33). The instruments used were the Autistic Trait Scale (ATS), the Columbia Mental Scale and the Gender Apperception Test - GAT. The results indicated differences related to the clinical characteristics of the boys who composed the groups (effect size η^2=0,25).

Keywords: Gender identity; Development; Autistic spectrum disorders; Mental retardation

Introduction

The formation of self-concept is a result of the process of human development and maintains a direct relation with the formation of gender identity [1], which has differentiated stages and is subject to an interactive logic in which biology, social coexistence and culture are considered as an inseparable unit [2-6].

The Socio-cognitive of Gender Differentiation and Development Theory (SGDDT) suggests that gender-related roles and behaviors are acquired through modeling, of experiments and direct teaching it is influenced by the stage of development in which the child is [7]. The behavioral repertoire stereotyped and related to their sex is acquire through play that presents differences in its complexity, structure and rules [8-10]. Research indicates premature, abandoned and mentally retarded children demonstrate stability in play and play [11].

In other species, the influence of biological factors on sexual differences is evidenced in the behaviors related to playing. Female mice and rhesus monkeys that were treated with androgens during critical periods of gestation showed a typical male aggressive behavior [12-14], because androgens promote the neural development of basic processes in relevant regions of the brain [15,16]. The girls who were exposed to these androgens have preferences for toys and games typically favored by boys [17,18] and a reduced interest in toys and games typically favored by girls [19-21]. The influence of the androgen effect on the play of a variety of mammals suggests that gonadal hormones, as well as social and cognitive factors, can influence sexual differentiation and interest in toys and games [22].

A survey of studies related to play performed by Cordazzo et al. [23] found that research is limited on the importance of playing for the child with neurodevelopmental disorders. This fact is most evident in the area of Autistic Spectrum Disorders (ASD), what second Wing [24] is a cognitive disorder that causes deficits in Mind Theory, Central Coherence and Executive Dysfunctions [25]. The ASD modifies structurally the process of child development varying in degree of impairment [26] and according to Baron-Cohen [27] is an exaggeration of the normal process of brain development in the early years of life, with acceleration in development of "masculine abilities" to the detriment of "feminine abilities".

This causes a lack of communicative skills that includes the shared attention that would be to direct the child's attention to a communicative partner, with the intention of showing, asking for something or attending to another's request, thus assuming a fundamental role in the development, not only of communication-related skills, but also of social skills [28-30]. From the perspectives presented so far, changes during development added to cognitive and social factors could account for the sexual differences identified in the play of boys and girls and in the specific interests for certain toys.

The present study was based on the hypothesis that boys with ASD present evidence of the process of gender identity formation that is different from typical boys and the mentally retarded boys.

Methods

The sample consisted of 99 boys, aged between 4 and 6 years and 6 months (mean=5,24, *Std*=0,80), from the States of Bahia (33.3%) and São Paulo (66.7%) and were distributed in 3 groups. Considering the clinical characteristics presented by the boys, they were divided into two clinical groups and one control group. The first clinical group consisted of 33 boys diagnosed with Autism Spectrum Disorder (mean age=5,27 e *Std*=0,80), the second clinical group by 33 boys diagnosed with mental retardation (mean age=5,18 e *Std*=0,81) and who receive specialized

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care in public institutions; The control group consisted of 33 boys with normal development (mean age=5,27 e *Std*=0,80). All the boys who participated in the formation of the clinical groups are being followed up in specialized institutions of the public and private network.

Procedures

The Control Group consisted of 33 boys, enrolled in a regular school, with at least 4 full years at the time of the evaluation and at most 6 years and 6 months. To make up this group, the boy could not present morbid psychiatric conditions or any other nature. The boys in this group were randomly selected from a database constructed during the Gender Apperception Test - GAT validation process [31], matching these participants to the others who formed the other groups in this research. Parents and/or guardians signed the Free and Informed Consent Form.

The Autistic Spectrum Disorder (ASD) group consisted of 33 boys, who were enrolled in institutions specialized in attending this public and in regular schools, and met the following criteria to be included in the group: (1) chronological age between 4 years and 6 years and 6 months; (2) Autistic Spectrum Disorder according to Diagnostic and Statistical Manual of Mental Disorders-5 [32] ou ICD-10 [33]; (3) Absence of other morbid psychiatric conditions or mental retardation; (4) absence of physical or sensory impairments; (5) score above 23 on the Autistic Trait Scale (ATS) [34]; e (6) Signature of the Free and Informed Consent Form by the parents and/or guardians.

The mental retardation clinical group (MR) was composed of 33 boys, who received care in clinics and specialized institutions, and met the following criteria to be included in the group: (1) chronological age between 04 years and 06 years and six months; (2) psychological and neurological diagnosis of MR according to criteria of the Diagnostic and Statistical Manual of Mental Disorders-5 [32] or ICD-10 [33]; (3) absence of other psychiatric morbid conditions; (4) classification of altered general thinking capacity with indication of moderate mental retardation (IQ between 50-55), confirmed by the application of the Columbia Mental Maturity Scale [35]; and (5) signature of the Free and Informed Consent Form by the parents and/or guardians.

In order to make data collection and research development possible, it was necessary to create an instrument that would make data collection viable and with minimal interference of variables, since the use of "real" toys and games could interfere in the results, Children with ASD could fixate themselves on certain toys because of the characteristics presented by him as color, size, shape, texture, smell and not because of their representativeness (boy, girl or unisex). The instrument was called the Gender Apperception Test-GAT [31]. The term Gender Apperception was chosen because the Apperception is a process that organizes the mental elements and is directly related to the capacity of interpretation of the sensorial stimuli attributing them meaning based on the personal experiences, the emotions and the knowledge of the world. This process of apperception can be active or passive. In the active process the individual consciously apprehends, by his own initiative and through attention, new content, and assimilates it to another already mentally disposed. In the case of the passive process, the new content imposes its access to consciousness. The apperceptive process is that it will allow man, among other abilities, to establish suitable mnemonic traits to be reactivated as memories and images, as well as to activate such traits without the stimulation of a corresponding external perception [36,37]. In this sense, the apperception of gender could be considered as an indicator of the immediate awareness that the child has of himself and others.

The GAT is an instrument consisting of black and white drawings, with simple and two - dimensional features, mostly made in 10 × 5cm cards (51 in total) and depicting toys and games (of boys, of girls and unisex). This test evaluates the preference that the child has for toys and games that are typically related to the masculine and feminine gender and also those that are considered unisex. From the results obtained it is possible to identify the patterns of preferences/choices that the child has for certain types of toys or games, as well as make inferences about how the development of the formation of their gender identity is developing. After receiving a favorable opinion from the Committee for Ethics in Research with Human Subjects of the Maria Milza College (FAMAM), data collection was performed and in all contexts, the application of GAT occurred in a room containing a table and two chairs, with the examiner of facing the child and without the interference of parents/caregivers.

The 51 cards that make up the GAT were separated into three blocks, organized according to the toys and games they were representing. They were arranged on the table with the part containing the drawings facing downwards, and with the indications printed discreetly on the back (MC=Male Cards, UNC=Unisex Cards and FC=Female Cards). Before starting the application, itself, it was made available for each boy explanations about how it would occur and for that the three separate charts were used to serve as an example (and that they were also duly identified on the back). The cards were turned and the drawings were facing upwards. Then it was said to each boy, "Look at these three letters that are on the table. They are drawn toys and games of boys, girls or with which the two can play. Point or hold in your hand the card that has the toy or play design you prefer. "After being verified that the instructions had been understood the application of the test began. Each round was arranged three cards on the table, with the part drawn upwards, each one belonging to a different block (total 17 rounds). As each boy chose his favorite cards, the researcher recorded that choice on the answer sheet. Each application of the TAG took an average of 10 minutes. The calculation of the results was quite simple, being assigned zero (0) point for the cards not chosen and one (1) point for the chosen card. Shortly after the points were added and it was verified for which block of cards had been awarded the highest number of points (if for the one of CM, CF or CUN), reaching a final result for each participant.

Data storage and analysis

The data were organized in a spreadsheet of the software Statistical Package for the Social Sciences-SPSS version 17.0 for Windows, from which descriptive and inferential statistical analyzes were carried out. Initially, an exploratory analysis of the data was performed to verify the occurrence of missing values, atypical univariate observations (outliers) and evaluation of the multivariate assumptions of normality and homoscedasticity, as suggested by different authors [38-41].

Then, the internal consistency of the data collected was analyzed, considering the category/score by means of the Kuder-Richardson index (K-20), in the whole sample and in each specific group. The dimension of the test was evaluated by analyzing the correlation structure of the composition of the sets of cards (boys, girls, and unisex) and by the sum of items of the instrument and its ability to identify whether or not the acquisition of the identity of gender, considering the clinical condition of the boys distributed in the three previously described groups [42].

Descriptive analyzes were performed for GAT scores, also considering the total sample and the specific groups (Control, Clinical ASD and Clinical MRI). Finally, an analysis was performed using MANOVA to compare the test scores according to the specific groups and the age of the boys, using post-hoc analyzes to better understand the significant differences between the groups.

Results

The degree of internal consistency for the items that compose the GAT in the sample of the present study was evaluated. This type of evaluation is important since these are the indicators that will be used for the inferences regarding the level of development of the formation of gender identity in the boys surveyed.

The evaluation of the internal consistency index for the items of the GAT was performed from the Kuder-Richardson index (K-20), since these items are dichotomous in nature [40,43]. The indices were calculated considering the total sample (N=99) and the subsamples by clinical groups. The results are shown in Table 1.

Considering the total sample (N=99), the results of the correlation analyzes between the items/subscales of the GAT showed a negative, highly significant and strong magnitude pattern between the male item and the female subscale (r=-0.71; P<0.01). This pattern was found for the whole sample and also for the subgroups. A negative, highly significant and strong magnitude pattern was also observed between the male score and the unisex subscale (r=-0.80, p<0.01) for both the whole sample and the subgroups. The unisex score/item was not significantly related (r=0.15, p>0.149) to the female subscale in any of the analyzes (for the whole sample or for the subgroups). In general, the boys chose more cards of the male category (M=9.01) and less the unisex (M=5.01) and female (M=2.92) cards, according to the descriptive results presented in Table 2.

In addition to this general description, GAT scores were also evaluated considering the specificities of each clinical group and each age group. The results of this analysis are summarized in Table 3.

In evaluating the results presented in Table 3 from the logic of the hierarchy of mean scores for each group and by age group, the following results were obtained: in the control group, independent of the boy's age, the pattern of choice was maintained: first the male cards, followed by the unisex cards and the last the female cards.

In the clinical group with ASD, specifically for the ages of five and six years, the pattern of choice was: first the male cards followed by the unisex cards and the last the female cards. This hierarchical logic was not present among boys with four-year-old ASD who chose a larger number of male cards, followed by female cards, and finally unisex cards. But they kept the index of choice for female cards very close to the seen at age four.

The clinical group with MR was the one that most differed from the others. Boys aged four years presented a pattern of choice that followed the following hierarchical logic: first the unisex cards, followed by the female cards and finally the male cards. The five year old chose a larger number of unisex cards, followed by the male cards and finally the female cards. Only six year old boys presented the standard of choice with a larger number of male cards, followed by unisex cards and lastly female cards.

In order to evaluate the existence of significant (main and/or interaction) effects of the variables "belonging group (Control, clinical

Items	Groups	Coefficient of internal consistency (K-20)
Male	Control	0,74
	Clínical Autistic	0,69
	Clínical MR	0,42
	Total sample	0,76
Female	Control	0,42
	Clínical Autistic	0,54
	Clínical MR	0,33
	Total sample	0,62
Unissex	Control	0,69
	Clínical Autistic	0,53
	Clínical MR	0,05
	Total sample	0,55

Table 1: Internal consistency coefficient for TAG items.

Scores	N					Amplitude	
	Valide	Missing	Median	Mean	Std.	Min	Max
Male	99	0	9,0	9,01	3,87	1	16
Female	99	0	3,0	2,92	2,31	0	8
Unissex	99	0	5,0	5,01	2,69	0	11

Table 2: Descriptive statistics for the items that make up the GAT considering the total sample (N=99).

Items	Age membership groups		Descriptive statistics for GAT items		
			Mean	*Std.*	*N*
Male	Control Group	4 years	**9,71**	4,751	7
		5 years	**11,00**	1,886	10
		6 years	**13,06**	2,977	16
		Total	11,73	3,366	33
	Autism Clinical Group	4 years	**10,00**	4,282	7
		5 years	**7,70**	2,214	10
		6 years	**9,69**	3,701	16
		Total	9,15	3,492	33
	Clinical Group MR	4 years	**4,50**	2,000	8
		5 years	**6,18**	1,940	11
		6 years	**7,07**	2,759	14
		Total	6,15	2,489	33
Female	Control Group	4 years	**1,71**	2,138	7
		5 years	**1,40**	1,265	10
		6 years	**0,81**	,750	16
		Total	1,18	1,310	33
	Autism Clinical Group	4 years	**4,29**	2,984	7
		5 years	**3,90**	1,595	10
		6 years	**2,69**	2,213	16
		Total	3,39	2,277	33
	Clinical Group MR	4 years	**5,88**	1,356	8
		5 years	**3,36**	2,157	11
		6 years	**3,86**	1,994	14
		Total	4,18	2,113	33
Unisex	Control Group	4 years	**5,57**	3,207	7
		5 years	**4,60**	2,066	10
		6 years	**3,13**	2,778	16
		Total	4,09	2,788	33
	Autism Clinical Group	4 years	**2,71**	2,360	7
		5 years	**5,20**	2,936	10
		6 years	**4,69**	2,301	16
		Total	4,42	2,610	33
	Clinical Group MR	4 years	**6,63**	2,134	8
		5 years	**7,09**	1,300	11
		6 years	**6,00**	2,386	14
		Total	6,52	2,017	33

Table 3: Descriptive statistics for the items, considering groups of belonging and age of the boys.

Effect Type	Variables	Statistics						
		Wilks's Lambda	F	*gl*	Standard error	Sig.	η^2	Power (p<0,05)
	Interceptor	0,001	38168,278	3	88	0,001	0,99	1,00
Principal	Group	0,560	9,867	6	176	0,001	0,25	1,00
	Age	0,840	2,676	6	176	0,016	0,08	0,86
Interaction	Group*Age	0,851	1,219	12	233,118	0,271	0,05	0,61

Table 4: MANOVA analysis results.

ASD and clinical MR)" and "age (4, 5 or 6 years)" on the scores of the GAT scores (Items: male, female and unisex), a multivariate analysis of variance (MANOVA) was performed. As criterion of significance the critical limit was adopted p<0.05, that is, the allowed random error margin was a maximum of 5% [44]. Table 4 presents the results of these analyses.

Two significant main effects were observed for the scores on the GAT items (Table 4) group [F (6; 99)=9.9867, p<0.001] and age F (6; 99)=2.666, p <0.016]. From the point of view of the size of the effect, the variable "clinical group" was the one that best explained the variation in the score of the items of the GAT (effect size η^2=0,25), compared to the age variable (effect Size η^2=0,08). This is equivalent to saying that the 25% index of the variations in the GAT scores can be explained by the type of group to which the boy belonged, whereas the 8% index of the variations can be explained by the age. When the interaction effects of group and age variables were analyzed, the results were not significant (p<0.271). This data suggests that, although the age variable seems to be determinant in the GAT scores, when compared with the clinical group variable its effect is no longer significant, that is, what most influenced the results were the clinical characteristics of the boys who composed the respective groups who participated in this study. Other interesting data could be identified during the statistical analysis and should be explored in future studies.

Discussion

The objective of this study was to verify if children with Autistic Spectrum Disorders (ASD) present evidence of the process of gender identity formation and whether these signs could be identified. For this to be verified with an adequate empirical approach, the group of 33 boys with ASD was compared and paired with two other groups: one group of 33 boys with typical development and another group of 33 boys with a diagnosis of mental retardation. The project was challenging and complex, since it involved clinical settings that present a series of specificities that may hinder data collection and interfere with the interpretation of results.

It was decided to use the play method as a strategy to play access contents related to the notion of gender identity in the groups because the children naturally acquire the stereotyped behavioral repertoire related to their sex through play that presents differences in their complexity, structure and rules [7,9,10].

However, it was understood that the use of "real" toys and games could interfere with the results, since children with ASD tend to concentrate on objects considering aspects such as color, size, shape, texture, smell, etc. For the present investigation, those aspects would be variables that would make it impossible know if they chose of the toys/games related to the male and female genders, or even those considered unisex. For this reason, the Gender Apperception Test (GAT) [31], which is easy to apply and can be used in several contexts, has been used.

Data collection was performed and the results indicated that the boys who composed the three groups presented indications of process a gender identity formation, including the boys from the ASD group.

Regarding the evolution observed in the formation of Gender Identity in the groups that participated in the study (control, ASD and MR), It was verified that the process is differentiated in all three groups. The data of group MR indicated the boys who composed this group presented a pattern of responses to the less consistent GAT subscale items with the expected for the ages indicated but with an evolution progressive. The differences in the pattern of the responses of this group when compared to the control group may be related to cognitive development of these boys [1-6].

The patterns of responses obtained and the upward curve accompanying the increase in the age presented by the boys of the control group corroborated the descriptions and studies in the area, who affirm that gender identity comprises a set of meanings and symbols that are built internally. The perception of sexual difference will be employed in the understanding of the world and the social relations and that this behavioral repertoire stereotyped and related to their sex will be acquired naturally through games [7,9,10].

And, finally, the results by the ASD clinical group that presented differences in the pattern of choices in relation to the female and unisex cards, what suggest that the formation of gender identity in the ASD group is differentiated and with peculiar regarding from the other groups (Control and MR). It seems that acquiring the concept of what is unisex is more complex for these boys.

Conclusion

Many difficulties were found regarding the theories available to explain the development of the gender identity verified in the two clinical groups studied (ASD and MR). Many difficulties were found regarding the theories available to explain the development of the gender identity verified in the two clinical groups studied (ASD and MR). Thus, new research should be carried out to corroborate results found and increase the knowledge in the area.

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