Evolution of the ludic behavior of children with Down syndrome

Evolução do comportamento lúdico de crianças com síndrome de Down

ARTIGO ORIGINAL

Miryam Bonadiu Pelosi[1] Andreza dos Santos Munaretti[2], Janaína Santos Nascimento[3], Juliana Valéria de Melo[4]

http://dx.doi.org/10.11606/issn.2238-6149.v29i2p170-178

Pelosi MB, Munaretti AS, Nascimento JS, Melo JV. Evolution of the ludic behavior of children with Down syndrome. Rev Ter Ocup Univ São Paulo. 2018 May-Aug.;29(2):170-8.

ABSTRACT: Playing is central to child development and it is the primary occupational role in childhood. The use of the Ludic Model as a theoretical reference allows the analysis of the act of playing and the reflection on the function of Occupational Therapy in this context. The purpose of this work was to evaluate the ludic behavior of a group of children with Down syndrome before and after the interventions performed by occupational therapists. This is an observational, analytical and retrospective study performed in the therapeutic toy library of a university children's hospital's Occupational Therapy sector. Thirty children diagnosed with Down syndrome, aged between 8 months and 14 years old, participated in the research. The results suggest that the studied group evolved significantly in the General and Ludic Interest, Playfulness and Ludic Behavior categories, except for the ability to express oneself using words and phrases. The final considerations point to the adequacy of the use of the instruments proposed by the Ludic Model to measure the ludic behavior of children with Down syndrome aged up to 14 years old.

Keywords: Occupational therapy, Down syndrome, Games and toys.

Pelosi MB, Munaretti AS, Nascimento JS, Melo JV. Evolução do comportamento lúdico de crianças com síndrome de Down. Rev Ter Ocup Univ São Paulo. 2018 maio-ago.;29(2):170-8.

RESUMO: O brincar é fundamental para o desenvolvimento infantil e é o principal papel ocupacional na infância. A utilização do modelo lúdico como referencial teórico possibilita a análise do brincar e a reflexão da prática da Terapia Ocupacional neste contexto. O objetivo deste trabalho foi avaliar o comportamento lúdico de um grupo de crianças com síndrome de Down antes e depois das intervenções realizadas por terapeutas ocupacionais. Trata-se de estudo observacional, analítico e retrospectivo realizado na brinquedoteca terapêutica de um hospital-escola infantil, no setor de Terapia Ocupacional. Participaram da investigação 30 crianças com idades entre 8 meses e 14 anos com diagnóstico de síndrome de Down. Os resultados sugerem que o grupo estudado evoluiu de maneira significativa no interesse geral e lúdico, na capacidade lúdica e na atitude lúdica, mas não na habilidade de expressão por palavras e frases. As considerações finais apontam para a adequação dos instrumentos propostos pelo modelo lúdico em mensurar o comportamento lúdico de crianças com síndrome de Down com idade até 14 anos.

Descritores: Terapia ocupacional, Síndrome de Down, Jogos e brinquedos.

This work is part of project *TO Brincando: Evolução do Comportamento Lúdico de Crianças com Síndrome de Down*, developed in a therapeutic toy library. Partial data of the research were presented at the 15th Brazilian Occupational Therapy Congress, held from September 11 to 15, 2017, in Porto Alegre.

1. Occupational therapist with a master's and doctoral degree in Education from the State University of Rio de Janeiro (UERJ), associate professor at the Federal University of Rio de Janeiro (UFRJ), professor of the Department of Occupational Therapy of UFRJ's School of Medicine. ORCID: http://orcid.org/0000-0002-6109-4296. Email: miryampelosi@ufrj.br.
2. Degree in occupational therapy from UFRJ. ORCID: http://orcid.org/0000-0002-7642-0007. Email: andreza.munaretti@hotmail.com.
3. Occupational therapist with a master's degree in Health, Interdisciplinarity and Rehabilitation from the State University of Campinas (Unicamp).
4. Occupational therapist with a master's degree in Health, Interdisciplinarity and Rehabilitation from Unicamp, professor of the Department of Occupational Therapy of UFRJ's School of Medicine. ORCID: http://orcid.org/0000-0002-0883-6609. Email: julianamelo_to@hotmail.com.

Corresponding address: Miryam Bonadiu Pelosi. Universidade Federal do Rio de Janeiro, Faculdade de Medicina. Rua Prof. Rodolpho Paulo Rocco, s/n, Prédio do CCS, bloco K, sala 17. Cidade Universitária, Ilha do Fundão, Rio de Janeiro, RJ, Brazil. CEP: 21910-590. E-mail: miryampelosi@ufrj.br.

INTRODUCTION

Playing is the primary activity of childhood. It is through this action that the child's potential and social, physical, cognitive and emotional skills are developed. By playing, the child explores and communicates with others and with his/her surroundings, acquires new experiences and exposes his/her feelings, fears and preferences[1].

When the child uses the ludic process to grow and interacts with it using objects or by basing him/herself on previously experienced circumstances, he/she assumes an active and creative role, thus demonstrating the benefits of that unique experience for his/her development[2].

Playing is one of the dimensions of Occupational Therapy for being designated as the primary occupational role in childhood, being involved in all aspects of a child's daily life and used as a therapeutic resource for all children[3]. Thus, by establishing the principle that Occupational Therapy studies the subject's involvement in the various areas of occupation, the capacities and potentialities of the child in his/her playing experience are emphasized[4].

Playing is a strategy used by occupational therapists to initiate contact with the child, establish a bond with him/her and promote the discovery of his/her interest and enjoyment[5]. Based on activities that are significant to the child, the occupational therapist acts as a mediator of the child's games, analyzing the physical and psychosocial dimensions, observing attitudes, skills and difficulties in need of attention in that context[6].

Children need to play regardless of their physical, intellectual or social conditions, but for those with disabilities in particular, playing has a key role in the promotion of their development[7].

Children with Down syndrome have a global delay in development characterized by impairment in language and in cognitive and motor skills, and may be afflicted by congenital heart disease (40%), hypotonia (100%), hearing (50 to 70%) and sight (15 to 50%) problems, neurological problems (5 to 10%), obesity and early aging[8].

One of the ways to evaluate the effects of Occupational Therapy in children is to analyze the evolution of their ludic behavior, according to the theoretical framework of Ferland[5], who proposed the reflection on the act of playing in the practice of Occupational Therapy and on its place in the life of children with disabilities.

In the Ludic Model theory, two instruments are presented: the Assessment of Ludic Behavior (ALB) and the Initial Interview with Parents (IIP), with the aim of assessing the subject's ludic behavior and planning the future intervention. Since its creation, several studies with different populations have been conducted[9-13].

The study of Zaguini et al.[9] involving children with cerebral palsy showed that the assessment instrument of the Ludic Model allows understanding the children by analyzing their capabilities, difficulties and ludic behavior while they play. This research noted that ludic behavior was the most relevant item, being compatible with the findings in the literature that motor and cognitive difficulties do not interfere in this attribute. The study demonstrated that both evaluations (ALB and IIP) were fundamental to understand ludic behavior, concluding that despite their ludic capacity being limited, this did not interfere in the children's ludic interest and behavior.

Santos et al.[10] used the Ludic Model to analyze the playing process of hospitalized children. After the application of the protocol, they carried out individual interventions with the bedridden children, inserting the act of playing in the process of hospitalization. In this study, the Ludic Model was an essential instrument to systematize the playing process as a care strategy centered on the child, corresponding to the humanization guidelines and enabling its application in this context.

The research by Sant'Anna et al.[11] pointed to the fact that the Ludic Model, with its theory and evaluations, qualifies the intervention with the essential need of children: playing. The model for children with physical disabilities allowed identifying their interests and capacities, going beyond their limitations, with focus on the use of individual skills.

The study by Silva et al.[13], on the other hand, demonstrates that the IIP and ALB protocols are complementary, and, for this reason, it is necessary to pay attention to differences in their results, because they indicate distinct experiences in the family and therapeutic environments. This study indicated that both instruments are able to identify the ludic behavior of children with cerebral palsy, it being important to apply them as a guideline for the therapeutic planning's goals and targets.

Diegues[12] studied the use of the Ludic Model's protocols with children with Down syndrome and found that the instruments contributed to the investigation of their playing process, identifying interests, needs, behaviors, and preferences of toys and stimulation strategies during the interventions.

The theoretical framework of the Ludic Model was also used with children with Down syndrome by Solai and Pfeifer[14], who researched how cognitive and motor changes influence their ludic behavior in activities that require motor coordination, in social interaction and in games of make-believe, concluding that it is very important to encourage

the development and the early ludic stimulation of this population.

In this sense, the objective of this study was to evaluate the ludic behavior of a group of children with Down syndrome before and after the interventions carried out by occupational therapists.

METHODOLOGICAL PROCEDURES

This is an observational, retrospective and analytical study held at the *Martagão Gesteira* Institute of Child Care and Pediatrics, the Federal University of Rio de Janeiro's children's hospital, in the Occupational Therapy sector's therapeutic toy library. This research involved 30 children aged between 8 months and 14 years old diagnosed with Down syndrome.

The therapeutic work took place once a week, lasting 90 minutes, 60 minutes having been intended for group therapy, 15 minutes for free games and 15 minutes for conversations with family members about the child's development, clarification on the activities carried out and provision of guidelines to be followed.

The work carried out in the toy library was based on the theoretical framework of the Ludic Model, which motivated the realization of this study.

All children with Down syndrome receiving care in the toy library between 2014 and 2015 were included, and those who did not undergo reevaluation after one year were excluded.

The study was approved by the Research Ethics Committee with CAAE No. 40956015.6.0000.5264.

For the collection of data, the ALB (version 2) and IIP were carried out[15]. The version used in this study was that of Sant'Anna et al.[15], because the first assessment of the children studied happened prior to the publication of the *Manual of the adapted Brazilian version of the procedures for application of the ludic model's assessment instruments*, by Sant'Anna et al.[16]

The children's ALB assigns quantitative, qualitative and individualized scores to five dimensions of ludic behavior: general interest in the human and sensory environment; analysis of the child's ludic behavior; interest in playing; ludic capacity to use objects and spaces; and communication of needs, difficulties and feelings.

The IIP protocol covers nine areas, evaluated through questions about the children's ludic behavior, and reveals their interests, their way of communicating and playing and their preferences. The interview allows collecting data about the children's ludic behavior in their daily life that would not have been observable during the evaluation, as it is provided by the guardians, who have closer ties and play with them on a daily basis.

The evaluations took place in the period from November 2014 to May 2015, and the revaluations were carried out from December 2015 to May 2016. The data were collected by an occupational therapist trained in the application of the two instruments, following the instructions described in the works by Ferland[5] and Sant'Anna et al.[15], in two individual sessions, one for each protocol.

A spreadsheet was created in Microsoft Excel® for analysis of the data. The collected data were inserted into a double-entry table, and the consistency between the two databases was then verified. In case of inconsistencies, the protocols were referred to for correction. The database has been imported into the Statistical Package for The Social Sciences (SPSS) version 19.0, to be analyzed.

The quantitative variables were evaluated using descriptive measures mean, standard deviation, median and range, depending on the normality of the data. For the qualitative variables, frequency distribution was obtained.

Data analysis was performed via descriptive statistics using absolute frequencies and percentages for categorical variables and measures of central tendency (mean) and variability (standard deviation) for numerical variables.

The answers obtained in the evaluation and reevaluation were analyzed to measure the children's development level. Paired t-test was used for this purpose. The significance level adopted was 5% ($p < 0.05$).

For the analysis, the children were separated into two groups: the preschool group, made up of children from 8 months to 5 years and 11 months old, and the group of school-age children, from 6 to 14 years old, thus facilitating the verification of the results and their relationship with the activities carried out in the toy library.

RESULTS

The analysis of the children's general characteristics showed that they did not have associated motor difficulties, but nearly half had speech delay (43%), sight difficulties (23.3%) and hearing impairment (13%).

The comparison between evaluation and reevaluation after one year of intervention for the 30 children studied, using the ALB, is presented in Table 1.

Table 1. ALB with the entire population studied (N=30)

Variables	Evaluation	Reevaluation		
	Mean (SD)	Mean (SD)	p*	T
General Interest (0 – 26)	11.8 (3.2)	14.3 (3.7)	**0.006**	-2.937
Ludic Interest (0 – 66)	27.5 (7.1)	41.9 (11.6)	**<0.001**	-7.213
Ludic Capacity (0-76)	58.6 (19.1)	62.9 (14.2)	**0.019**	-2.489
Ludic Behavior (0 – 12)	8.1 (2.9)	9.4 (2.5)	**0.008**	-2.856
Expression (0 – 32)	17.9 (6.2)	17.8 (6.5)	0.88	0.143

Significance level $p < 0.05$.

By analyzing each test of ludic behavior, it was found that the children showed higher average scores in the reevaluation of general interest ($p = 0.006$), ludic interest ($p < 0.001$), ludic capacity ($p = 0.019$) and ludic behavior ($p = 0.008$).

The comparison of ludic behavior was also divided into preschool (n = 11) and school age (n = 19), to compare these phases before and after the interventions carried out in the therapeutic toy library.

Table 2. ALB of preschool children (N=11)

Variables	Evaluation	Reevaluation		
	Mean (SD)	Mean (SD)	p*	T
General Interest (0 – 26)	10.1 (2.0)	13.9 (4.1)	**0.030**	-2.535
Ludic Interest (0 – 66)	23.0 (7.6)	40.0 (11.8)	**<0.001**	-5.518
Ludic Capacity (0-76)	41.9 (17.9)	52.4 (15.5)	**<0.001**	-5.107
Ludic Behavior (0 – 12)	9.0 (3.1)	10.1 (2.2)	0.067	-2.058
Expression (0 – 32)	14.2 (3.6)	14,4 (5.1)	0.862	-0.179

Significance level $p < 0.05$.

By analyzing each test of ludic behavior of the preschool group (8 months to 5 years and 11 months old), it was found that the children showed higher average scores in the reevaluation of general interest ($p = 0.030$), ludic interest ($p < 0.001$) and ludic capacity ($p < 0.001$). Ludic behavior – which encompasses the child's creativity and initiative and freedom to imagine solutions – evolved, but did not reach significance level $p < 0.05$.

Table 3. ALB of school-age children (N=19)

Variables	Evaluation	Reevaluation		
	Mean (SD)	Mean (SD)	*p**	*T*
General Interest (0 – 26)	12.8 (3.3)	14.5 (3.5)	0.105	-1.709
Ludic Interest (0 – 66)	30.1 (5.4)	43.0 (11.6)	**<0.001**	-4.966
Ludic Capacity (0-76)	68.7 (10.6)	69.0 (9.1)	0.872	-0.163
Ludic Behavior (0 – 12)	7.5 (2.8)	9.0 (2.6)	**0.045**	-2.156
Expression (0 – 32)	20.0 (6.4)	19.8 (6.5)	0.659	0.449

Significance level $p < 0.05$.

By analyzing each test of ludic behavior of the school-age group (6 to 14 years old), it was found that the children showed higher average scores in the reevaluation of ludic interest ($p < 0.001$) and ludic behavior ($p < 0.045$).

The family members answered the IIP and the items relevant to the work developed in the toy library were selected for presentation in this article. The description of the results considered the group of children in the preschool and school stages, as performed in the ALB.

In the preschool group, the ability of expression of needs using words and sentences increased from 3% in the evaluation to 30% in the reevaluation. However, the most frequent manner of expression in the reevaluation was expression through gestures (39%).

For the school-age group, the two most common forms of expression were gestures and words and phrases, both in the evaluation and in the reevaluation, but in the latter there was a decrease from 51% to 33% of communication through words and phrases, and communication was distributed between gestures (42%), words and phrases (33%) and sounds (18%).

In relation to the expression of feelings, the preschool group evolved from no expression through words and phrases to 24% in the reevaluation, the other most frequent forms of communication having been gestures (36%) in the evaluation and face expression (38%) in the reevaluation.

Initially, the school-age group communicated using various strategies, such as face expression (27%), gestures (26%) and words and phrases (28%). In the reevaluation, the same modalities were present with little variation in percentages (35%, 24% and 20%, respectively).

The data related to the way the families communicated with the children showed that the parents of the preschool (82%) and school-age (95%) children already communicated with them using words and verbal explanations in the initial interview. This percentage was maintained for the preschool group and increased to 100% for the school-age group after one year of the intervention.

Table 4 presents the interest of the children for toys, and Table 5, the characteristics of the games.

Table 4. IIP – Toys

4. Toys	**Evaluation N (%)**	**Reevaluation N (%)**	**Evaluation N (%)**	**Reevaluation N (%)**
Does your child play with any of the materials below?	**Preschool**		**School**	
Different textures	10 (91%)	10 (91%)	16 (84%)	19 (100%)
Sound stimuli	11 (100%)	11 (100%)	19 (100%)	19 (100%)
Visual stimuli	**10 (91%)**	**11 (100%)**	19 (100%)	19 (100%)
Stimuli to mimic frequent situations	**9 (82%)**	**10 (91%)**	19 (100%)	18 (95%)
Imagination stimuli	**7 (64%)**	**10 (91%)**	17 (89%)	16 (84%)
Stimuli to move	**9 (82%)**	**11 (100%)**	**16 (84%)**	**18 (95%)**
Stimuli to interact with others	10 (91%)	10 (91%)	18 (95%)	16 (84%)

Table 5. IIP – Characteristics of the games

5. Characteristics of the games	**Evaluation N (%)**	**Reevaluation N (%)**	**Evaluation N (%)**	**Reevaluation N (%)**
Does your child like any of the activities below?	**Preschool**		**School**	
Repeating the same game to become better at it	**9 (82%)**	**10 (91%)**	**12 (63%)**	**14 (74%)**
Playing with new toys	**9 (92%)**	**11 (100%)**	18 (95%)	17 (89%)
Being in new places	**9 (82%)**	**11 (100%)**	**14 (74%)**	**19 (100%)**
Exploring the external spaces of the house while playing	9 (82%)	9 (82%)	**15 (83%)**	**17 (89%)**
Can your child do any of the below?				
Use a toy in a conventional way	**7 (64%)**	**11 (100%)**	17 (89%)	16 (84%)
Imagine new ways of using a toy	**5 (15%)**	**10 (91%)**	**11 (58%)**	**14 (74%)**

In relation to toys and games, an evolution in the interest in visual stimuli, in stimuli to mimic frequent situations, in imagination stimuli and in stimuli to move was observed for the preschool group. The interest in toys and new places also evolved significantly. Finally, it was possible to observe significant advances in the use of toys in conventional ways, in the use of their own means to move from one place to another, and, with greater emphasis, in the ability to imagine new ways to use a toy.

In the school-age group, the greatest advances included interest in toys that stimulated movement, being in new places and exploring the house's external spaces while playing. As for skills, new ways to use a toy and the use of their own means to move from one place to another stood out.

In relation to playmates, in the preschool group the mother was the usual playmate (91%), and in the reevaluation this became the siblings' role (73%). The preferred playmates, on the other hand, were the siblings (73%), and in the reevaluation this preference was divided between mother (45%) and siblings (45%).

In the school-age group, the usual playmate was the mother (74%), and continued being so in the revaluation (79%). The preferred playmate was the father (47%), followed by others (37%), and, in the reevaluation, the mother (47%) and others (47%).

In relation to behavior, initiative, the pleasure of playing and the taste for challenges were evaluated.

In the preschool group, the parents classified their children as having no initiative (9%) or as having initiative (91%). In the reevaluation, there were no more children described as lacking initiative, but as having some (36%) and good initiative (64%).

In the school-age group, there was a significant percentage of children without initiative (26%), which no longer appeared in the reevaluation, as the children had little (37%) or good (63%) initiative.

Most children found playing enjoyable (82%), but in the reevaluation this percentage decreased to 73%, as some parents of the preschool group (9%) reported a lack of this aspect in their children.

In the evaluation of the school group, the summary of the findings showed that 58% of the children found playing enjoyable, and in the reevaluation, this number increased to 84%.

In the preschool group, 82% of the children liked to be challenged, and 18% of them liked it a little. In the reevaluation, this group was divided between liking challenges a little (55%) and liking challenges (45%). The data of the school-age group were the same in the evaluation and in the reevaluation, not liking challenges having corresponded to 5%, somewhat liking challenges to 42%, and liking challenges to 53% of the children.

DISCUSSION

In this study, the theoretical framework of the Ludic Model was used for the evaluation of children with Down syndrome between the ages of 8 months and 14 years old.

Ferland[5] had already considered in his theoretical model the possibility of applying it to different age groups, contexts and populations, and other researchers have shown this viability[6,9,12,17,18].

Santos[18] applied it to pediatric patients assisted by the Bone Marrow Transplant Service, working with 39 children from 3 to 10 years old hospitalized for transplant of hematopoietic stem cells. Other studies have shown application in children with cerebral palsy from different age groups, considering the ranges from 1 to 6 years old[13], 2 to 12 years old[9] and 5 to 10 years old[6].

The Ludic Model has been used without age restriction, as shown in the research of Guitard et al.[17], who investigated the ability to play of adults and the influences of playfulness, originating a diversified proposal of intervention by the occupational therapist.

The study by Diegues[12] was conducted with eight children from 6 to 10 years old diagnosed with Down syndrome, resembling the population of this study. Ferland[5] argues that the Ludic model's application to children with intellectual disabilities should be adapted to the development and the characteristics of this population. The therapist may need to intervene more actively and directly when dealing with these children by assigning meaning to the experience of playing, but the ludic behavior is not necessarily proportional to the severity of the disability[5].

Considering the group of children studied (n = 30), it was found that they achieved higher average scores in the reevaluation of general interest, ludic interest, ludic capacity and ludic behavior, but not in relation to expression. This result corroborates the one found by Santos[18], in which the evolution of ludic behavior was prevalent in the case of its emotional components and of the cognitive and social components involved in the act of playing.

In the analysis of the sample divided into the preschool and school-age groups, the former had superior average scores and significance level $p < 0.05$ in relation to general interest (human and sensory environment), ludic interest and ludic capacity (both relate to action and use of objects and space), while the school-age group had

improvements only in ludic interest and ludic behavior.

In both groups, ludic capacity increased, being significant for the preschool group and not significant for the school-age group. The ludic capacity of the children from 6 to 14 years old was good in the evaluation (68.7/76) and evolved little in the revaluation (69/76), showing that the children already had the ludic capacity to play. The children of the school-age group were able to explore the space and use the materials and objects, an attribute that implies in, according to Ferland[5], the possibility of dealing better with everyday challenges. Ramos et al.[19] also describe that the greater the motor damages, the less the child will express his/her ludic capacity, which consequently leads to a decreased capacity to play.

The significant evolution in ludic behavior and interest found in this study was also observed for Ferland[5] and Zaguini et al.[9], who concluded that even if there is some motor disability, most children demonstrate evolution in these two aspects.

The most frequent form of expression found in the researched group was the use of gestures, followed by words and phrases. This component of the Ludic Model was the only one that did not evolve, considering the entire sample.

The time lag for emergence of the stages of language acquisition and a deficit in the composition of its formative aspect are characteristics often found in children with Down syndrome[20]. A study conducted with ten children from 7 to 13 years old with this diagnosis showed that 90% of them communicated verbally, but also used gestures in a complimentary manner[21].

For communication between caregiver and child, the most significant results were the use of words and verbal explanations in both groups. This conduct was also found in the studies by Santos[18] and Diegues[12], in which the form of communication between parents and children also focused on the use of words and verbal explanations.

In relation to the characteristics of the games, the study showed, in both groups, but particularly in the preschool group, a significant advance in the ability to imagine new ways of using toys. This result differs from that found by Diegues[12], in which the majority of children with Down syndrome demonstrated difficulty playing in unconventional ways.

Imagination has been reported as a difficulty for children with intellectual disabilities, as it is driven to concrete through, being dependent on the immediate-situational context. This function is essential to child development, because imagination broadens the set of experiences beyond temporal and spatial barriers, allowing the understanding of what cannot be personally seen or lived[22].

As for the children's interest in toys, the results show that those featuring sound stimuli were reported by all families. A similar result was found in the study by Zaguini et al.[9], who also showed a predominance of sound toys. Another type of toy that was often reported by the families who participated in this study were those featuring visual stimuli. The research by Diegues[12], with children from 6 to 10 years old with Down syndrome, showed that toys with sound stimuli were recurring, as were those with visual stimuli and those favoring movement.

In relation to behavior, initiative, the pleasure of playing and the taste for challenges were evaluated based on the families' report. In the reevaluation, there were no more children described as having no initiative; in the school-age group, pleasure for playing evolved, but in the preschool group, 9% of the parents stated that their children found no pleasure in playing. As for liking challenges, 5% of the school-age children continued not enjoying them. Based on the Ludic Model, experimentation and enjoyment are fundamental for a child to play freely and spontaneously. The development of enjoyment associated with the capacity to act will provide autonomy to the child, it being essential to stimulate them[5].

In summary, in the reevaluation, the preschool children evolved significantly in relation to general interest, ludic interest and ludic capacity. The expression of needs and feelings continued being realized through gestures, despite the parents using words and verbal explanations to communicate with the children. Their favorite toys became mostly those with visual and sound stimuli, and those that stimulated movement. Playtime started featuring new places and toys, used in conventional ways, new games thought up by the children themselves and autonomous movement. The usual playmates became the siblings, and the preferred playmates, mother and siblings. While playing, the children showed initiative, enjoyment and a taste for challenges.

The reevaluation of the school-age children showed that they had evolved significantly in relation to ludic interest and ludic behavior. The expression of needs continued being realized through gestures, words and phrases, but feelings started being demonstrated through facial expressions. The parents' communication with the children continued happening through words and verbal explanations. Their favorite toys already featured all kinds of stimuli and remained that way. About the characteristic of the games, the children already used all modalities, but there was an increase in relation to thinking up new ways to play with a toy. The usual playmate remained being the mother, and the preferred playmates, the mother and others. While playing, all the children started showing initiative

and enjoyment, and maintained their taste for challenges.

Finally, it is possible to say that the use of the Ludic Model and its protocols provided information about the children's ludic activity and ways of playing to the occupational therapist, allowing the analysis of their ludic behavior. Based on the initial evaluation, it was possible to devise the objectives to be achieved with the children and their group, offering various means and strategies to intervene in their development.

It is concluded that, after one year of occupational therapy, the group studied evolved significantly in relation to general and ludic interest, ludic capacity and ludic behavior. The exception was the skill of expression through words and phrases.

In this way, the importance of developing strategies to stimulate the expression of feelings and needs mostly through words and phrases for the group of children studied is emphasized.

CONCLUSIONS

The Ludic Model, as a theoretical model that proposes the systematic use of playtime in the practice of Occupational Therapy, was shown to be applicable to the context of the toy library, assisting in the planning of occupational therapy interventions focused on the act of playing. The protocols proved suitable for measuring the ludic behavior of children with Down syndrome aged up to 14 years old.

Authors' Contribution: The authors conceived the project, organized the sources and analyzed the data, having written and revised the text.

REFERENCES

1. Santos CA, Marques EM, Pfeifer LI. A brinquedoteca sob a visão da Terapia Ocupacional: diferentes contextos**.** Cad Ter Ocup UFSCar. 2006;14(2):91-109.
2. Takatori M, Bomtempo E, Pereira FDSD, Lin LW, Bansi LO, Correia RL. O lúdico no atendimento de crianças com deficiência: uma reflexão sobre a produção cultural na infância. Estilos Clínica (São Paulo). 2007;12(23):90-107. doi: http://dx.doi.org/10.11606/issn.1981-1624.v12i23p90-107.
3. American Occupational Therapy Association – AOTA. Occupational therapy practice framework: domain & process. 3rd ed. Am J Occup Ther. 2014;68(6):1-43. doi: http://dx.doi.org/10.5014/ajot.2014.682006.
4. Fonsêca MED, Da Silva ACD. Concepções e uso do brincar na prática clínica de terapeutas ocupacionais. Cad Ter Ocup UFSCar (São Carlos). 2015;23(3):589-97. doi: http://dx.doi.org/10.4322/0104-4931.ctoAO0554.
5. Ferland F. O Modelo Lúdico: o brincar, a criança com deficiência física e a Terapia Ocupacional. Trad. Maria Madalena Moraes Sant'Anna. 3a ed. São Paulo: Roca; 2006.
6. Oliveira LDB, Vieira ML, Cordazzo STD. "Brincar" como agente promotor de saúde no desenvolvimento infantil. Rev Ciênc Humanas (Florianópolis). 2008;42(1,2):193-215. Disponível em: https://periodicos.ufsc.br/index.php/revistacfh/article/view/2178-4582.2008v42n1-2p193/13335.
7 Mafra SRC. O lúdico e o desenvolvimento da criança deficiente intelectual. Paraná: Secretaria de Estado da Educação; 2008. Disponível em: http://www.diaadiaeducacao.pr.gov.br/portals/pde/arquivos/2444-6.pdf.
8. Silva NLP, Dessen MA. Síndrome de Down: etiologia, caracterização e impacto na família. Interação Psicol (Curitiba). 2002;6(2):167-76. doi: http://dx.doi.org/10.5380/psi.v6i2.3304.
9. Zaguini CGS, Bianchin MA, Lucato Junior RV, Chueire RHMF. Avaliação do comportamento lúdico da criança com paralisia cerebral e da percepção de seus cuidadores. Acta Fisiátr (São Paulo). 2011;18(4):187-91. doi: 10.5935/0104-7795.20110004.
10. Santos DR, Bomfim CMS, Mazza VA, Wall ML, Merces NNA. Processo de brincar da criança hospitalizada guiado pelo modelo lúdico. Cogitare Enferm (Curitiba). 2014;19(3):617-20. doi: http://dx.doi.org/10.5380/ce.v19i3.36669.
11. Sant'Anna MMM, Blascovi-Assis SM, Magalhães L. Modelo Lúdico: Favorecendo o brincar da criança com deficiência física. Rev Assoc Bras Ativ Motora Adaptada (Marília). 2015;16(01):15-8. Disponível em: http://www2.marilia.unesp.br/revistas/index.php/sobama/article/view/4965/3549.
12. Diegues D. O Modelo Lúdico na análise do brincar de crianças com síndrome de Down [Dissertação]. São Paulo: Universidade Presbiteriana Mackenzie; 2015. Disponível em: http://tede.mackenzie.br/jspui/bitstream/tede/1651/1/Debora%20Diegues.pdf.
13. Silva CMA, Cunha TT, Pfeifer LI, Tedesco AS, Sant'Anna NNN. Percepção de pais e terapeutas ocupacionais sobre o brincar da criança com paralisia cerebral. Rev Bras Educ. Espec (Marília). 2016;22(2):221-32. doi: http://dx.doi.org/10.1590/S1413-65382216000200006.
14. Solai VQ, Pfeifer LI. Comportamento lúdico de crianças com síndrome de Down. In: Simpósio Internacional de Iniciação

Científica da Universidade de São Paulo, São Paulo, 2006. Anais eletrônicos. São Paulo: USP; 2006.

15. Sant'Anna MMM, Blascovi-Assos SM, Magalhães VLC. Adaptação transcultural dos protocolos de avaliação do modelo lúdico. Rev Ter Ocup da Univ São Paulo. 2008;19(1):34-47. Disponível em: https://www.revistas.usp.br/rto/article/view/14026.

16. Sant'Anna MMM, Pfeiffer LI, Tedesco S, Costa SC, Silva CMA, Jimenez L, et al. Instrumentos de avaliação do modelo lúdico para criança com deficiência física (EIP– ACL) – manual da versão brasileira adaptada. Organização: Maria Madalena Moraes Sant'Anna. São Carlos. Abpee; 2015. Disponível em: http://leptoi.fmrp.usp.br.

17. Guitard P, Ferland F, Dutil E. L'importance de l'attitude ludique en ergothérapie avec une clientele adulte. Can J Occup Ther. 2006;73(5):281-94. doi: 10.2182/cjot.06.002.

18. Santos DR. Aplicabilidade do Modelo Lúdico no processo terapêutico ocupacional de cuidado à criança em transplante de células-tronco hematopoéticas [Dissertação]. Curitiba: Universidade Federal do Paraná; 2013. Disponível em: https://educapes.capes.gov.br/handle/1884/35066.

19. Ramos RM, Bazilio S, Anthero TDDO. Aplicação dos protocolos de avaliação do modelo lúdico em crianças com deficiência física de dois a seis anos [Trabalho de Conclusão de Curso]. Lins: Curso de Terapia Ocupacional, Centro Universitário Católico Salesiano; 2008. Disponível em: http://www.unisalesiano.edu.br/biblioteca/monografias/46195.pdf.

20. Flabiano-Almeida FC, Limongi SCO. O papel dos gestos no desenvolvimento da linguagem oral de crianças com desenvolvimento típico e crianças com síndrome de Down. Rev Soc Bras Fonoaudiol (São Paulo). 2010;15(3):458-64. doi: http://dx.doi.org/10.1590/S1516-80342010000300023.

21. Soares EMF, Pereira MMB, Sampaio TMM. Habilidade pragmática e síndrome de Down. Rev CEFAC (São Paulo). 2009;11(4):579-86. doi: http://dx.doi.org/10.1590/S1516-18462009000800006.

22. Pinto GU, Góes MCR. Deficiência mental, imaginação e mediação social: um estudo sobre o brincar. Rev Bras Educ Espec (Marília). 2006;12(1):11-28. doi: http://dx.doi.org/10.1590/S1413-65382006000100003.

Received in: 2018 Jan 30
Accepted on: 2018 June 12