Developmental Psychology

Coordinated Actions at Free Play Activities on Children Interethnic Encounters

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Abstract: This study aimed to investigate coordinated actions built between *Mbya-Guarani* and non-indigenous children during free play activities. 21 *Mbya-Guarani* and 61 non-indigenous children participated in two "Encounters for Play," a project constructed by the Indigenous Network and *Mbya-Guarani* communities. We recorded children's social interactions during the free playtimes, selected the first and last 10 minutes of each encounter: (1) Performed scans every 30s registering children who were playing together; (2) Applied Social Network Analysis to explore children's association pattern on each encounter; (3) Performed a focal continuous transcription of each child present in the interethnic clusters using an ethogram. Our results show free play was effective in promoting coordinated actions between children up to eight years old, in mixed age clusters. The "Encounters for Play" activities demonstrated the ability to mitigate the avoidance of ethnic groups in children, displaying potential as an educational intervention.

Keywords: social interaction, clusters analysis, childhood play behavior, ethnic groups

Ações Coordenadas na Brincadeira Livre de Crianças em Encontros Interétnicos

Resumo: Este estudo teve como objetivo investigar as ações coordenadas construídas entre crianças *Mbya-Guarani* e não indígenas na brincadeira livre. 21 crianças *Mbya-Guarani* e 61 não-indígenas participaram de dois "Encontros para brincar," projeto elaborado pela Rede Indígena e por comunidades *Mbya-Guarani*. Videogravamos as interações sociais durante a brincadeira, selecionamos os primeiros e últimos 10 minutos de cada encontro: (1) Realizamos varreduras a cada 30s registrando quais crianças brincavam juntas; (2) Aplicamos a Análise de Redes Sociais para explorar o padrão de associação em cada encontro; (3) Realizamos uma transcrição focal contínua para cada criança dos conglomerados interétnicos usando um etograma. Os resultados mostram que as brincadeiras livres foram eficazes em promover ações coordenadas entre crianças de até oito anos em grupos etários mistos. Os "Encontros para brincar" têm potencial como intervenção educativa, demonstrando capacidade de mitigar a evitação de grupos étnicos em crianças.

Palavras-chave: interação social, análise de conglomerados, comportamento de brincar, grupos étnicos

Acciones Coordinadas en el Juego Libre de Niños en Encuentros Interétnicos

Resumen: Este estudio tuvo como objetivo investigar las acciones coordinadas entre niños mbya-guaraníes y niños no indígenas en el juego libre. Participaron 21 niños mbya-guaraníes y 61 niños no indígenas en dos Encuentros para jugar, un proyecto de la Red Indígena y las comunidades mbya-guaraníes. Grabamos las interacciones sociales durante el juego, seleccionamos los primeros segundos y últimos 10 minutos de cada encuentro: (1) Realizamos análisis a cada 30 segundos registrando qué niños jugaban juntos; (2) Aplicamos el análisis de redes sociales para explorar el patrón de asociación; y (3) Hacemos una transcripción focal continua de cada niño presente en los conglomerados interétnicos utilizando una etograma. Nuestros resultados evidencian que el juego libre fue eficaz en la promoción de acciones coordinadas entre niños hasta 8 años de edad, en conglomerados de edad mista. Los Encuentros para jugar tienen potencial como intervención educativa, demostrando la capacidad de mitigar la evitación de grupos étnicos en los niños.

Palabras clave: interación social, análisis de conglomerados, conducta de jugar, grupos étnicos

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The Brazilian state is part of a territory that is home to several peoples. The last census of the indigenous population carried out by the Brazilian Institute of Geography and Statistics (IBGE, 2012) indicated that around 305 different ethnicities live in the country. Among them are the *Mbya-Guarani* people, who inhabit the *Yvyrupa*, an ancestral territory that involves the South, Southeast and Midwest regions of Brazil, as well as Argentina, Paraguay and Uruguay (Popyguá, 2022). Together with *Mbya-Guarani* educators and their communities, the Indigenous Network,

an extension service of the Institute of Psychology of the University of São Paulo, has built reflections on the role of the school in indigenous and non-indigenous education, in the face of challenges encountered for the construction of plural educations, which value the coexistence of knowledge.

One of the actions resulting from these partnerships was the extension project "Interethnic Encounters for Play." These encounters are understood as educational practices that provide dialogues between *Mbya-Guarani* and non-indigenous people, favoring the protagonism of indigenous peoples in the teaching of their history and culture to non-indigenous people. The activities of the Encounters propose new ways of transmitting knowledge to children, encouraging their autonomy through peer exchanges and contributing to increasing the visibility of traditional peoples. The project uses the experience of playing as an instrument for appropriating meanings from the social world (Lucena et al., 2021).

From the development of the Encounters, it became necessary to investigate whether the activities were being successful in promoting interethnic play among the participants (Lira et al., 2021). And, if they were, it would be paramount to assess the quality of these playful interactions beyond the mere description of what the pairs are doing together, such as, for example, whether interaction was aggressive or kind, with conflicting or coinciding objectives, as pointed out by Hinde (1976). In addition, we evaluated whether this playtime would have the potential to constitute spaces for exchanges and learning between children from both social groups.

Play is an ecologically relevant multidimensional phenomenon for several species (Ades, 2018). In humans, it has different manifestations with a wide variety of functions, being able to act both in metabolic, nervous and muscular development, as well as in the promotion of learning about the properties of objects, limits and capacities of its peers, the physical environment, and emotional regulation (Lucena & Pedrosa, 2021). Social play, i.e., play that involves more than one player, is in its very nature a continuous exercise of coordination between peers, encompassing consensual decision-making processes. The great motivation that children have in playing with others could be seen as an important force that allows them to learn to negotiate differences and meet the interests of their peers (Gray, 2013).

In several species, play would enable the formation of social bonds, which would promote a relatively peaceful coexistence for cooperation to occur in life promotion and maintenance activities. Studies with wolves and with different primate species corroborate this theory (Cordoni, 2009; Palagi, 2023). In humans, the increased need for cooperation and sharing could have led to the expansion of human motivation to play throughout the life cycle, involving greater flexibility of this playful context, allowing it to manifest itself in an infinite variety of activities (Gray, 2019).

Aspects such as familiarity between partners, gender, ethnicity, age, action patterns, among other variables, will influence the formation of play groups and playful

behavior (Richter et al., 2016; Skinner & Meltzoff, 2019). However, evidence shows that positive social contacts through cooperative activities between children from different social groups can act to reduce partner choice biases, promoting more positive interactional experiences and with the potential to mitigate prejudices (Skinner & Meltzoff, 2019). Studies also show that play groups with partners of different ages invest less in competitive play. Social play with groups formed by children of different ages would be different from that constructed by groups of children of the same age (Gray, 2011).

The construction and engagement of children in coordinated actions allow peers to act together to achieve objectives that emerge and develop in the course of the interactive flow of the group (Fogel, 2008). In these actions, peers perform activities that may be similar or different, but that involve negotiation for the management of the activity and for the establishment of shared understandings. Coordinated actions can be identified from behavioral displays of directing attention to partners or objects, as well as physical contact with partners or objects, spatial proximity, vocalizations, gestures, among others (Duguid & Melis, 2020; Tomasello, 2019). In this sense, processes of construction and sharing of information can be inferred through the analysis of children's actions in the construction of their play (Lucena & Pedrosa, 2021).

In this perspective, this study aimed to investigate the coordinated actions built between *Mbya-Guarani* and non-indigenous children in free play. Considering that positive interactional experiences have the potential to mitigate partner choice biases (Skinner & Meltzoff, 2019), we predicted that more interethnic coordinated actions would be built at the end of the Encounters, and that groups with children of mixed ages would present more such actions compared to groups of equal ages, as discussed by Gray (2011). In view of these predictions, we compared: (1) the duration and frequency values of the behaviors indicative of coordinated actions directed at interethnic partners at the beginning and end of the Encounters; (2) the duration and frequency values of the behaviors indicative of coordinated actions between interethnic conglomerates formed with children of mixed ages versus interethnic conglomerates formed by children of the same age at the beginning and end of each meeting.

Method

Participants

33 children participated in Encounter 1: 28 non-indigenous children and five *Mbya-Guarani* children from the *Yyrexakã* village. In Encounter 2, 49 children participated: 33 non-indigenous children and 16 *Mbya-Guarani* children from *Djekupe Amba Arandy* School. Different children were present at each event. All non-indigenous children were between 8 and 10 years of age, and were 4th grade students at the same school in the Western

side of São Paulo. The *Mbya-Guarani* children, on the other hand, were between 1 and 13 years old, and lived in two distinct villages. *Yyrexakã* is located at the southern end of the municipality, while *Djekupe Amba Arandy School* is located in the Jaraguá Indigenous Land.

Instruments

Video recordings of children's social interactions were used as a collection instrument. To this end, an area of 5m x 10m was delimited using a blue plastic canvas, and two video recording cameras on fixed tripods were used to cover this area located behind the House of Cultures. EVA mat pieces in two different sizes were offered, which could be explored as building blocks.

Procedures

Data collection. The two "Interethnic Encounters for Play" took place at the House of Indigenous Cultures, located at the Institute of Psychology of the University of São Paulo. Each Encounter was divided into four parts: Presentation, questions and answers, snack and free play, and closing. Both events took place in April 2019, and lasted an average of 3 hours. The children could roam the entire space around the House of Cultures. We videotaped the moments of free interaction, with 33 minutes filmed in Encounter 1, and 26 minutes filmed in the second event. At the end of Encounter 2 it began to rain, shortening our recording time by a few minutes.

Data analysis. The videos of Encounter 1 and Encounter 2 were analyzed separately. Initially, we select the first and last 10 minutes of each Encounter. Then, we performed scans (Altmann, 1974) every 30 seconds, recording which children were playing together in these time frames. We consider play, the action of manipulating objects or the environment, playing make-believe, tagging or hide-and-seek. It is important to highlight that this concept was delimited from the observation of the children's social interactions in the events.

Next, we applied Social Network Analysis (SNA) methods to explore children's association patterns at the beginning and end of the free interaction time of each encounter (Brass & Borgatti, 2019). We used SOCROG (Whitehead, 2019) to build the play association matrices. Subsequently, these matrices were forwarded to Gephi, and the community detection algorithm was implemented. In SNA, conglomerates or communities are portions of Networks in which individuals associate more with each other than with peers outside these conglomerates (Blondel et al., 2008).

From the implementation of this algorithm, we had access to how many play conglomerates were formed at the beginning and end of each Encounter, and which children were part of each conglomerate (Lira et al., 2021). Considering the hypothesis of this study, we selected only the interethnic conglomerates formed at the beginning and end of each Encounter to investigate the coordinated actions. Therefore, using the ethogram (Table 1), we performed the continuous focal transcription for each child present in these communities in the first and last 10 minutes of each Encounter. The coding of behaviors was performed in the BORIS software (Behavioral Observation Research Interactive Software).

Table 1

Ethogram with coded behaviors and their descriptions

Behaviors	Description	Measurements
Direct attention to the partner (DAP)	Child rotates their body and/or head to face, or direct their eyes, to one or more partners.	Duration
Direct attention to the partner with object (DAPO)	Child rotates their body and/or head to face, or direct their eyes, to one or more partners who have been touching an object for more than 3 seconds. Partners use one or both hands to throw, hold, lift, lower, drag, rotate, turn, squeeze, snap, or undock the object.	Duration
Direct attention to the object (DAO)	Child rotates their body and/or head to face, or direct their eyes, to an object not used by other partners.	Duration
Touching the object (TO)	Child touches an object using head, hands, arms, legs, feet, or other body parts for less than 3 seconds. It may or may not involve the use of force to propel the object.	Frequency
Manipulate the object solitarily (MOS)	Child touches the object with one or two hands for more than 3 seconds. The child can throw, hold, lift, lower, drag, rotate, turn, tighten, snap or undock another object.	Duration
Manipulate the object with partner (MOP)	Child touches the object with one or two hands for more than 3 seconds with one or more partners. The child can throw, hold, lift, lower, drag, rotate, turn, tighten, snap or undock another object.	Duration
Touching the partner (ENC)	Child touches a partner for less than 3 seconds with hands, arms, torso, or hips.	Frequency
Being touched by a partner (SENC)	Child is touched by a partner's hands, arms, torso, or hips for less than 3 seconds.	Frequency

For purposes of analysis, in this study, we will name interethnic conglomerates with an alphanumeric acronym, such as 1Ai. The first character refers to the Encounter in which the conglomerate was formed, which can be 1 or 2; the second character seeks to differentiate the conglomerates, assigning them capital letters following the order of the alphabet; and the third character refers to the reference cut of the conglomerate, which can be i (beginning) or f (end). We keep the same letter of the alphabet (second character) for conglomerates that kept at least half of the same members between the beginning and the end of the Encounters.

Ethnicity, age, and gender modifiers were also used when encoding videos. For ethnicity, the modifiers used were: non-indigenous partners, indigenous partners, interethnic partners. Considering the age of the children, four categories were established: 0 to 3 years, 4 to 7 years, 8 to 11 years, and 12 to 15 years. The modifiers used in the analysis were: younger partner or group; older partner or group; partner or group of the same age; and mixed age group. The modifiers considering sex were: partner or group of girls; partner or group of boys; and mixed group. These modifiers allowed us to characterize the pairs to which the actions were directed, so that we could compare the duration and frequency of behaviors oriented to both interethnic and mixed-age groupings.

Initially, to test the prediction that more interethnic coordinated actions would be built at the end of the Encounters, we applied the non-parametric Wilcoxon Signaled Posts test to related samples, checking if there was a significant difference between the duration and frequency values of the behaviors at the beginning and end of the Encounters. Then, in order to test the prediction that groups with children of mixed ages would present more coordinated actions compared to groups of equal ages, we also used the Wilcoxon test to compare the values of duration and frequency of behaviors between the clusters.

We separately compared the conglomerates formed at the beginning of Encounter 1: 1Ai x 1Bi. Then, the conglomerates formed at the end of Encounter 1: 1Cf x 1Bf, and finally the conglomerates formed at the end of Encounter 2: 2Ef x 2Ff. In the initial clipping of Encounter 2, only one conglomerate (2Di) was formed, which did not allow a comparison to be made for this time frame. The significance level was set at 5%.

Two trained observers independently coded the occurrences of the behaviors recorded in 25% of the videos analyzed. For the correspondence analysis between the three encodings, the Kendall coefficient of agreement (W) was calculated. All behaviors had agreement $W \geq 0.86$, revealing a good agreement between the evaluators. All these analyses were calculated in SPSS (Statistical Package for the Social Sciences).

Ethical Considerations

The research was approved by the National Research Ethics Commission (CONEP) – CAAE No. 86548618.4.0000.5561. We obtained the consent of the children's parents and guardians to perform video recordings of social interactions during the encounters. The use of the children's image was also authorized, safeguarding their identities, for the purposes of scientific publications and training of professionals and students.

Results

Encounter 1

In the initial cut of Encounter 1, 26 children were playing divided into five conglomerates, two of them interethnic, and three non-indigenous. 14 children were part of these two interethnic conglomerates. Conglomerate 1Ai was formed by: an indigenous boy and girl, two non-indigenous girls and a non-indigenous boy. The two indigenous children in these conglomerates were in the 4-7 age group, and all non-indigenous children were in the 8-11 age group. The 1Bi conglomerate was formed by: two indigenous girls and an indigenous boy, four non-indigenous boys and two non-indigenous girls. All non-indigenous children were in the age group of 8 to 11 years, while one indigenous girl was in age group 0 to 3, another in the group 12 to 15 years and the boy was in age group 8 to 11 years.

In the final cut, we had 25 children playing in four conglomerates: two interethnic and two non-indigenous. 17 children were part of the two interethnic conglomerates. Conglomerate 1Cf was formed by an indigenous boy, three non-indigenous boys and three non-indigenous girls. All children were in the age group 8 to 11 years. In conglomerate 1Bf, we had: two indigenous girls and one indigenous boy, five non-indigenous boys and two non-indigenous girls. Indigenous children were in the age group of 0 to 3 years and 4 to 7 years, while all non-indigenous children were in the age group of 8 to 11 years. Regarding the Wilcoxon test to assess the significance between the beginning and the end (Table 2), we found that the object manipulation behavior with interethnic partners had a significant increase ($p = 0.02$).

Regarding the results of the Wilcoxon test to evaluate the significance of the difference between the interethnic conglomerates (Table 3) in each cutout, we found that between the 1Ai x 1Bi conglomerates of the initial cutout, there was a statistical difference for the behaviors of directing attention to the partner with an object ($p = 0.01$) and manipulation of the object with a partner ($p = 0.01$). Both behaviors had a positive difference, indicating that conglomerate 1Bi had higher values in these categories. In the final cut, between conglomerates 1Cf and 1Bf, we observed a statistical difference only for the variable *manipulation of object with a partner* ($p = 0.03$), with a positive difference indicating that conglomerate 1Bf had higher values for this category.

Table 2

Descriptive statistics and Wilcoxon test referring to the beginning and end of the Encounters

Behavior	Statistics	Encounter 1		Encounter 2	
		Beginning	**End**	**Beginning**	**End**
DAP - Interethnic Partners	Mean ± EP	49.71 ± 24.58	0.00	0 ± 0	9.00 ± 9.00
	Median	0.00	0.00	0.00	9.00
	Wilcoxon	*p* = 0.10		*p* = 0.18	
DAPO - Interethnic Partners	Mean ± EP	216.00 ± 61.06	407.14 ± 75.97	51.00 ± 33.00	6.00 ± 6.00
	Median	300.00	492.00	51.00	6.00
	Wilcoxon	*p* = 0.13		*p* = 0.10	
DAO	Mean ± EP	9.86±5.45	20.82±11.99	141.40±54.00	39.00±23.30
	Median	0	0	185	27
	Wilcoxon	*p* = 0.91		*p* = 0.21	
MOP – Interethnic Partners	Mean ± EP	48.00 ± 20.61	295.71 ± 72.45	0.00 ± 0.00	0.00 ± 0.00
	Median	46.00	348.00	0.00	0.00
	Wilcoxon	*p* = 0.02		*p* = 1.00	
ENC	Mean ± EP	1.29 ± 0.35	5.71 ± 3.07	0.00 ± 0.00	5.00 ± 4.00
	Median	2.00	2.00	0.00	5.00
	Wilcoxon	*p* = 0.07		*p* = 0.18	
SENC	Mean ± EP	2.14 ± 0.91	5.14 ± 2.45	0.00 ± 0.00	2.00 ± 1.0
	Median	1.00	2.00	0.00	2.00
	Wilcoxon	*p* =0.05		*p* = 0.18	
MOS	Mean ± EP	44.43 ± 18.68	102.94 ± 102.9	216.80 ± 71.41	234.33 ± 46.24
	Median	12.50	44.00	243.00	276.00
	Wilcoxon	*p* = 0.20		*p* =0.05	
TO	Mean ± EP	2.14 ± 0.50	5.24 ± 1.73	2.40 ± 1.28	7.00 (±4.50) *
	Median	3.00	2.00	1.00	3.00
	Wilcoxon	*p* = 0.44		*p* = 0.06	

Table 3

Descriptive statistics and Wilcoxon test for the conglomerates in Encounter 1

Behavior	Statistics	Beginning		End	
		Conglomerate 1Ai	**Conglomerate 1Bi**	**Conglomerate 1Cf**	**Conglomerate 1Bf**
DAP	Mean ± EP	146.40 ± 19.125	18.67 ± 12.78	16.29 ± 10.77	27.00 ± 11.77
	Median	144.00	0.00	0.00	6.00
	Wilcoxon	*p* = 0.12		*p* = 0.20	
DAPO	Mean ± EP	38.40 ± 22.81	454.67 ± 67.54	534.86 ± 26.00	450.60 ± 55.07
	Median	6.00	546.00	570.00	480.00
	Wilcoxon	*p* = 0.01		p = 0.86	
DAO	Mean ± EP	3.93 ± 3.93	5.93 ± 4.23	2.41± 1.65	18.41 ± 12.11
	Median	0.00	0.00	0.00	0.00
	Wilcoxon	*p* = 1.00		*p* = 0.23	
MOP	Mean ± EP	0.00 ± 0.00	266.00 ± 60.67	70.29 ± 16.80	369.00 ± 49.61
	Median	0.00	306.00	66.00	399.00
	Wilcoxon	*p* = 0.01		*p* = 0.03	
ENC	Mean ± EP	0.64 ± 0.28	0.43 ± 0.20	3.57 ± 1.37	4.10 ± 2.25
	Median	0.00	0.00	2.00	0,50
	Wilcoxon	*p* = 0.47		*p* = 0.78	
SENC	Mean ± EP	2.20 ± 1.35	0.89 ± 0.26	3.71 ± 1.37	4.20 ± 1.84
	Median	0.00	1.00	3.00	1.50
	Wilcoxon	*p* = 0.67		*p* = 0.78	
MOS	Mean ± EP	5.93 ± 5.93	38.50 ± 18.65	62.29 ± 28.83	40.65 ± 21.53
	Median	0.00	6.00	0.00	0.00
	Wilcoxon	*p* = 0.09		*p* = 0.55	
TO	Mean ± EP	(0.29 - 0.29)	1.86 ± 0.501	4.71 ± 1.80	0.53 (0.22)
	Median	0.00	0-5	0.00	0.00
	Wilcoxon	*p* = 0.06		*P* =0.15	

Encounter 2

In the initial cut of Encounter 2, 16 children played divided into four conglomerates: one interethnic, two indigenous, and one non-indigenous. Five children were part of the 2Di interethnic conglomerate, three non-indigenous boys, one indigenous girl and one indigenous boy. All children were in the age group from 8 to 11 years. In the final cut, 28 children played divided into three communities: two interethnic and one non-indigenous. In the interethnic conglomerate 2Ef, we had 11 children: one indigenous boy, 9 non-indigenous boys and one non-indigenous girl. All children were in the age group from 8 to 11 years. Conglomerate 2Ff, on the other hand, contained seven children, two indigenous boys and five non-indigenous boys. All were in the same age group from 8 to 11 years.

Taking into account the Wilcoxon test to assess the significance between the beginning and the end, we found that no behavior had a statistical difference between the initial and final value of the variable (Table 2). In the initial clipping of Encounter 2, we had only one interethnic conglomerate built (2Di). The Wilcoxon test showed a significant difference for all behavioral categories between the 2Ef x 2Ff conglomerates (Table 4), from the final cut of Encounter 2: directing attention to the partner ($p < 0.01$); *directing attention to a partner with an object* ($p < 0.01$); *directing attention to an object* ($p = 0.01$); *manipulating an object with* a partner ($p = 0.01$); *manipulating an object alone* ($p < 0.01$); *touching the partner* ($p = 0.01$); *being touched* ($p = 0.01$); *touching an object* ($p = 0.02$).

Table 4

Descriptive statistics and Wilcoxon test for the conglomerates in Encounter 2

Behavior	Statistics	Encounter 2 - End	
		Conglomerate 2Ef	**Conglomerate 2Ff**
DAP	Mean ± EP	213.60 ± 56.94	195 ± 80.86
	Median	192.00	120.00
	Wilcoxon	$p < 0.01$	
DAPO	Mean ± EP	216.00 ± 77.50	123.00 ± 37.39
	Median	57.00	138.00
	Wilcoxon	$p < 0.01$	
DAO	Mean ± EP	95.14 ± 38.42	90.14 ± 51.70
	Median	52.00	53.50
	Wilcoxon	$p = 0.01$	
MOP	Mean ± EP	66.00 ± 29.44	30.00 ± 18.06
	Median	9.00	3.00
	Wilcoxon	$p = 0.01$	
ENC	Mean ± EP	2.80 ± 1.02	2.33 ± 0.91
	Median	2.00	2.00
	Wilcoxon	$p = 0.01$	
SENC	Mean ± EP	2.50 ± 0.74	1.50 ± 0.42
	Median	2.50	1.50
	Wilcoxon	$p = 0.01$	
MOS	Mean ± EP	182.50 ± 41.24	131.86 ± 62.92
	Median	185 50	103.00
	Wilcoxon	$p < 0.01$	
TO	Mean ± EP	4.17 ± 2.38	6.14 ± 3.42
	Median	2.00	8.00
	Wilcoxon	$p = 0.02$	

Discussion

This study sought to test the hypothesis that free play would promote the construction of coordinated actions among the children participating in two Interethnic Encounters for Play. We predicted that more interethnic coordinated actions would be built at the end of the Encounters, and that groups with children of mixed ages would present more such actions when compared to groups of equal ages.

At Encounter 1, our prediction that there would be more inter-ethnic coordinated actions at the end of the event

was corroborated. We found that *Object Manipulation with Interethnic Partners* (MOP) behavior was significantly higher in the final cutout, while *Attention Direction to Interethnic Partners* (DAPO) behavior also demonstrated some tendency to increase in the final time frame. In addition, the categories of physical contact with partners, *touching the partner* (ENC) and *being touched by a partner* (SENC) also tended to increase.

Through these data, we can also infer that interactive frames of joint attention were constructed by the children. These frames are recognized by directing attention to partners

and objects, as well as action on the same object as a partner, and constitute an important element of the development of coordinated actions. Sharing the focus of attention between partners creates the possibility of multiple perspectives on the same activity, enabling children to be able to solve challenges and negotiate forms of collaboration, generating shared understandings (Tomasello, 2019).

Fogel (2008) highlights the creative aspect of these consensual frames. The author argues that co-regulations experienced between peers in the interactional field allow not only the exchange of information, but also the creation of new information. It is conceived that information can be anything that is perceived or created through interactional co-regulations with objects or people. Information is not selected in advance, but becomes available through active engagement, which can be a bodily movement, emotion, thought, memory or sensation. From this perspective, we can understand that being together would be an important element for sharing among children to occur.

In Encounter 2, we found that our prediction about the increase in interethnic coordinated activities at the end of the event was not corroborated. Not only did no behavioral category have a significant increase, but we also saw a decrease in the *DAPO* and *MOP* categories. In addition, *interethnic DAPO* decreased the value, there was no *interethnic MOP* in both the initial and final cuts, and the category of *handling the object alone (MOS)* increased.

Regarding our prediction that groups of children of mixed ages would present more coordinated actions, we visualized that both play conglomerates of the initial cut (1Ai and 1Bi) were groups with children of different age classes, while in the final cut only one of the conglomerates (1Bf) had pairs of distinct age classes. Regarding the comparison of the conglomerates of the initial cut, we found that the conglomerate with the greatest diversity of age groups had a significant difference in the *MOP* and *DAPO* categories.

In the final cut, conglomerate 1Bf, a group of mixed-age children, had a significantly higher *MOP* category than conglomerate 1Cf, children of the same age, corroborating our prediction. Conglomerate 1Bf also had longer duration of interethnic *MOP* and *DAPO* than conglomerate 1Cf. It is important to remember that the 1Bf conglomerate kept at least half of its members between the initial and final cut. In this perspective, this result can corroborate data that demonstrates that positive interactional experiences can mitigate partner choice biases (Skinner & Meltzoff, 2019).

On the other hand, it was not possible to test this prediction in Encounter 2, as all play conglomerates had only peers of the same age group. However, conglomerate 2Ef of the final cut had significantly higher values, compared to conglomerate 2Ff, in all behavioral categories.

The results found in this study also indicate that free play had a greater potential for building interethnic coordinated activities in groups of children with mixed ages. Understanding that motivations to play, as well as the types of play considered relevant, change during the development of children, we can infer that free play in the format provided

at the event may not have been motivating for peers from the age of eight. While the mixed age groups, with the presence of younger children, may have acted as facilitators of the construction of actions, as discussed by Gray (2011).

Play with mixed-age groups is an important part of childhood experiences in various ethnic groups of indigenous peoples. Childhood is understood as an important life cycle phase in its own right, and children are recognized as active agents in their social environments. Shared experiences with older peers are essential opportunities to acquire skills and knowledge that will be naturally acquired through observation, and participation in activities and games (Gosso et al., 2015).

In recent decades, we have seen that strong age segregation is imposed on children living in Western societies. Most of them spend all day in schools, or other educational activities that are adult-oriented, in which they socialize more directly with peers of a maximum of a year or two apart. This situation is also associated with the decrease in the number of children of nuclear families, the weakening of ties with the extended family, and the decrease in play spaces in the streets and communities (Gray, 2013). On the other hand, we observed that in traditional societies, age division and the classification of knowledge are not part of the educational experiences of traditional knowledge. Guarani reflections argue that this division would lead to a reduction in the strength of community bonds that affectively support social cohesion among young people in the communities (Lima et al., 2019).

We recognize that the data discussed in this study have limitations. Considering that the activities of the Encounters for Play were built with objects that go beyond this investigation, i.e., cultivating educational practices which provide for dialogue between *Mbya-Guarani* and non-indigenous people, there was no control over the number of children within each ethnic, gender, or age group. One can also see that the time interval between the initial and final clipping of each encounter is relatively short, and that it would be interesting to analyze the activities of more Encounters.

We recognize the need to build other types of interactive contexts that can be used as educational practices to promote protagonism for indigenous communities, considering the audience of non-indigenous children from eight years old and adolescents. New research needs to be developed in order to subsidize modifications to the proposal of "Encounters fro play," to expand the successful development of interventions considering the entire age group of basic education students in non-indigenous society. What interactive spaces could foster better engagement with these children?

These results also corroborate and add to the reflections built by Lucena and Pedrosa (2021) on the importance of free play for the construction of healthy development paths, and for the promotion of citizenship. Considering the activities of the "Encounters for play," we understand that free play has potential as an educational instrument, allowing the

construction of spaces for exchanges and learning between *Mbya-Guarani* and non-indigenous children.

References

Ades, C. (2018). A psychoethological perspective for the study of animal behavior. In P. Izar & P. I. C. Gomide (Orgs.), *Beyond the innate-learned dichotomy: Contributions of César Ades to Brazilian Psychology* (pp. 61-70). Sociedade Brasileira de Psicologia.

Altmann, J. (1974). Observational study of behavior: Sampling methods. *Behaviour, 49*(3), 227-266. https://doi.org/10.1163/156853974x00534

Blondel, V. D., Guillaume, J.-L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment, 10*, P10008. https://doi.org/10.1088/1742-5468/2008/10/P10008

Brass, D. J., & Borgatti, S. P. (Eds.). (2019). *Social networks at work*. Routledge.

Cordoni, G. (2009). Social play in captive wolves (Canis lupus): Not only an immature affair. *Behaviour, 146*(10), 1363-1385. https://doi.org/10.1163/156853909X427722

Duguid, S., & Melis, A. P. (2020). How animals collaborate: Underlying proximate mechanisms. *Wiley Interdisciplinary Reviews: Cognitive Science, 11*(5), e1529. https://doi.org/10.1002/wcs.1529

Fogel, A. (2008). Relationships that support human development. In A. Fogel, B. J. King, & S. G. Shanker (Eds.), *Human development in the twenty-first century: Visionary ideas from systems scientists* (pp. 57-64). Cambridge University Press.

Gosso, Y., Bichara, I. D., & Carvalho, A. M. A. (2015). Brazilian children at play: Reviewing relationships between play and culture. In J. L. Roopnarine, M. Patte, J. E. Jonhson, & D. Kuschner, *International perspectives on children's play* (pp. 23-33). McGraw-Hill Education.

Gray, P. (2011). The special value of children's age-mixed play. *American Journal of Play, 3*(4), 500-522. https://files.eric.ed.gov/fulltext/EJ985544.pdf

Gray, P. (2013). *Free to learn: Why unleashing the instinct to play will make our children happier, more self-reliant, and better students for life*. Basic Books.

Gray, P. (2019). Evolutionary functions of play: Practice, resilience, innovation, and cooperation. In P. K. Smith & J. L. Roopnarine (Eds.), *The Cambridge handbook of play: Developmental and disciplinary perspectives* (pp. 84-102). Cambridge University Press.

Hinde, R. A. (1976). Interactions, relationships, and social structure. *Man, 11*(1), 1-17. https://doi.org/10.2307/2800384

Instituto Brasileiro de Geografia e Estatística. (2012). Os indígenas no Censo Demográfico 2010: Primeiras considerações com base no quesito cor ou raça [Indigenous people in the 2010 Demographic Census: First considerations based on color or race]. https://www.ibge.gov.br/indigenas/indigena_censo2010.pdf

Lima, R. V., Martim, J. A., & Guimarães, D. S. (2019). Nhembo'ea Reko Regua: Trajectories of the Mbya Guarani struggle for a differentiated education. In P. Hviid & M. Martsin (Eds.), *Culture in education and education in culture: Tensioned dialogues and creative constructions* (pp. 107-124). Springer International.

Lira, P., Moretti, C., Guimarães, D., & Resende, B. (2021). Group cohesiveness in children free-play activity: A social network analysis. *International Journal of Psychology, 56*(6), 941-950. http://dx.doi.org/10.1002/ijop.12777

Lucena, J. M. F., Amorim, K. S., & Pedrosa, M. I. (2021). Aprendizagem cultural por crianças de dois anos em seu grupo de brinquedo [Cultural learning by two-year-old children in play group]. *Estudos e Pesquisas em Psicologia, 21*(3), 1087-1107. https://doi.org/10.12957/epp.2021.62712

Lucena, J. M. F., & Pedrosa, M. I. (2021). O brincar e a construção de um meio culturalmente sustentável [Play and the construction of an cultural sustainable environment]. In M. I. Pedrosa, M. T. C. C. Souza, & M. I. S. Leme (Orgs.), *Desenvolvimento humano, justiça social e contextos sustentáveis* [Human development, social justice and sustainable contexts] (pp. 48-67). Edicon.

Palagi, E. (2023). Adult play and the evolution of tolerant and cooperative societies. *Neuroscience & Biobehavioral Reviews, 148*, 105124. https://doi.org/10.1016/j.neubiorev.2023.105124

Popyguá, T. S. V. T. (2022). *A terra uma só: Yvy Rupa* [The land is one: Yvy Rupa] (2nd ed.). Hedra.

Richter, N., Tiddeman, B., & Haun, D. B. (2016). Social preference in preschoolers: Effects of morphological self-similarity and familiarity. *PloS One, 11*(1), e0145443. https://doi.org/10.1371/journal.pone.0145443

Skinner, A. L., & Meltzoff, A. N. (2019). Childhood experiences and intergroup biases among children. *Social Issues and Policy Review, 13*(1), 211-240. https://doi.org/10.1111/sipr.12054

Tomasello, M. (2019). *Becoming human: A theory of ontogeny*. Harvard University Press.

Whitehead, H. (2019). SOCPROG: Programs for analyzing social structures (version 2.9). http://whitelab.biology.dal.ca/SOCPROG/Manual.pdf

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