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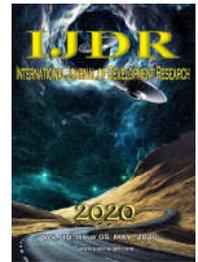
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RESEARCH ARTICLE

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CASE STUDY REGARDING BEHAVIORAL INTERVENTIONS TO A CHILD WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

The Assessment, Research and Intervention in Autism Spectrum Disorder Laboratory (LAPITEA) from CEUMA University in Brazil seeks to promote the development of skills, such as language, communication, imitation, motor and other behavior repertoires through interventions based on principles of Applied Behavior Analysis (ABA), applied to the treatment of children diagnosed with ASD. The purpose of this study was to present an experience report on the efficacy of discrete trial teaching, an intervention format in ABA, in establishing non-verbal and verbal skills in a 5-year-old child with ASD. This paper shows the child's performance in two interventions to develop repertoires of sitting still and making requests. Access to preferred items was granted to the child when he emitted correct responses while incorrect responses, resulted in corrections with prompts by a therapist. Along the year of 2018, the child showed high rates of correct performance in both repertoires. Implications for the development in social contexts, such as the school, were discussed.

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INTRODUCTION

Assessment, Research and Intervention in Autism Spectrum Disorder Laboratory (LAPITEA) is a facility located within the limits of a private University in Brazil (CEUMA University). There, a multi-methodological proposal integrates three fields of study: Psychological Evaluation; Applied Behavior Analysis; and consulting and collaboration in School Psychology (Matos & Matos, 2017). Children with ASD in LAPITEA, at first, are assessed through protocols with the purpose of identifying skill deficits, which shall be addressed by interventions based on Applied Behavior Analysis (ABA). 20 children are attended twice a week, 1 hour and 30 minutes per day. For each child, an individual curriculum is established based on his/her strengths and weaknesses on important repertoires for their development. Each curriculum emphasizes the expected learning levels for a typically developing child and intervention programs seek to establish skills to promote a better functioning in social environments, such as the residence and school.

Over decades, research in ABA has focused in assessing the efficiency and efficacy of procedures to teach repertoires regarding areas such as language, communication and non-verbal skills. In this process, intervention manuals were also published and they provide information that describes step by step the scientifically based programs to teach verbal and non-verbal repertoires to children with ASD and other cases of learning disabilities (Greer & Ross, 2008; Sundberg & Partington, 1998). In LAPITEA, a set of interventions is consistently and systematically implemented to not only teach undergraduate Psychology students in theoretical and conceptual issues in ABA but also how to implement interventions with high levels of accuracy to the children with ASD, to whom several programs are addressed later (Lerman, Tetreault, Hovanetz, Strobel & Garro, 2008). The way, through which these interventions are conducted in LAPITEA, refer to discrete trial teaching (Allen & Cowan, 2008; Matos, 2016). In this sense, each program regarding a specific skill involves the operational definition of a response class to be taught, either verbal or non-verbal. As an example, consider a program

implemented to teach the imitation of simple non-verbal actions. A teacher presents a model by clapping his hands and a learner has to replicate it. When this happens, the teacher delivers feedback, which might function as a reinforcer to establish and strengthen the aforementioned repertoire. The reinforcer is the variable responsible for the response learning in the presence of the model as an antecedent stimulus. A successful trial is defined as a contingency of reinforcement (Skinner, 1953). That is, an antecedent event (called discriminative stimulus) sets the occasion for the emission of a specific response that produces a consequence, functioning as a reinforcer. A contingency of reinforcement represents operant behavior. ABA is especially concerned in teaching non-verbal and verbal operant behaviors to individuals with ASD. The discrete trial teaching is planned and implemented in a structured context, where teacher and learner sit in front of each other near a table. The procedures are conducted in the format of massed trials and arbitrary learning criteria are defined. The purpose of this brief experience report was to present data on performance in programs, with the purpose of teaching non-verbal and verbal behavior, exhibited by a 5-year-old child with ASD from LAPITEA and to conduct a brief discussion on the implications for inclusion in day-to-day social environments. Due to the need of making a brief report on the child's performance as to give evidence of the efficacy of interventions, data from two programs, sitting still (non-verbal skill) and mand/making requests (verbal skill) are presented.

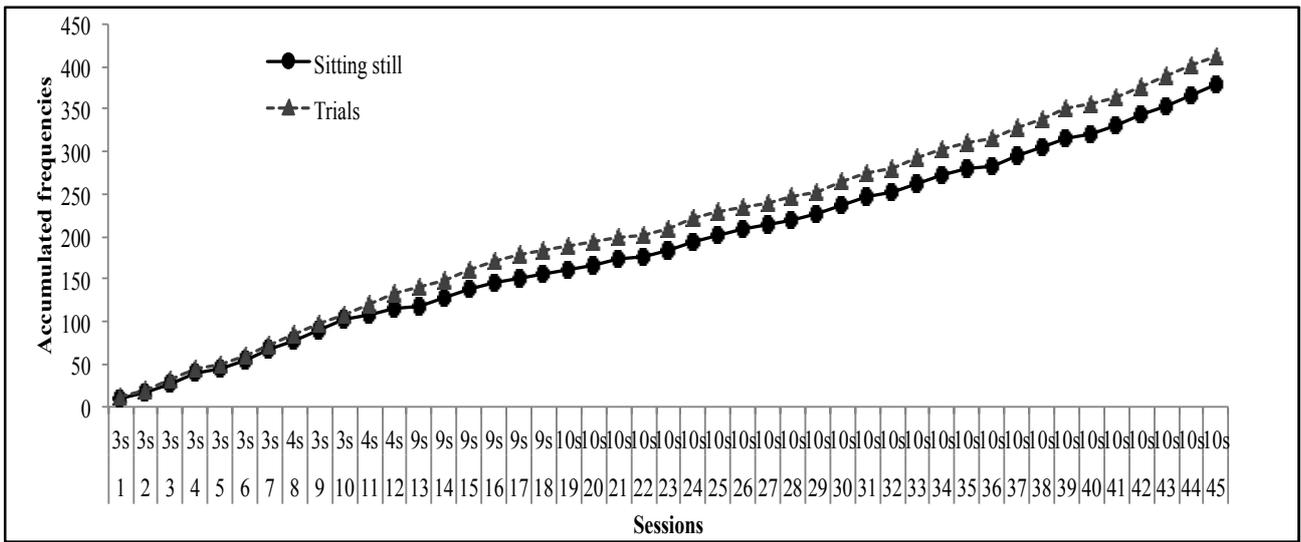
MATERIALS AND METHODS

The 5-year-old child with ASD from LAPITEA was first assessed through a component of the Verbal Behavior Milestones Assessment and Placement Program (Sundberg, 2008). This protocol allows the mapping of the child's current repertoires, regarding deficits in skills, which must be addressed through intervention based on discrete trial teaching. The child was attended in LAPITEA since the onset of 2017. His repertoire during the beginning of the study was related to what he was able to do during 2018, second year of the child in the laboratory. At that time, he could make several requests, regarding his most preferred edibles and games available; he was able to state the name of at least ten different pictures and objects; he could follow at least 12 different verbal instructions related to simple actions, such as clapping the hands and touching the nose; he demonstrated functional play with at least three different toys, such as colored blocks, toy car and horse; he showed interest in physical contact with different therapists; he could demonstrate at least 12 different motor responses upon the presentation of models by therapists; he was able to vocally imitate many words presented by different therapists. As to the procedures conducted with the child, although several repertoires were taught through discrete trial teaching, and the learner was successful with all of them, two skills with some of the best results during the year of 2018 were specifically selected to demonstrate the efficiency and efficacy of the teaching. One of the repertoires is non-verbal and consisted in making the child "sitting still". It is a program to develop imitation and correct the learner's posture according to a model presented by the therapist, which involves the therapist positioning his hands over his legs, while he remains sitting with an erect posture. During a successful trial, the therapist presents the non-verbal model as discriminative stimulus, as well as a verbal instruction ("sit still"). The child, then, replicates the model by responding accordingly in 3 s. As

soon as this happens, the therapist reinforces the child's non-verbal operant behavior. Along several trials, it is expected that the child demonstrates a consistent pattern of correct responses. In a given session, a specific response cost is required for each trial. In the beginning, the learner needs to remain seated with an erect posture during 1s and according to the adult's model. As soon as arbitrary learning criteria are met, the response cost increases progressively to 2s, 3s and so on. This happens every time the learner shows 100% correct responses. During teaching trials, if the learner makes mistakes or does not respond within 3s, the adult presents physical prompts to correct the learner. The other selected repertoire, as an example of a successful established verbal skill, consists in vocal mands (making requests). A mand is a kind of verbal operant behavior (Skinner, 1957). Verbal behavior is operant behavior under the control of mediated consequences. During a verbal episode between two people, for example, if one of them is thirsty, this and the presence of the other one sets the occasion for the emission of a verbal response, such as "could you give me some water, please?". This description constitutes the mand behavior or, in other words, a verbal request. The person who emits this verbal behavior is called a speaker and, the other one who delivers whatever the speaker might ask for, is called listener. Many children with ASD lack this kind of skill and part of the literature on ABA recommends the teaching of this skill as one of the major concerns, because it is a skill through which the speaker might be able to get access to things that greatly benefit him/her in the immediate environment. It is also important for generalization purposes, considering that people in general use it in many social occasions. This way, by addressing learning difficulties regarding the repertoire in a structured environment, it is hoped that the acquired mand will generalize to different settings and communication partners. At first, preference assessments were carried out in order to determine some of the child's favorite goods. Among them, there were cookies, videogames and water. During the program to teach the skill of making requests, each discrete trial involved the presentation of one of the items and, sometimes, the question "what do you want?" as stimuli to evoke the emission of a vocal request (e.g. "cookie") by the child. Once this happened, the therapist delivered a piece of the item (or some time to interact with it if it's not an edible) as consequence. This established a successful trial. Nevertheless, if the child was unable to name the wanted item within 3s or made a mistake, the therapist presented a vocal model, so the child could repeat it. As it happened to the other program, arbitrary learning criteria were determined and, along several learning trials, the presentation of the items occurred in a random fashion. 100% correct responses and maintenance was the goal of the intervention. An informed consent form was signed by child's parents, for his participation and the study was approved by an ethics committee in research with humans (authorization No. 1.189.331) humans from CEUMA University, São Luís-MA, Brazil.

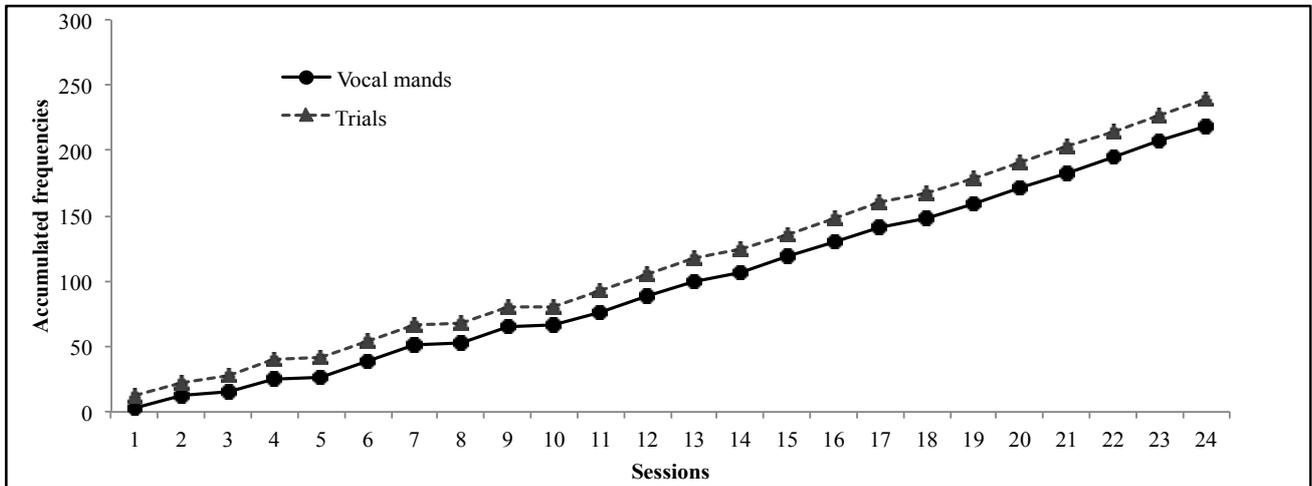
RESULTS

Figure 1 represents the first repertoire (sitting still) and, Figure 2, the second (mand/making requests), regarding the interventions conducted with the child. The data from both figures correspond to a year of work with the child in LAPITEA. They are related to the year of 2018, even though the child was enrolled since the beginning of 2017. Data are plotted as cumulative measures, regarding correct responses and the number of trials or opportunities to respond.



Source: The authors (2019)

Figure 1. Cumulative frequencies of correct “sitting still” responses and number of trials for the target child



Source: The authors (2019)

Figure 2. Cumulative frequencies of correct “vocal mand” responses and number of trials for the target child

Figure 1 depicts data regarding performance of a non-verbal repertoire named "sitting still" to develop imitation and correct the learner's posture according to a model presented by the teacher, as mentioned previously. The data show that the teaching was effective in establishing the target behavior in a way that the child exhibited fluent responses for longer durations along the sessions progressively. Correct responses were demonstrated in most of the teaching trials. Figure 2 represents data concerning the child's performance on vocal mands. Basically, the response patterns replicate those from the "sitting still" program. The child was already fluent in emitting vocal mands in order to get access to his preferred reinforcers, along several opportunities to respond.

DISCUSSION

The data demonstrated that the discrete trial teaching effectively maintained correct non-verbal and verbal responses at a high rate along many sessions in the year of 2018. The child showed consistency in emitting independent responses. It was said previously that he was attended in LAPITEA since 2017. Although data regarding 2017 are not plotted, it is worth mentioning that the child showed no consistent verbal requests during many months in that year.

In 2018, the repertoire was established and generalized effects were assumed due to reports from the parents, who said the child was demonstrating the use of the aforementioned skill in a very fluent and independent manner throughout several contexts in daily interactions. So far, as examples of the work conducted in LAPITEA with one of the children with ASD, the collected data shows that the procedures seem to be very effective in establishing repertoires, which may not be developed very appropriately under different circumstances. The main purpose with these kinds of interventions in structured environments, however, is with the production of generalization effects. It is hoped that the developed skills will be used in different settings, which should be less structured and more related to day-to-day situations, such as school and residence. Inside LAPITEA, the axis responsible for consulting and collaboration in School Psychology is especially concerned with a school inclusion process. The educational staff at school is responsible for the learning in the context of groups of children, which may be a challenge for many children with ASD. In LAPITEA, the Psychological Evaluation axis is responsible for the conduction of assessment processes, which contribute in mapping the learning strengths and weaknesses and finally the ABA axis use this data to better define an individual curriculum to teach basic skills that

may facilitate the process of inclusion at school later. It is supposed that if basic repertoires are improved, in the sense that a given child is, for example, paying more attention, sitting appropriately, establishing and maintaining eye contact, making requests, then this child might benefit more in the future in contexts with groups of children, such as the classroom. Measures of planning and implementation of inclusion practices at school, as a more natural environment, might be discussed and conducted by the educational staff and with the aid from school psychologists (Matos & Matos, 2017; Mitijáns-Martínez, 2005).

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