Does Playing Games Contribute to Develop Better Attitudes?

Maria Thereza Costa Coelho de Souza, Ana Lucia Petty, Camila Tarif Ferreira Folquitto,
Mariana Ines Garbarino, Tamires Alves Monteiro

University of Sao Paulo, São Paulo, Brazil

This research was held at the Laboratory of Studies about Development and Learning (Institute of Psychology, University of Sao Paulo) for the period of three semesters in which children with learning disabilities aged 7-11 years were observed in a game context mediated by professionals. It investigated in which categories playing games interfered in the construction of favorable attitudes towards the learning and development processes. To collect data researchers used a questionnaire, answered in the beginning and at the end of each semester, and where attitudes were registered considering four categories: time, space, objects and interaction. A total of 88 questionnaires were analyzed. Results show that: (1) All categories increased scores; (2) There was no decrease in any category; (3) At space and objects there were more visible changes, comparing high scores between the first and third semesters, increasing 25% and 36% respectively; (4) At time and interaction, changes showed 20% high score increase in both, also comparing first with third semester; and (5) It was identified a decrease in low scores at time and there were not visible changes at interaction. Taking Piaget's theory as reference and the practice in seeing children with learning disabilities at the laboratory, playing games in an intervention context contributes to help them build up better attitudes towards reasoning and social development.

Keywords: development processes, attitudes, playing games, intervention, genetic epistemology

Introduction

The genetic epistemology of Jean Piaget embassies the psychogenetic approach of the development, presenting a relevant discussion about the factors that interfere in the mental evolution, contributing to the construction of new structures, such as those related to the knowledge of the physical world, the social interaction and the self. This author has proposed a succession of levels regarding the development of reasoning, stating that the operational thought supposes both: the transition from the concrete to the abstract level and from the individual to the social knowledge. About morality in children, he underlines that beyond the intellectual capacity to understand and practice social rules, the child also needs affectivity as the energetic regulation of the feelings towards the ones that presented the rules and expect them to be respected (Piaget,

Maria Thereza Costa Coelho de Souza, Ph.D., professor, Laboratory of Studies about Development and Learning, Institute of Psychology, University of Sao Paulo.

Ana Lucia Petty, M.D., Laboratory of Studies about Development and Learning (Institute of Psychology, University of Sao Paulo.

Camila Tarif Ferreira Folquitto, Ph.D., Laboratory of Studies about Development and Learning (Institute of Psychology, University of Sao Paulo).

Mariana Ines Garbarino, M.D., Laboratory of Studies about Development and Learning (Institute of Psychology, University of Sao Paulo.

Tamires Alves Monteiro, M.D., Laboratory of Studies about Development and Learning (Institute of Psychology, University of Sao Paulo.

1991).

According to Smith (2009), Piaget's perspective can be defined as a developmental epistemology because it articulates a theory of knowledge, in which genesis and structure are related (genetic epistemology), with a psychological method that allows to observe the transformations occurred with the subject and the object (clinical interview and piagetian tasks). Furthermore, for the author, psychology provides evidence about the transformations of knowledge and structures as the child develops, regarding the relations between external and internal factors. The genetic epistemology focuses on the interaction between subject and object, as well as between structure and genesis (dialectical constructivist). Together, they allow the subject to be investigated both from an epistemological point of view as well as the psychological.

The main subject of this research is the concept of attitude on solving problem situations as a system of intentional procedures organized by consciousness. Many times these procedures are isolated or not enough developed to face situations with more than one possible solution. As a consequence, they do not contribute to anticipate better strategies because they are too strict. Playing games in a problem-solving context, with peers and adult supervision promotes awareness of different points of views and look for better solutions. According to Inhelder (1992), procedures have to be coordinated, related to particular tasks and based on global mental processes (cognitive structures). Good procedures also have to be anticipatory and generalized to other situations, because they are based on macrogenetic construction. One can state that being able to construct successful procedures in terms of space, time, objects, and interaction allows the subject to change attitudes in favour of the learning and development processes.

Regarding the game context, Piaget's (1945) theory brought about important contributions to the researches that are game-based. In his studies, they were classified into three main structures: practice games, symbolic games, and games with rules. The latter supposes adjustment to reality and learning about the social world, and includes intellectual combinations regulated by rules and where there is competition between individuals. The author also states that knowledge means the existence of a subject-object relation, in a context where action is a condition for the former to build up new structures. In this particular case, he is making reference to actions that are significant to the subject. Firstly, these actions are physical, observable, involve movement and manipulation. Within the development process, the child becomes able to establish relations, and the actions are not only reduced to object manipulation, but they can also be mentally executed. From this moment on, he/she is capable of thinking, raising hypothesis, interpreting and creating, as well as can define goals, acts with intention and planning, coordinates information and considers different points of view. When rules are understood as a social regulator, it is possible to improve new competences in order to succeed and win, and to develop more adequate, interactive and cooperative attitudes (Piaget, 1932). To do so, it is also necessary to use different skills such as attention, organization, and self-control (Petty & De Souza, 2012).

Thus, the piagetian approach in which this research is based upon is considered interdisciplinary and provides a fundamental understanding about how children that have to solve challenges, in a context of playing games and problem-solving situations with adult supervision, articulate different elements that promote awareness of their actions and also improve their reasoning, affectivity and the ability to value judgments.

The practice in seeing children with learning disabilities (Macedo, Petty & Passos, 1997, 2000, 2005; De Souza, et al., 2002) at the Laboratory of Studies about Development and Learning has confirmed the contribution of playing games to the learning and development processes. This program is based on a methodology that supposes the use of games in an intervention context, and it is divided in four sequential

moments: First of all, children must learn the rules and play, being orientated on how to act accordingly and achieve the target. After that, they are invited to play several matches, aiming at building up strategies, and are questioned about their procedures and attitudes. The third moment includes problem-solving situations, created to find out if each one has improved strategies and procedures while taking part of the game context. At last, and mostly important, the child has to establish relations between the attitudes and procedures constructed while playing games with his/her difficulties, being able to use inner resources to understand and deal with them. The main point is not to become a good player, but to surpass school problems and/or inadequate attitudes, and the game context offers a privileged opportunity to contribute in order to help each one build up better attitudes towards reasoning and social development.

This contribution was also observed in a longitudinal study (Folquitto, 2013) that aimed at providing favorable experiences to the development of children diagnosed with ADHD (attention deficit and hyperactivity disorder). In this context, 18 children with ADHD aged 7-12 years took part in the research and were separated into two groups: one with children participating in the intervention program, and another group in which they were exclusively followed in their development (control group).

All participants were assessed before and after taking part of the intervention project, with rating scales of ADHD symptoms (SNAP-IV (Swanson, Nolan, and Pelham questionnaire (IV version)—parents and teacher rating scale of ADHD symptoms)), and with neuropsychological tests (ROCF (Rey Osterrieth Complex Figure), WISC-III's subtests "Vocabulary", "Block Design", "Coding", "Digit Span", and "Symbol Search" for obtaining IQ, and measures of attention and processing speed).

During approximately one year, children were seen every week, in which games with rules were used to intervene in the symptomatic characteristics of children with ADHD, such as inattention, hyperactivity and deficits in executive functions. Results suggest that games and problem-solving situations, mediated by professionals, can be useful instruments to enhance the development of children with ADHD, decreasing many symptoms and improving the executive functions. Among those who took part in the activities proposed, there was a 36% reduction in symptoms of inattention and 40.9% in those related to hyperactivity. Regarding the executive functions, improvements occurred in tests that evaluated processing speed, memory, and visuospatial attention.

Another study has confirmed the value of playing games to benefit the development and learning processes (Torres, 2001). It was also conducted in the context of game workshops held at the laboratory, with seven elementary school students who had learning disabilities. The longitudinal study evaluated the evolution of the subjects regarding the operational thought, using the Longeot Scale (EPL (Échelle de la Pensée Logique)). The post-test indicated that all of them changed from a lower level to a superior one. Pedagogical progress was evaluated by two tests, involving linguistic and mathematical contents, and every participant showed better results, mainly in mathematics. Regarding attitudes to the learning process, analysis was made from data registered in records and they also confirmed that all subjects changed attitudes and improved school results.

Authors such as Zaia (1996; 2003), Brenelli (1993; 2002), Zuben (2003), Rosseti and Missawa (2008), Dias (2009), Saravali et al. (2009), Ortega, Rossetti, Queiroz, and Stursa (2012), Rossetti and Ortega (2012), also brought about several contributions of playing games. In their studies and investigations, the main goal was to enhance the importance of the game context to interfere positively to the learning and development processes of children diagnosed with learning difficulties.

Each game and problem-solving situation investigated enables to analyze different procedures and attitudes, considering the piagetian perspective. In this approach, empirical researches have shown several possibilities of building up strategies and evaluating in a game context intervention. Brenelli (1996; 2005) has studied the game *Quips* taking into consideration aspects such as equivalence, inclusion, correspondence, seriating and conservation of quantities. According to the author, it is not the game itself that stimulates development, but the action of playing games in groups, which demands comprehension and cooperation. Petty & Passos (1996; 2005) have demonstrated how the Tic-Tac-Toe game brings about important contribution to make children learn how to become more organized in terms of dealing with limits and respecting opponents, both concepts based in the piagetian perspective. Tangram was another game investigated by the same authors. In this case, the main point was to analyze the operational relations that could be observed as children played, and also the expression of patience as an important attitude to be developed in order to find solutions and understand the geometric relations among the pieces.

Games can be used as evaluating instruments and with different perspectives, willing to interfere in favour of the construction of more positive attitudes. As Souza (1996/2005) states, they allow researchers to study how children think, develop reasoning, build up affectivity and social relations. Professional interventions in a game context can help them visualize, understand and correct unfavourable procedures. In accordance with Souza, another interesting research held by Dell'Agli and Brenelli (2010) confirm that children with learning difficulties and school maladjustment proceed and get better results when participating in game contexts. We completely agree with their hypothesis that this ludic context enables children to feel more confident to explore different solutions, being less afraid to make mistakes, if compared to the school demands.

Problem

This research summarizes a long-term study in which children were observed in a game context and their attitudes were registered in questionnaires that included four categories: time, space, objects, and interaction. It aimed at investigating in which categories playing games interfered to help them construct favorable attitudes towards the learning and development processes.

Materials and Method

Children with learning disabilities aged 7-11 years took part in the research. They were seen at the Laboratory of Studies about Development and Learning (Institute of Psychology, University of Sao Paulo) for the period of three semesters, during one hour every week. In this context, they were invited to play games with rules, solve logical problems and interact with peers. The activities were supervised by professionals, who mediated and challenged them to develop reasoning and build up favorable attitudes towards the problem-solving situations. It is important to underline that the program held at the laboratory offers a particularly interesting empirical environment because children are always seen in groups, which allows a more complete understanding of the social relations.

To collect data researchers used a questionnaire, answered in the beginning and at the end of each semester. It investigated four categories (time, space, objects, and interaction), divided in different aspects that informed about what would be considered at each one.

(1) At "Time", sequence of actions, action coordination and rhythm at tasks were the main references. It also included questions about: punctuality, beginning and ending of activities in the established period of time,

commitment with started activities that were undone, concentration during individual and/or group propositions;

(2) At "Space", it was investigated how children managed with localization, organization and orientation in different places. There were also questions about the condition to remain at a defined place, the use of space without interfering in other's place, how the space in a sheet of paper was used and if the child dominated the space of a board game;

(3) At "Objects", the questionnaire demanded information about caring of belongings, sharing materials with peers, and if the child could keep things in the proper place or find them when required. It was also important to register the use of garbage bin and files for papers, if there was interest in helping adults when necessary and if could follow a match moving the right piece at his/her turn;

(4) At "Interaction", there were many questions investigating social relations, friendships and choices of peers, recognition of the right time to talk and/or listen. It was also registered if the child required help and how often (meaning if he/she could do some activities alone before asks for interferences), comments and contributions, respect for friends and adults, observation of rules and limits, if accepted errors and mistakes, if followed others opinion and if was chosen by different colleagues.

Three scores were defined in order to register children's procedures and attitudes: 3 for high, 2 for medium or 1 for low, to each aspect of every category, according to the frequency observed. To analyze data, by the end of the three semesters it was possible to sum up the total of scores in each semester and compare them, aiming at verifying if the game context would interfere in favour of attitude improvement, and in which categories high scores were noted. A total of 88 questionnaires were analyzed.

Results

Results show important empirical indicators about the changes observed within the three semester game context. As a consequence, we can affirm that all investigated categories increased scores (see Figures 1 and 2).
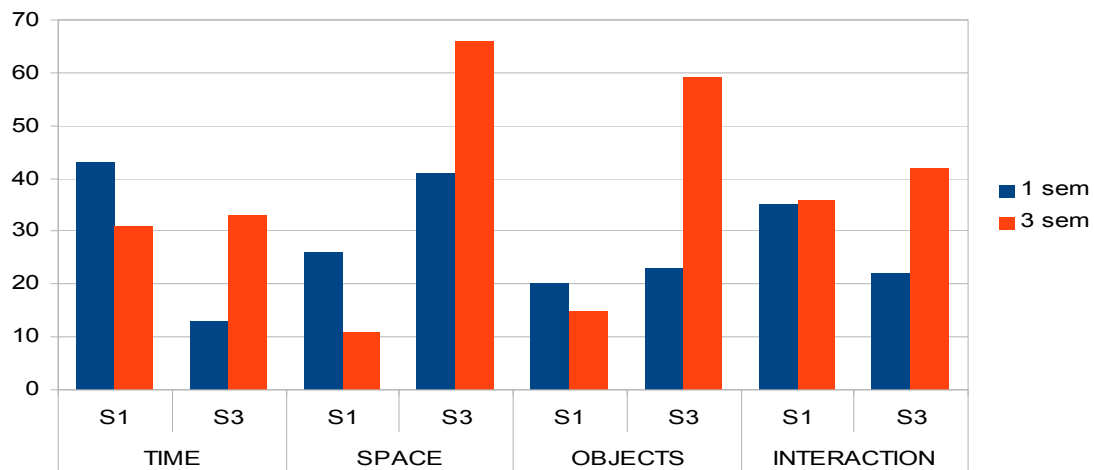

Figure 1. Distribution of scores 1 and 3 per category in 1st and 3rd semesters.

Figure 1 represents the distribution of scores 1 and 3 per category in the first and third semesters. It is possible to observe that the most preeminent progress happened at space and objects. At the same figure, it can

be noticed that the frequency of answers for score 1 decreased from the first to the third semester at three categories, exception to interaction, in which little changes happened. On the other hand, considering scores 3, even at interaction some progress occurred. At space and objects there were more visible changes, comparing high scores between the first and third semesters. They increased 25% and 36% respectively. At time and interaction, the changes were more discrete, showing 20% high score increases in both, also comparing first with third semester.

The distribution of score 3 per category during the three semesters can be visualized at Figure 2. It shows how changes developed at each semester.

There is a non linear progress, in which slight changes are noticed from the first to the second semester, and they become more evident from the second to the third. It seems the second semester represents a transition among the frequencies for score 3, that appears more evident. Another interesting aspect to be underlined is that there was no decrease of score 3 in any category (per semester). It was identified a decrease in low scores comparing results for each semester at time and there were no visible changes at interaction.
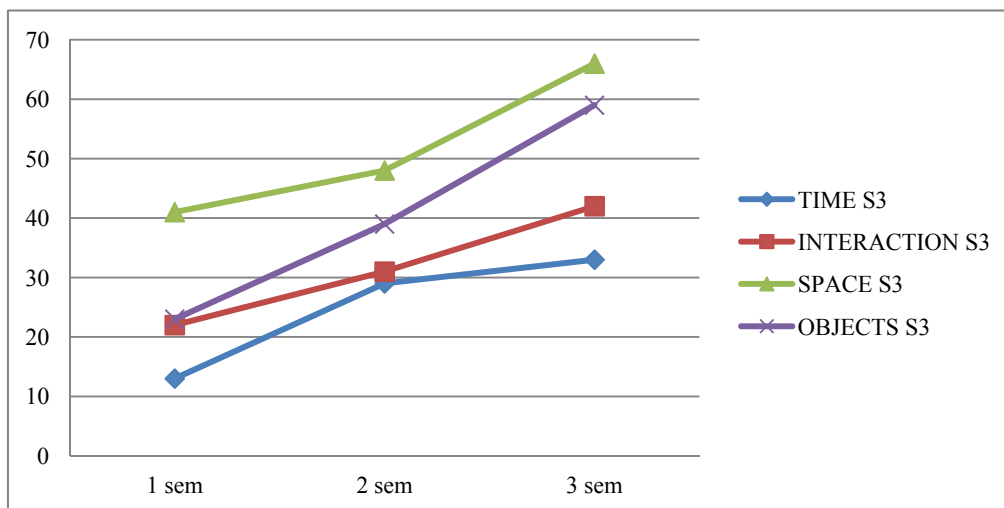

Figure 2. Distribution of score 3 per category during the three semesters.

Comparing Figures 1 and 2, it can be observed that there was no decrease of score 1 at interaction and there was score 3 increase, which enables to infer that the progress was influenced by decrease of score 2. For future planning, it will be necessary to define interaction as a priority, among the other categories, as results showed.

Considering the child's development perspective, the results are not a surprise and are aligned with Piaget's theory. Objects are one of the first things he/ she relates with, explores and learns about. Children who are not familiar enough with their school belongings, who are not able to share or take care of them, definitely need to conquer this competence. Doing so, and knowing what to do with objects contribute to spatial organization and this fact is confirmed with this research. In addition, it is known that to proceed adequately in relation to time matters, such as sequence of actions and rhythm at tasks, depend on a balanced relation between objects and space. All this is an interdependent construction, which has to include not only subject-object interaction, but also interaction, sharing and mutual respect. At interaction, scores 3 increased, but scores 1 did not indicate visible changes. The complexity of relating and establishing social interaction is probably one fundamental reason to explain the tardiness for changes to happen at this achievement.

Discussion and Implications

Playing games with children, under professional supervision and with adequate interventions, turned out to be a privileged opportunity to interfere in the categories they needed to improve. The game context demands from the players coordination between space and objects, as well as supposes action coordination in a period of time, always interacting with opponents and respecting the rules. As a consequence, it stimulated changes and the development of better attitudes, in particular those related to attention, organization and social relation.

It is important to underline that playing games is a necessary condition, but not enough for itself. In other words, it is not a guarantee that playing games will make children develop better attitudes at the four studied categories neither will directly interfere at their development. Changes can be noticed as the consequence of a well planned context in which interventions lead the subject to analyse procedures and attitudes, shifting the how-to-do action to the understanding of why it was done, widening the comprehension of the process. Thus, from this rich and favourable environment, that demands reasoning and reflection, the child becomes aware of his/her actions and is able to perform the necessary changes in attitudes. Macedo (1994) states that awareness of an action supposes understanding the process. Actions mean to do, being coordinated in space and time. Awareness, in its turn, is also the consequence of mental processes including reflection about the actions and their coordination. In other words, to do supposes the construction of many procedures (regarding how) and to comprehend implies thinking about them (regarding why). Considering the piagetian approach, it is possible to affirm that action awareness means not only describing it, but also being able to understand and explain it.

As mentioned in the introduction, the research performed with children with ADHD indicated that playing games in the intervention context and in accordance with the methodology already described, showed that it helped them improve executive functions, generating a reduction of the symptoms of hyperactivity and inattention, contributing at social adjustment as well as improving the necessary resources for the learning and development processes. Moreover, the worsening of performance in neuropsychological tests presented by the control group can be interpreted as an indication that interventions focused on executive functions such as planning, attention and working memory are essential for children with ADHD to show improvements at the learning and developing processes. At the same time, the reduction of ADHD symptoms observed on children who took part in the game project can also be interpreted as a consequence of the interventions that contributed to the development of better attitudes, which were more targeted and focused to the goals.

Conclusion

An important implication of the present research is to reinforce some methodological conditions to achieve good results, which are: (1) the game situations must be carefully planned; (2) interventions contribute to make children more conscious about their actions; (3) adequate problem-solving situations and significant tasks motivate children to face different challenges; and (4) this context favours children to become more confident and able to observe similarities among the procedures and attitudes constructed in the game context with school demands, willing to change.

This research consists of an important reference for further investigations and will enable professionals to use the results as a guide: (1) to define priorities at planning activities with games; (2) to know in what categories the project interferes first at children's attitudes; and (3) to create adequate interventions for the ensuing semesters, in order to help children surpass the remaining difficulties.

To sum up, we can affirm that playing games and solving problems seem to bear powerful means to help children with learning disabilities build up resources to achieve high scores at fundamental categories of the learning and development processes. When they act in pro of the changes and succeed, they also behave like this at home and school, becoming more autonomous and competent.

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