Original article

The social information processing in a sample of aggressive adolescents

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INTRODUCTION

The problem of aggressiveness in adolescence increasingly demands more comprehensive approaches. It has become necessary to have a better understanding of its most direct causes, as well as of some variables that, at different degrees, contribute to the manifestation of aggressive behaviors. In general terms, this has been the main proposal of the model developed by Crick & Dodge,[1] regarding social information processing in aggressive children and adolescents.

According to this model, a higher tendency to present aggressive behaviors in social interaction situations is associated with the way individuals process information in their own interpersonal context. Processing contextual information means, in this case, perceiving, interpreting and using certain social clues to generate and adopt specific behavioral strategies. Therefore, it is a model that comprehends different stages in terms of processing, and thus relates the manifestation of aggressive behaviors with specific deficiencies in the treatment of social data.[1]

In more explanatory terms, it should be stressed that, according to that model, at a first moment a codification of social clues is seen. Dodge & Newman[2] have demonstrated, for example, the fact that children with aggressive tendencies proved to be less efficient with regard to codification of social information. According to that study, non-aggressive children in the control group have shown, in quantitative terms, more skills to perceive and identify information that is present in an interpersonal context. Perceiving and focusing attention are mechanisms that serve to consolidate an understanding of what might be characterizing an interaction circumstance. Similar results have also been obtained by Shahinfar et al.[3]

According to this model, a second stage concerns interpretation. In this sense, social data would not be processed independently. In other words, these data are interpreted based on the activation of preexisting cognitive structures in the subject. As examples, the works by Dodge[4] and Dodge & Tolmin[5] stand out. They have demonstrated, for example, the tendency aggressive children have to generate analyses less based on perceived data and more influenced by previous experiences. That is, the interpretation a subject with aggressive tendencies makes of a situation

emphasizes the data that can be brought to his memory, to the detriment of some more immediate evidence. As a complement, Bickett et al.[6] and Dodge & Somberg[7] have drawn the attention to the fact that aggressive children and adolescents attribute more hostility to others' intentions than non-aggressive children and adolescents. Dodge et al. have also shown that an ambiguous event, such as being hit in the back by a ball, while the child was walking in a square, tends to be interpreted as intentional by an aggressive child.[8] How facts are understood and the integration of social clues are, therefore, crucial in the understanding of aspects associated with manifestation of aggressive behavior.

Once the situation has been interpreted, the social information processing model establishes that subjects will search answers in accordance with the situation they have just experienced. Thus, there is a generative process as to the different procedures that supposedly prove to be adequate to the context. Therefore, before making a decision, there would be a verification of the alternatives related to all the actions that can be undertaken. Researches developed by Lochman & Dodge[9] and by Mize & Cox[10] provide evidence related to the fact that aggressive children and adolescents end up by generating a smaller number of possible solutions for a given impasse situation. Ability to formulate resolution alternatives seems to be equally related with displayed behavior; a more restrict number of options may facilitate adoption of aggressive strategies. As demonstrated by other studies, aggressive children and adolescents tend to trust more in the efficacy of aggressive strategies, and such strategies are usually considered before any other solution with regard to a hypothetical impasse situation.[11]

Finally, at the decision stage, functionality of generated answers is considered, and the choice is linked to the success or failure in previous situations, besides being associated with the image children or adolescents have of themselves. Subjects will thus proceed according to behavioral strategies they think they are able to use successfully. Crick & Dodge have demonstrated that a subgroup of aggressive children (those who tend to use proactive aggressive behavior) attributed more efficacy in the use of aggression compared with a non-aggressive group.[1] Other

researches have also demonstrated that aggressive children and adolescents generally expect less positive results when they consider the possibility of adopting prosocial attitudes in hypothetical impasse situations.[1]

Dodge et al.[12] have aimed to perform a confirmatory study about the model's validity, considering its different stages and internal consistency for processing modalities. In that work, the model's multidimensionality has been confirmed, as well as its predictive capacity for aggressive behavior standards based on questionnaires filled in by teachers. In general, the model mentioned above stresses some particularities regarding the phenomenology of social interaction. Synthetically, the stages that compose that model respectively are: codification, interpretation, goal clarification, construction of answers, decision and behavioral performance. On the other hand, instead of clarifying all possible causes involved in the manifestation of aggressiveness, the idea is to explain the underlying cognitive mechanisms that, at different levels, may contribute to the worsening of some tendencies. Stating that such tendencies may be more or less stressed due to differentiated social information processing does not mean postulating that these cognitive aspects are sufficient conditions with regard to manifestation of aggressiveness.[13] It should also be highlighted the fact that, although performance in processing stages may be jeopardized in the presence of psychotic symptoms, more direct relationships with other cognitive abilities or even with different schooling levels have not been noted.[1] Therefore, based on the model previously mentioned, we present a study comprehending different aspects related to social information processing in a sample of incarcerated adolescents at Fundação de Atendimento Sócio-Educativo do Rio Grande do Sul (FASE), in Porto Alegre, Brazil. This study was based on the hypothesis that adolescents who may be classified as aggressive present differences concerning specific stages of social information processing compared with a control group.

METHODS

Subjects

It is a controlled cross-sectional study, in which a group of 29 incarcerated adolescents with history of aggressive behaviors was compared with a control group of 21 male adolescents with no history of aggressive behaviors. Groups were paired by age group.

Regarding the group of adolescents at FASE, we included those who had committed a crime involving threat or physical aggression, with or without a gun or any perforating/cutting object, and who were between 14-17 years (mean, M = 15.3; standard deviation, SD = 0.76) at date of assessment. Although those acts do not correspond to a specific legal category, having committed them has been confirmed, for each case, by employees at the institution with access to medical charts. This sample corresponds to the total of adolescents who have met the inclusion criteria and accepted participating in the study.

Control group included adolescents between 14-17 years (M = 15.19; SD = 0.75), students at different public schools in Porto Alegre (four state schools and one municipal school), whose school records did not present any records of aggressive acts against colleagues or teachers. Information contained in school records was obtained at the respective institutions, and the data were confirmed by parents or guardians. In both groups, exclusion criteria were: illiterate adolescents and those who presented a psychotic disorder without other particularities.

Instruments

To assess one of the aspects related to social information processing in both groups, i.e., the interpretation of social clues, four pictures were used; their high level of ambiguity concerning expressed emotions had been confirmed by a random sample of 125 individuals. At this stage, selection of pictures was based on the use of 10 pictures chosen by the researchers: five portraying male characters and five portraying female characters. Our aim was to identify which pictures had

the highest index of indetermination regarding any emotion expressed in the face. This stage served to confirm that the pictures were neutral with regard to expression of emotions.

To evaluate the processes of generating answers and making decisions about their adoption, a narrative involving a hypothetical impasse situation was used. Its conciseness and clarity were verified in a test with eight incarcerated adolescents, aged between 14-16 years, in which 100% of them affirmed having a complete understanding of the situation being described, being able to reproduce the story after listening or reading it only once (appendix 1).

The version of the Mini International Neuropsychiatric Interview – Brazilian Version 5.0.0 (MINI Plus) resulting from studies by Amorin[14] was used to exclude cases of psychotic disorder without other particularities in both samples. In this case, the module M of that instrument was used, composed of 24 questions that guided a semi-structured interview, based on the DSM-IV diagnostic criteria.

Procedures

Procedures to assess incarcerated adolescents occurred in four specific FASE units that contained male adolescents. The institution provided rooms to perform the assessments at all units. With regard to the control group, assessments were performed in unoccupied classrooms. Access to them was granted by board members of each school. All adolescents and those responsible for them signed a consent form, and the present study was approved by the ethics committee at Pontifícia Universidade Católica do Rio Grande do Sul, protocol nº 700-03-CEP. In all cases, the assessment was started by presenting the pictures and their respective classification by the individuals, followed by a description of the hypothetical impasse situation. Then, questions included in module M of the Mini Plus were asked. Before this procedure, the adolescents were told that there were no right or wring answers and that, in case the questions were causing them any discomfort, they could quit the assessment. For each picture, participants were asked whether they thought the person in the picture was somehow seeming to be angry at someone or unhappy about something; the answer should be

“yes” or “no.” This question was invariably made for the adolescents in the main group, as well as for those in the control group. With regard to interpersonal hypothetical impasse situation, as soon as it was described, participants were required to list all actions they would adopt to solve the impasse. Classification of answers was performed by one of the researchers, based on the fact that they contained or not the description of a strategy involving aggressiveness or even the threat of an aggressive behavior to obtain the object specified in the situation report (appendix 1). The following statements are examples of these answers: “I would start a fight;” “I would threaten to punch him." After providing all the answers, participants were asked whether they had any other action in mind concerning the described situation. Answers generated after the presentation of the pictures and those related to actions described by the participant were recorded in separate white sheets for each participant. Scores ranging from 0-4 were attributed, related to the number of times in which hostility was attributed to each picture (affirmative answers), as well as scores related to the amount of answers generated for the hypothetical impasse situation.

Statistical analysis

Student’s *t* test was used to compare scores of hostile attributional biases to the pictures, as well as to compare the total number of answers, independent of type of strategy. The chi-square method was used to compare the percentage of adolescents with and without aggressive answers in both groups. For all assessed individuals, we also considered the correlation level between the amount of generated answers and the scores of hostile attributional biases for the pictures based on Pearson's correlation coefficient.

RESULTS

With regard to adolescents with history of aggressive behavior (n = 29), mean score was 2.93, and standard deviation was 0.80. With regard to adolescents in the control group (n = 21), mean score was 1.43, and standard deviation was 0.93.

According to the Student's *t* test for independent samples, considering a 5% significance level, there was a statistically significant difference between mean scores of hostile attributional biases between both groups under investigation. Values obtained were: t = 6.14; gl = 48; and p < 0.001.

Concerning the total amount of generated answers, mean of answers generated by adolescents with history of aggressive behavior was 2.14, and standard deviation was 0.52. Mean of answers generated by adolescents in the control group was 2.67, and standard deviation was 1.11. According to the Student's *t* test for independent samples, considering a 5% significance level, there was no statistically significant difference between means. Values obtained were: t = - 2.029; gl = 26.277; and p = 0.053.

Regarding the presence of an aggressive strategy between answers mentioned by the participants for an interpersonal hypothetical impasse situation, the following percentage was obtained for both groups: in the group of adolescents with history of aggressive behavior, the percentage of individuals who mentioned one aggressive strategy, among others, was approximately 58.62% (17 adolescents); in the control group, the percentage of individuals who mentioned an aggressive behavior, among others, was approximately 9.52% (two adolescents). According to the chi-square test, there is a statistically significant association between presence of aggressive answer and group to which the individual belongs (12.462 and p < 0.001). In both groups, there was no situation in which the participant had mentioned two or more strategies that could be classified as aggressive.

Finally, concerning a correlation between the tendency of a hostile attributional bias to the pictures and the total amount of answers generated by the adolescents in both groups, considering a 5% significance level, there was a negative (r = - 0.306) and significant (p = 0.031) Pearson's correlation.

DISCUSSION

The present study aimed at investigating aspects of social cognition related to aggressive behavior in adolescents. Previous researchers had already demonstrated that, in fact, there are particularities related to the way incarcerated children and adolescents who can be classified as aggressive perceive and consider social information.[15] This study only focused on some specific stages of this process in incarcerated adolescents, according to the social information processing model previously described,[1] more specifically the stages related to codification and interpretation of clues and the stages related to construction and access to answers, as well as decision about them.

Our study confirms the findings by Bickett et al.[6] and Dodge & Somberg[7] related to hostile attributional biases concerning other's manifestations by aggressive children and adolescents. As stressed by Dodge,[16] a series of studies have confirmed this tendency in children and adolescents. Most of these studies used complete scenes, shown in videotape, and were equally classifiable as ambiguous. A study performed by Slaby & Guerra[15] has demonstrated, more specifically, a tendency of hostile attributional bias by incarcerated aggressive adolescents compared with a control group.

In this sense, we highlight the need of longitudinal studies to investigate the effects of incarceration in adolescents, with regard to the different aspects of social information processing. A significant number of studies presents differences related to social information processing in adolescents with and without history of aggressive behaviors.[1] On the other hand, it is also necessary to investigate the fact that incarceration time may increase certain processing characteristics. In our study and in the study by Slaby & Guerra,[15] both comparing adolescents under such conditions with a control group, a longitudinal design was not used to explore such questions. A limitation of this type may be overcome by further studies in this area.

On the other hand, as emphasized by Crick & Dodge,[1] the effect of hostile attributional bias alone on impairments in social competence for children and adolescents is not clear yet. However, it

is possible to raise a suspicion about a strong relationship. According to researches by Dodge & Somberg,[7] this tendency is even more present in children in situations in which they felt provoked.

Another issue under investigation in this study concerned the amount of solutions generated in both groups when faced with an interpersonal hypothetical impasse situation. In this case, incarcerated male adolescents, aged between 14-16 years, with history of aggressive behavior generated, in average, a lower number of solutions when faced with an interpersonal hypothetical impasse situation than adolescents in the control group; however, there were no differences according to the established significance level. Non-confirmation, in statistical terms, of previous studies about the total number of generated answers could be related to sample size.

Answers classified as representing aggressive solutions for the situation were also considered in this comparison. That is, answers in which participants affirmed they would threat or use their body, or even a weapon, as a form of retaliation for the described situation. In this case, such findings have corroborated researches performed by Lochman & Dodge[9] and Mize & Cox.[10] More specifically, Slaby & Guerra[15] have also demonstrated a higher tendency in incarcerated aggressive adolescents to find solutions involving retaliation when faced with a situation in which they felt provoked.

In general, studies of this kind show a difficulty presented by aggressive children and adolescents in solving problems related to social impasse or conflict situations. As stressed by some authors,[17,18] the systemic work related to gradual development of the ability to solve social problems has proven to be efficient for the treatment of aggressiveness in children and adolescents.

Recurrent aggressive behavior was not mentioned by all adolescents in the main group and, at the same time, was mentioned by a few adolescents in the control group. On the other hand, based on the collected data, it is perfectly possible to verify the difference between both groups. Therefore, it is possible to understand that the numbers might be reflecting a tendency that is in accordance with previous researches, even if, as mentioned above, more longitudinal studies about

social information processing in incarcerated adolescents are needed for a better understanding of these findings.

One aspect of the present research, related to convergence of methods and, therefore, to data obtained, is the fact that, based on them, it was possible to verify a negative and statistically significant correlation between hostile attributional criteria and total amount of generated answers, reporting or not aggressive strategies. In other words, the statistical treatment of the total sample showed that the tendency of hostile attributional biases for ambiguous facial expressions was, in this study, correlated with lower probability of generating solutions from an impasse situation, independent of assessed adolescents being incarcerated or not. It would be premature to make general statements based on the numbers obtained in this study; however, the data demonstrate that distinct aspects of social cognition might be associated. To date, no studies have been carried out to confirm this hypothesis for a heterogeneous sample. The correlation index may only serve to propose hypotheses for further researches about a close and verifiable inter-relationship regarding these stages of social information processing.

This study focused on social information processing of those adolescents. Due to the differences found, it is possible to note that more directive treatments, whose focus would be on the adolescents' social skills, could prove to be adequate. In this context, although this study is not focused on the issue of clinical treatment for aggressive adolescents, results achieved may subsidize the proposal of new intervention programs.

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ABSTRACT

This study aimed at investigating hostile attributional biases for ambiguous facial expressions and answers generated to impasse situations related to aggressive behavior in adolescence. In a cross-sectional design, four pictures suggesting ambiguity in relation to emotions and a narrative based on a hypothetic impasse situation were applied to a non-randomized sample of 29 incarcerated, male adolescents with history of aggressive behavior, and in a control group of 21 male adolescents, both groups aged 14 to 16 years. The Mini International Neuropsychiatric Interview – Brazilian Version 5.0.0 was used to exclude psychosis. There were statistical differences between the scores of hostile attributional biases ($t = 6.140$, $p < 0.001$). There was correlation between the scores of hostile attributional biases and the number of answers to the hypothetic situation in the total sample ($r = -0.306$, $p = 0.031$).

Keywords: *Social cognition, information processing, aggressive behavior.*

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Appendix 1. Hypothetical impasse situation

Imagine you have bought two comic books by your favorite character. You leave the newsstand where you have bought the comic books, walk for one block and realize you dropped one of them. You come back and see another boy who is about your age picking the comic book up. What would you do to get the comic book back? Try to list all the solutions you can imagine for this situation that could make you get the comic book back.