Decision-making and social skills in children with ADHD

Toma de decisiones y habilidades sociales de niños con TDAH

Tomada de decisão e habilidades sociais de crianças com TDAH

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ABSTRACT

There is evidence that children with attention-deficit/hyperactivity disorder (ADHD) have more deficits in decision-making and social skills. This study aimed to verify whether these findings could be replicated in a sample of Brazilian children and whether these two domains were associated. Forty-nine children with ADHD and 57 children without ADHD responded to two computerized decision-making tasks and to an inventory of social skills. The children with ADHD showed worse indicators of social skills. However, the groups presented similar decision-making patterns, and these measures did not predict the overall social skills scores.

Key words: ADHD; attention-deficit/hyperactivity disorder; decision-making; social skills

RESUMEN

Existe evidencia de que los niños con trastorno por déficit de atención/hiperactividad (TDAH) tienen más déficits en las habilidades sociales y de toma de decisiones. Este estudio tuvo como objetivo verificar si estos hallazgos podían replicarse en una muestra de niños brasileños y si estos dos campos estaban asociados. Cuarenta y nueve niños con TDAH y 57 niños sin TDAH

Palabras clave: TDAH; trastorno hiperactivo por déficit de atención; toma

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respondieron a dos tareas de toma de decisiones computarizadas y a un listado de habilidades sociales. Los niños con TDAH mostraron peores indicadores de habilidades sociales. Sin embargo, los grupos presentaron patrones similares en la toma de decisiones y estos indicadores no predijeron las puntuaciones generales de habilidades sociales.

RESUMO

Há evidências de que crianças com transtorno de déficit de atenção/hiperatividade (TDAH) apresentam mais déficits em tomada de decisão e em habilidades sociais. Objetivamos verificar se esses achados são replicados em uma amostra de crianças brasileiras e se esses dois domínios estão associados. Quarenta e nove crianças com TDAH e 57 crianças sem TDAH foram submetidas a duas tarefas computadorizadas de tomada de decisão e a um inventário de habilidades sociais. Crianças com TDAH apresentaram piores indicadores de habilidades sociais. Contudo, os grupos apresentaram padrões de decisão similares, e essas medidas não predisseram significativamente os escores gerais de habilidades sociais.

de decisiones;
habilidades
sociales

Palavras-chave:
habilidades
sociais; TDAH;
tomada de decisão;
transtorno de
déficit de atenção/
hiperatividade

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is characterized by a persistent and dysfunctional pattern of inattention and/or hyperactivity/impulsiveness (American Psychiatric Association, 2014). There is much evidence that children with ADHD are more likely to present deficits in social functioning (for a meta-analytic review, see Ros & Graziano, 2017). For example, they tend to present lower scores in social skills questionnaires (Aduen et al., 2018; DuPaul, Morgan, Farkas, Hillemeier & Maczuga, 2017; Mikami, Huang-Pollock, Pfiffner, McBurnett & Hangai, 2007; Murray-Close et al., 2010), and some studies have found that they give more decontextualized (Mikami et al., 2007; Ronk, Hund & Landau, 2011) and hostile (Mikami et al., 2007) responses in social situations, are less skilled when joining groups (Ronk et al., 2011), are less likely to recognize emotional faces (Pelc, Kornreich, Foisy & Dan, 2006), and perform worse in social cognition tasks (Parke et al., 2018) than children without this condition. There is also some evidence that children with ADHD are more susceptible to making disadvantageous decisions (Marx, Hacker, Yu, Cortese & Sonuga-Barke, 2018; Sonuga-Barke, Cortese, Fairchild & Stringaris, 2016). For instance, they seem to be more prone to making impulsive decisions (Bitsakou, Psychogiou, Thompson, Sonuga-Barke, 2009; De Meyer, Beckers, Tripp & Van der Oord, 2019; Fabio et al., 2020; Kuntsi, Oosterlaan & Stevenson, 2001; Marco et al., 2009) and bad choices in tests that simulate gambling (Bubier & Drabick, 2008; Drechsler, Rizzo & Steinhausen, 2008; Drechsler, Rizzo & Steinhausen, 2010). Accordingly, this study aimed to verify whether these findings could be replicated in a sample of Brazilian children. Furthermore, we intended to investigate whether these two domains were correlated, since some authors have already hypothesized that social behavior is, in part, immediately influenced by our decisions (Damásio, 1994; Del Prette & Del Prette, 2009; Mata et al., 2011). Accordingly, children with ADHD may be more inclined to make impulsive – rather than self-controlled – decisions in social contexts, which could worsen the quality of their interpersonal relationships. In this study, we used two decision-making tasks to verify whether different deficits in this process – i.e., delay aversion or difficulty in predicting the future consequences of choices – would be associated with social skills.

Method

Participants

The sample was composed of 106 children (48 girls and 58 boys) aged between 8 and 11 years ($M = 9.00$; $SD = 0.98$). Participants of the clinical group were 49 children (16 girls and 36 boys) with ADHD. All of them had been diagnosed at the Attention Deficit Clinic (AMBDA) of the Federal University of Minas Gerais (UFMG). The comparison group was composed of children enrolled in two public schools in Belo Horizonte. Of the 67 children whose parents authorized their participation in the study, 10 were excluded due to presenting a clinically relevant score regarding inattention and/or hyperactivity/impulsiveness according to the *Swanson, Nolan and Pelham Evaluation Scale* (SNAP-IV; Mattos, Serra-Pinheiro, Rohde & Pinto, 2006; Swanson et al., 2001). Therefore, 57 children (32 girls and 25 boys) composed the comparison group. In order to participate in the study, one of the parents/legal guardians of the child was required to read and sign the consent form. This study was part of a larger project, which was approved by the Ethics Committee of UFMG.

Instruments

Maudsley's Index of Childhood Delay Aversion (MIDA; Kuntsi et al., 2001). The MIDA is a computerized test that evaluates delay aversion, which is thought to be one of the causes of impulsive decision-making. In 20 trials, the child needs to choose between waiting for two seconds to destroy a spaceship (obtaining one point; impulsive decision) or waiting thirty seconds to destroy two spaceships (obtaining two points; self-controlled decision). The performance in the MIDA refers to the percentage of two-point choices obtained.

Hungry Donkey Task (HDT; Crone & Van der Molen, 2004; Mueller & Piper, 2014). The HDT is a computerized test that evaluates the child's capacity to make self-controlled decisions by predicting the possible consequences. In order to acquire apples for a donkey, the child needs to choose, in 150 trials, between opening doors A, B, C, or D. Every 10 trials, doors A and B provide 40 apples and remove 50 (a net loss of 10 apples), and doors C and D provide 40 apples and remove 30 (a net gain of 10 apples). The performance in the HDT is a result of the

subtraction of the total choices of the advantageous doors (C and D) from the total of the disadvantageous doors (A and B).

Social Skills Rating System (SSRS-BR; Gresham & Elliot, 1990; validated by Bandeira, Del Prette, Del Prette & Magalhães, 2009). The SSRS version for children contains 34 items ($\alpha = 0.80$) which evaluate social skills pertaining to six classes of behaviors, while the version for parents/guardians encompasses 38 items ($\alpha = 0.91$) which evaluate six other classes. The response alternatives are “Never”, “Sometimes”, and “Frequently”. An overall social skills score is extracted from each version of the instrument following the sum of their items score.

Results

Mean scores and standard deviations for each instrument are described in Table 1 (Supplementary Materials). According to the analyses of covariance (ANCOVA),¹ no statistically significant differences were found between the groups regarding their decisions in the MIDA [$F(1, 100) = 0.622$; $p = .432$; $\eta^2 = .006$] or in HDT [$F(1, 99) = 0.004$; $p = .952$; $\eta^2 < .001$]. With regard to the children’s assessments of their social skills, the groups were not different in the classes of responsibility [$F(1, 100) = 3.823$; $p = .053$; $\eta^2 = .037$], empathy [$F(1, 100) = 1.794$; $p = .183$; $\eta^2 = .018$], assertiveness [$F(1, 100) = 0.935$; $p = .336$; $\eta^2 = .009$], self-control [$F(1, 100) = 3.766$; $p = .055$; $\eta^2 = .036$], problem avoidance [$F(1, 100) = 0.252$; $p = .617$; $\eta^2 = .003$] and expression of positive feelings [$F(1, 100) = 2.342$; $p = .129$; $\eta^2 = .023$]. However, the children with ADHD had a lower overall social skills score [$F(1, 100) = 6.775$; $p = .011$; $\eta^2 = .063$]. Regarding the parents’ evaluation, the groups were not different in the classes of initiative [$F(1, 100) = 1.695$; $p = .196$; $\eta^2 = .017$] and assertion [$F(1, 100) = 1.766$; $p = .187$; $\eta^2 = .017$]. However, the children with ADHD presented lower scores in the classes of cooperation [$F(1, 100) = 14.642$; $p < .001$; $\eta^2 = .128$], kindness [$F(1, 100) = 25.426$; $p < .001$; $\eta^2 = .196$], self-control/civility [$F(1, 100) = 39.019$; $p < .001$; $\eta^2 = .281$] and passive self-control [$F(1, 100) = 16.930$; $p < .001$; $\eta^2 = .145$]. Furthermore, their overall social

¹ Age, economic level, gender and intelligence (measured by The Raven’s Coloured Progressive Matrices; Angelini, Alves, Custódio, Duarte & Duarte, 2009) were used as covariates in all comparative and regression analyses.

skills score was lower than that of children without ADHD [$F(1, 100) = 23.937$; $p < .001$; $\eta^2 = .193$].

Multiple linear regressions were used in order to test whether the children's scores in the decision-making tasks would predict their social skills. With regard to the children's self-assessment, the SSRS overall score was not significantly predicted by the performance in the MIDA ($\beta = .126$; $t = 1.293$; $p = .199$) nor by the HDT score ($\beta = .21$; $t = 0.230$; $p = .818$). Similarly, regarding the parents' evaluation, the overall SSRS-BR score was not significantly predicted by the performance in the MIDA ($\beta = .113$; $t = 1.118$; $p = .266$) nor by the HDT score ($\beta = -.032$; $t = -0.334$; $p = .739$).

Discussion

In line with the literature (e.g., Aduen et al., 2018; DuPaul et al., 2017; Ros & Graziano, 2017), we found that children with ADHD presented a lower overall social skills score than children without this condition. Furthermore, they scored worse in four out of six social skills evaluated by their parents. Some authors suggest that these social deficits can be partially explained by the symptoms of inattention and impulsivity (Andrade, Brodeur, Waschbusch, Stewart, & McGee, 2009; Humphreys, Galán, Tottenham & Lee, 2016; Nijmeijer et al., 2008). For example, Humphreys et al. (2016) claim that children with ADHD may neglect others people's "facial cues", which would affect their decisions and behaviors in social contexts.

Conversely, the groups presented similar performance in the decision-making tasks. Unlike others studies (Bitsakou et al., 2009; De Meyer et al., 2019; Kuntsi et al., 2001; Marco et al., 2009), an examiner on our team informed the participants whenever they earned points in the MIDA, round by round. Therefore, it is possible that this interfered in the detection of possible differences between the groups regarding the impulsive choice due to delay aversion. With regard to the HDT, other studies also did not find differences between children with and without ADHD (Geurts, Van der Oord & Crone, 2006; Lambek et al., 2010). Lambek et al. (2010) suggested that "the contingency schedules involved in the HDT might be too complex to understand", and that "there appears to be some limitations when applying gambling tasks in childhood populations" (p. 903).

We also found no evidence to support the hypothesis that children's social skills are influenced by their decision-making profiles. However, since there are some theoretical (e.g., Mata et al., 2011) and even empirical reasons to believe this (Humphreys et al., 2016), it is possible that we adopted problematic strategies to test this relationship. For example, both the MIDA and HDT have yet to be adapted for the Brazilian context, and an easier version of the latter could be more appropriated to assess children's abilities to make self-controlled decisions (Lambek et al., 2010). Furthermore, our relatively small sample may also have affected some results we found – especially those involving the MIDA, the score of which have been frequently associated with ADHD (e.g., Marco et al., 2009; De Meyer et al., 2019).

In conclusion, we verified that our sample of Brazilian children with ADHD tended to present more social skill deficits. However, we did not replicate the findings that suggest that this population is more susceptible to deficits in decision-making (e.g., Marx et al., 2018), and we did not find support for the hypothesis that this construct is associated with social skills. It is possible that this occurred because of the size of our sample and/or due to some limitations related to the computerized tasks we used – which could be validated for the Brazilian population in future studies. If the hypothesis we have been working with is true, then interventions to improve the profile of choices of children with ADHD in social contexts could be developed. Therefore, we encourage more research on this topic to be carried out.

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