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An effective intervention can contribute to enhancing social integration while reducing perceived stress in children

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Abstract

Introduction. This investigation evaluates whether an intervention involving mindfulness-based practices, socio-affective activities, and socio-cognitive instances can foster prosocial attitudes and positive social relationships and reduce perceived stress in children.

Method. The study was conducted with 44 children (20 girls and 24 boys) aged between 6 and 8 (*M*= 7.25 years, *SD*= 0.43), and followed a quasi experimental wait list design with two measurement time points (pre and post intervention). We analyzed relative changes in social integration, universal altruism and perceived stress levels.

Results. Our results revealed that children who participated in the intervention showed an enhancement in social integration and universal altruism tests, and a decrease in the perceived stress indices. That is, children chose more peers as playmates and rejected fewer of them, while evidencing more prosocial attitudes.

Discussion and Conclusion. Our findings suggest that this kind of intervention can contribute to fostering social integration and prosociality while promoting children's health and wellbeing from an early age.

Keywords: social relationships; altruism; perceived stress; prosocial behavior; empathy

Resumen

Introducción. La presente investigación evalúa si una intervención que involucra prácticas basadas en la atención plena, actividades socio afectivas e instancias sociocognitivas puede fomentar actitudes prosociales y relaciones sociales positivas y reducir el estrés percibido en los niños.

Método. El estudio se realizó con 44 niños (20 niñas and 24 niños) de entre 6 y 8 años (*M*= 7.25 años, *DS*= 0.43), y siguió un diseño cuasi experimental con dos momentos de medición (antes y después de la intervención). Analizamos los cambios relativos en los niveles de integración social, altruismo universal y estrés percibido.

Resultados. Nuestros resultados revelaron que los niños que participaron en la intervención mostraron una mejora en las pruebas de integración social y altruismo universal; es decir, los niños eligieron más compañeros como compañeros de juego y rechazaron a menos de ellos, al tiempo que evidenciaron mayores actitudes prosociales. Asimismo, se observó una disminución en los índices de estrés percibido luego de la intervención.

Discusión y **Conclusión**: Nuestros hallazgos sugieren que este tipo de intervención puede contribuir a fomentar la integración social y la prosocialidad, y promover la salud y el bienestar de los niños desde una edad temprana.

Palabras clave: relaciones sociales; altruismo; estrés percibido; comportamiento prosocial; empatía

Introduction

Prosocial behavior emerges from an early age and includes diverse behaviors such as helping, comforting, sharing and informing (Warneken & Tomasello, 2006, 2009). It has been proposed that prosocial behavior can be beneficial for those who perform it, since they can have a positive effect on psychological well being, health, and longevity (e.g., Brown & Brown, 2015; Brown et al., 2009: Lozada, D'Adamo, & Fuentes, 2011, Poulin et al., 2010). For example, prosocial behavior can help mitigate the effects of exposure to stressors, attenuating the negative consequences of psychological and physiological stress (e.g., Brown & Brown, 2015; Brown et al., 2009). In addition, social integration can be promoted when prosocial motivation is fostered (e.g., Mikulincer & Shaver, 2001). However, despite the fact that social environments, particularly social support, can moderate the relationship between stressful events and stress responses during childhood (e.g., Adams, Santos, & Bukowski, 2011; Doom, Doyle, & Gunnar, 2016; Hostinar, Johnson, & Gunnar, 2015), few studies have focused on the link between prosocial behavior and social integration between peers and the regulation of stress during this stage of development (e.g., Ponzi et al., 2015; Trianes et al., 2011).

Social relationships and prosocial behavior can be fostered through empathy (e.g., Decety, 2010; Decety & Cowell, 2014; Eisenberg, Spinrad, & Knafo-Noam, 2015), and in turn, socio-affective and socio-cognitive processes involved in empathy can be developed through different intersubjective instances (e.g., Valk et al., 2017). Numerous studies have thoroughly described the relationship between the ability to register bodily and emotional states (self-perception) and the development of socio-affective and socio-cognitive processes related to empathy (e.g. Farb et al., 2015; Füstös, Gramann, Herert & Pollatos, 2012, Koch & Pollatos, 2014; Grynberg & Pollatos, 2015). In this way, greater awareness of one's own bodily and emotional states can favor empathy and self-regulation (Davidson & McEwen, 2012; Kilpatrick et al., 2011; Thompson & Gauntlett-Gilbert, 2008). In contrast, stressful states negatively affect empathic processes such as perception of others and perspective taking (Davidson & McEwen, 2012; Kilpatrick et al., 2011; Thompson & Gauntlett-Gilbert, 2008). Taking these findings into account, it seems opportune to develop interventions that promote empathic processes which favor prosocial behavior and can contribute to broadening social relationships among peers during childhood.

Numerous studies have shown that interventions which promote empathy, prosocial attitudes and compassion can also improve social relationships, cognitive functions and health in children (e.g., Flook, Goldberg, Pinger, & Davidson, 2015; Ozawa de-Silva & Dodson-Lavelle, 2011; Schonert-Reichl et al., 2015; Spinrad & Gal, 2018). Along the same lines, experiences involving mindfulness-based practices, cooperative activities and perspective-taking instances fostered prosocial behavior and positive social relationships between peers, and tended to reduce stress in children (Lozada, Carro, D´Adamo, & Barclay, 2014; Lozada, D´Adamo, & Carro, 2014). These results tie in well with various studies demonstrating that adverse social relationships are one of the major stressors which negatively impact children's health and wellness (e.g., Vanaelst et al., 2012). In contrast, positive social relationships have been associated with lower stress levels (e.g., Ponzi, Muehlenbein, Geary, & Flinn, 2015). It has been shown that higher levels of physiological markers related to stress such as cortisol correspond to higher scores of perceived stress self-reports (e.g., Trianes et al., 2011). This indicates that perceived stress can be a useful tool to evaluate the incidence of chronic stress in children.

The embodied cognition theory proposes that cognition is embodied, lived, and embedded in sociocultural contexts (e.g. Varela 2000). In line with this, extensive evidence shows how prosocial embodied experiences affect social cognitive processes promoting empathic attitudes (e.g., Di Paolo and De Jaegher 2012; Lozada et al 2017). Taking into account the embodied cognition perspective, we developed behavioral interventions that aimed to fostering interoceptive and intersubjective awareness in primary school children. In the present study we expect to find that the proposed experiential school intervention, which involves mindfulness-based practices (interoceptive awareness), socio-affective activities (e.g., empathic collaboration in both dyads and larger groups), and socio-cognitive instances (e.g., perspective taking), will decrease perceived stress while promoting prosocial attitudes and positive social relationships between peers.

Objectives and Hypotheses

The objective of this study is to evaluate the impact that a scholar intervention involving mindfulness-based practices (interoceptive awareness), socio-affective activities (e.g., empathic collaboration in both dyads and larger groups), and socio-cognitive instances (e.g., perspective taking) can have on perceived stress, prosocial attitudes and social relationships between peers in 6-8 years old children.

We hypothesize that children performing activities favouring connectedness with themselves and with others will show a reduction in perceived stress indices, as well as an enhancement of universal altruism and social integration.

Method

Participants

The study followed a controlled wait list design with two measurement time points, at the beginning and at the end of the intervention. It was conducted with 44 children (20 girls and 24 boys) aged between 6 and 8 (M= 7.25 years, SD= 0.43) in a state school in San Carlos de Bariloche, Argentina. One class of 24 children (9 girls and 15 boys) was randomly assigned (on the flip of a coin) as the intervention group, and the other class of 20 children (11 girls and 9 boys) as the wait list group, which followed the regular school program. The aim of our work was to detect changes in each child due to his or her participation in the program, therefore our sample size was 24 undergoing the intervention and 20 in the wait list group. The latter group did not participate in the intervention, thus serving as a control group (in which no pre-post changes were expected to occur). Our aim was therefore to evaluate changes within each group before and after the intervention, but and not to compare absolute values between groups. The study was conducted during the last three months of the school year in the southern hemisphere (i.e., from September to December), and measurements were taken within the same week in both groups (pre-test during the week prior to the intervention, and post-test the week after its completion). All participants were in good general health, and no particular issue was documented by the medical service associated with the school. Both the intervention and wait list groups belonged to a similar social context.

Instruments

Social relationships within the group were analyzed by means of a sociogram (Moreno, 1972; Gutiérrez, 1999) based on the results of a Sociometric Questionnaire in which children were asked to say which classmates they would choose as playmates and which ones they would not. The choice of peers as playmates at this age is a concept associated with reciprocity and pro-sociality (Garaigordobil, 2005), and is a common, established, and valid method of assessing peer acceptance (e.g., Cillessen, 2009; Oberle, 2018; Wentzel, Barry, & Caldwell, 2004; Younger, Schneider, Guirguis, & Bergeron, 2000). This questionnaire shows

adequate test-retest reliability properties (e.g., Kalfus & Berler, 1985), and as mentioned above, was completed during individual interviews, previous to and after the intervention in both groups. The changes in the number of peers selected (i.e., positive elections) and rejected (i.e., negative elections) reflect changes in the pattern of social relationships of each child. This is a recognized method for evaluating social relationships in children of this age; it is based on simple questions that children answer spontaneously and captures the dynamics of social relationships within a class group.

Altruistic behavior was evaluated by means of the universal altruism test (adapted from Israel, Weisel, Ebstein, & Bornstein, 2012), which is similar to the dictator game. It was carried out before and after the intervention in both groups. To perform the universal altruism test, each child received 10 candies in an envelope with their name on it. They were informed that the candies were for them, but if they liked they could put some candies in a box (none, or as many as they wanted to share) for children belonging to a rural school close to the city who live in precarious conditions. The box was placed in a hidden site, so that each child was not observed by his/her peers. We compared the relative change in the number of shared sweets before and after the intervention for both groups.

Perceived stress was analyzed by means of the Children's Daily Stress Inventory (CDSI), a questionnaire proposed as a measure of daily stress in Primary School children, validated for use with 6-12-year-old children (Trianes et al., 2009; Trianes, Mena, Fernández-Baena, Escobar, & Maldonado, 2012). This test has adequate psychometric properties for evaluating daily stress in children (Trianes et al., 2009), presenting internal validity of 0.70 (Cronbach alpha) and a test-retest reliability of 0.78; it was developed in Spanish (participants' native language). The questionnaire was performed previous to and after the intervention in both groups and completed by the same researcher during an interview with each child. It consisted of 25 dichotomic (Yes/No) items (i.e. was not based on the Likert scale), which described circumstances related to family, school, peers, and health, extending over a broader period of time than one day. Thus, it inquired about the frequency of stressful events with negative consequences which occurred at a time near the present. Although twenty-five questions may appear to be a lot for 6-8 year-olds, the questions were simple, requiring yes/no answers, so the children could complete the questionnaire fully in a short period of time. Within the questions, 12 were related to health issues (e.g., I often feel bad, have a headache, nausea, etc.); 6 were related to school and social environment (e.g. at school, children fight a

lot with me), and 7 were related to the family context (e.g., I spend a little time with my parents). A total score was obtained for each child (Yes = 1, No = 0, as in Trianes et al., 2009) and an average score was then calculated for each group, before and after the intervention.

Procedure

The investigation was conducted according to the World Medical Association Declaration of Helsinki. The project had been previously approved by the Clinical Research Ethics Committee (CEIC), Revision 919-42-2012 Protocol Bar-Alt-01-2012 and by the Council of Education of Río Negro Province, Argentina. Parents of both the intervention and wait list groups were informed as to how their children would participate in the study, and the activities proposed for the intervention were fully explained. All procedures were performed after parents and school authorities had provided their written consent. The participants' data were treated under confidential conditions. Before and after the intervention, all participants were interviewed individually in a school room, by a single researcher. That is, one student at a time was taken out of the class to do the interview, which lasted approximately 10-15 minutes. The researcher applied two questionnaires at this time: The stress self-report (Children's Daily Stress Inventory) and the Sociometric Questionnaire, and the universal altruism test detailed above.

The intervention consisted of 8 sessions of 60 minutes, performed once a week (Table 1). Two researchers conducted the program along with the class teacher. The intervention comprised three stages:

1. Mindfulness-based practices promoting interoceptive awareness which involved mindful breathing techniques and slow movement, tai chi-like practices, where children were invited to focus and concentrate on their body states.
2. Socio-affective instances which included dyadic activities to awaken subtle perception of the other, and group activities entailing cooperative games in which mutual help was needed to achieve shared goals.
3. Socio-cognitive instances in which perspective taking was encouraged within the group by inviting the children to share their experiences, expressing how they felt, whether they had enjoyed helping their peers or not, etc.

Table 1. *Examples of activities performed throughout the intervention*

	Mindfulness-based practices	**Socio-affective activities**	**Socio-cognitive instances**
Session 1	breathing awareness	Trust walk(a)	Conversation circle
Session 2	breathing awareness and body scan	Trust walk(b)	Conversation circle
Session 3	breathing awareness and tai chi-like practices	Trust walk(c)	Reflection instance shared in a conversation circle
Session 4	breathing awareness and slow movement balance	The mirror game	Reflection instance shared in a conversation circle
Session5	breathing awareness and *Sound awareness*	Measuring someone else's pulse and listening to his/her heart	Reflection instance shared in a conversation circle
Session 6	breathing awareness and pulse measurement	Massage to the peer	Reflection instance shared in a conversation circle
Session 7	breathing awareness and *Self-massage*	Cooperative drawing	Reflection instance shared in a conversation circle
Session 8	Breathing awareness, move-ment, sound awareness, tai chi like exercises	Sandbag cooperative game	Reflection instance shared in a conversation circle

Description of some of the activities performed throughout the intervention (Table 1):

1. *Mindfulness-based practices*

Body scan: children sat down in a circle. They closed their eyes and paid attention to their body; starting from the head, face, and relaxing their frown, jaws, mouth, tongue, neck...

Then, they were invited to release the muscular tension of their shoulders, their thorax, arms, hands. Afterwards, they were invited to concentrate on their back, legs, and feet, trying to relax each part of the body. Then, they were invited to feel their whole body, slowly opening their eyes.

Breathing awareness: children sat down in a circle, close their eyes, and placed their hands on their belly. They were invited to perceive each inhalation and exhalation, counting each breath in silence.

Sound awareness: children were invited to close their eyes and listen to a bell sound. They had to raise their hands when they no longer listened to the sound. This practice favored mindful listening.

Pulse measurement: children were asked to perceive their pulse placing two fingers on one wrist, keeping count during one minute.

Self-massage: children were invited to massage one of their hands, perceiving their skin, joints, bones, paying attention to how they felt each finger, palm and back of their hand. Afterwards, they were guided to compare both hands, perceiving and sharing with their peers perceptual differences.

Movement awareness during tai chi-like exercises: children were invited to pay attention to their body, perceiving the weight yielded onto their feet. They were asked to feel their spine and head in an upright position. They were invited to perform gentle rocking movements, being attentive to weight changes on their feet. First, each child moved at his/her own rhythm, and were later invited to synchronize their movements with the whole group.

2. Socio-affective activities:

Cooperative drawing: children were grouped in dyads, and were asked to drawing in a collaboratively way, taking turns without speaking. They jointly had to decide when the picture was finished. The whole group was invited to share how they had felt during the activity.

The Trust Walk: this game promotes confidence on others. Children were grouped in dyads, in which one was blindfolded whereas the other was the guide. The latter had to kindly

steer their partner throughout the room, taking care of him/her. Afterwards, they were asked to exchange roles. Some variations within this game were introduced: Trust walk (a): the blindfolded child hold his/her partner from his/her shoulders, while the guide was walking slowly. Trust walk (b): the guide held his/her partner from his/her shoulders, while walking slowly. Trust walk(c): the guide held his/her partner from his/her shoulders, while avoiding obstacles.

Measuring the pulse of a peer: children were grouped in dyads in which one of them was invited to perceive his/her partner's pulse. After one minute, they exchanged roles.

The mirror game: children were grouped in pairs, each child facing each other. One of the peers started to carry on slow movements and his/her partner had to follow him/her. After several minutes roles were exchanged.

3. Socio-cognitive instances: after socio-affective activities, children and researchers sat in a circle and reflected about the experiences, sharing thoughts and feelings one at a time.

Data Analysis

Differences in the universal altruism test at the two measurement time points were analyzed by means of the Chi-Square test for each group. Statistical significance was established at 0.05 p level. We analyzed differences in the data from the Sociometric Questionnaire and the perceived stress test before and after the intervention, using the paired t test in both groups. When the paired t test comparison was statistically significant, the Cohen's d coefficient was calculated in order to evaluate effect sizes.

Results

When evaluating children's social relationships improved after the intervention since a significant increase in each child's number of positive choices (20.9%) was observed in the intervention group. Thus, social integration was enhanced, since children chose more peers to play with after the intervention than before (t = -4.55, df = 25, p < .001, *Cohen's d* = .9). Conversely, in the waitlist group social relationships were similar at the two measurement timepoints (t = -.79, df = 21, p > .05) (Figure 1).

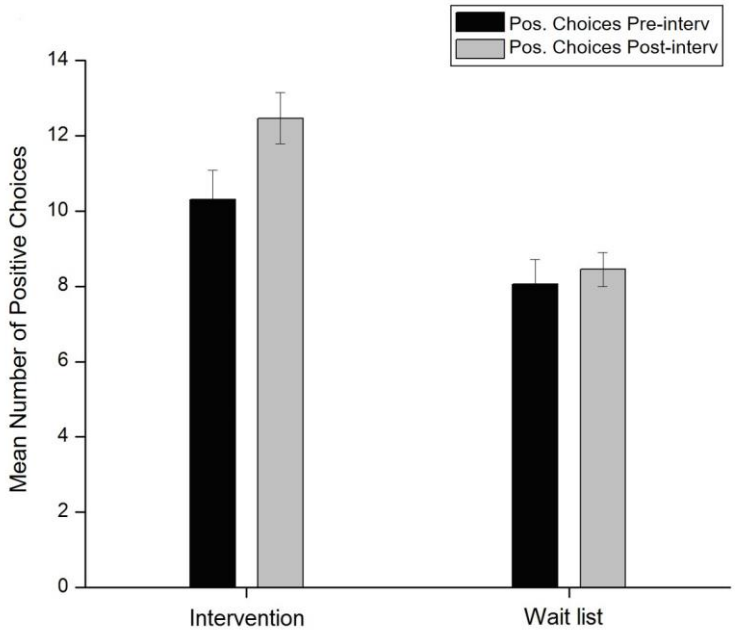

Figure 1. Mean number of positive peer choices, before and after the intervention, for the intervention and wait list groups.

When analyzing each child's number of negative choices before and after the intervention, a significant post intervention decrease (43.7%) was found in the intervention group (t = 3.53, df = 25, $p < .05$, *Cohen's d* = .7), while no significant decrease (11.9%) was observed in the wait list group (t = -1.70, df = 21, $p > .05$) (Figure 2).

Results from the universal altruism test varied between the two measurement time points in the intervention group; i.e., the proportion of shared sweets significantly increased after the intervention (60%, X^2 = 18.8, $p < .001$), while this variation was not observed in the wait list group (10%, X^2 = .07, $p > .05$).

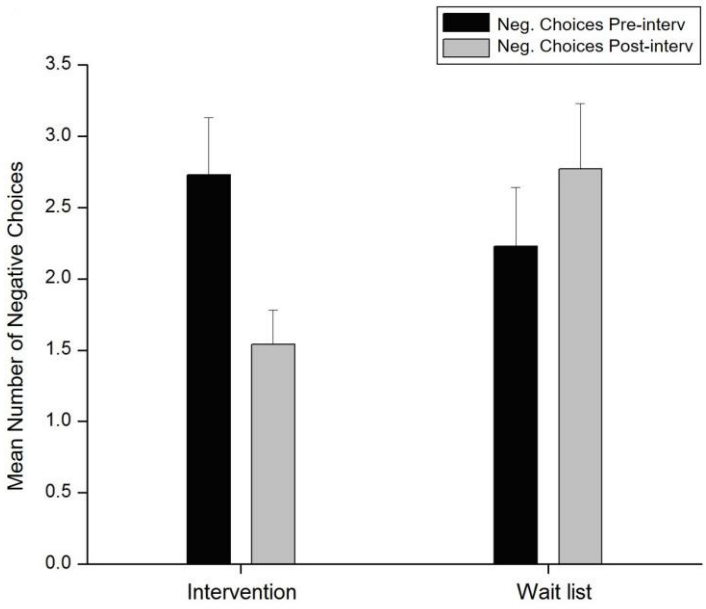

Figure 2. Mean number of negative peer choices, before and after the intervention, for the intervention and wait list groups.

Moreover, perceived stress, we found that the intervention promoted significant changes in children's self-report indices. Thus, when comparing perceived stress before the program started and at the end of the intervention, a significant decrease was found in the intervention group ($t = 2.37$, $df = 22$, $p < .05$, *Cohen's d* = .5). In contrast, no significant changes were detected when comparing this parameter at the two measurement time points in the wait list group ($t = 0.95$, $df = 17$, $p > .05$).

Discussion and conclusion

In the present study we found that prosociality and social integration were enhanced while perceived stress decreased in children who participated in the school intervention which promoted self-awareness and awareness of others, by means of mindfulness-based practices, socio-affective activities and socio-cognitive instances. In addition, these embodied experiences positively modulated universal altruism and social relationships between peers.

The improvement found in prosocial attitudes and social relationships suggests that empathic processes might have been fostered throughout the intervention. As seen in other studies, empathy can promote prosocial behavior (e.g., Decety, Bartal, Uzefovsky, & Knafo-Noam, 2016; Eisenberg et al., 2015). This behavior, intended to benefit others, includes altru-

istic attitudes such as helping, sharing, comforting and informing, which are observable early in life (Warneken & Tomasello, 2009). Likewise, empathy allows keeping people together in social groups, since it favors both the creation of interpersonal bonds and their long-term stability (Decety et al., 2016; Watt, 2005). Along these lines, sharing behavior and positive social relationships in 6-9 year olds tended to enhance after participating in an intervention that included mindfulness-based practices and cooperative activities (Lozada, Carro, et al., 2014; Lozada, D'Adamo, et al., 2014). Findings regarding the association between prosocialness and healthy states are in accordance with the hypothesis that human altruism and social support can confer positive effects on health and wellbeing (e.g., Chin, Murphy, & Cohen, 2018; Lozada et al., 2011; Ponzi et al., 2015). Moreover, it has been found in adults that self-reported stress can be diminished by the performance of practices which foster attentional (e.g., interoceptive awareness), socio-affective (e.g., compassion) or socio-cognitive abilities (e.g., perspective-taking) for over three months (e.g., Engert, Kok, Papassotiriou, Chrousos, & Singer, 2017).

Other interventions were successful in developing prosocial attitudes in young children by including mindfulness-based programs (Flook et al., 2015; Viglas & Perlman, 2018), socio-emotional learning (Schonert-Reichl et al., 2015) and cognitive-based compassion training (Ozawa de-Silva & Dodson-Lavelle, 2011). Earlier work performed in Primary School children showed that cooperative play improved prosocial behavior among peers (Garaigordobil, 2005). Our intervention not only involved cooperative play but also self-awareness and perspective-taking practices, which might have helped develop interoception and emotional regulation. This is in consonance with previous investigations which revealed that greater emotional regulation tends to favor empathic concern and prosociality in children (e.g., Eisenberg et al., 2015). Consequently, the performance of activities that foster connectedness with oneself might have potentiated the positive effects of socio-affective and socio-cognitive instances, emphasizing the relevance of focusing on both individual and inter-subjective experiences in order to improve social relationships.

A potential limitation of the current study is associated with the fact that as we chose to work with an entire group that was already interacting together in a class; the selection of participants was not randomised and the number of children was pre-established. It would be interesting to replicate this intervention in other schools and age-groups, and further analyze other chronic stress indicators.

In sum, the present study illustrates how promoting interoceptive awareness, socio-affective and socio-cognitive abilities can have a beneficial influence on social relationships and perceived stress reduction in children. Given that childhood is a sensitive and vulnerable period of life, it seems particularly important to provide opportunities for this kind of embodied experiences at an early age, as it could contribute to fostering prosocial behavior and social integration, while decreasing perceived stress. The current investigation provides further evidence of the intrinsic benefits of prosocial behavior and of the impact of social integration on psychophysical well-being during childhood.

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