

# Effectiveness of Manualised Interpersonal Problem-Solving Skills Intervention for Children with Autism Spectrum Disorder (ASD)

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## Abstract

**Background:** Children with Autism spectrum disorders (ASD) frequently present a deficit in interpersonal and social problem solving skills. The Interpersonal Problem-Solving Skills Programme for Children (SCI-Children) comprises 10 weekly, one hour sessions working on interpersonal abilities from a mediation strategy for training purposes. **Method:** The first study explores the effectiveness of training through pre- and post-treatment evaluations of a sample of 22 children with ASD (7-13 years of age). The second study replicates the programme with 15 children who were assessed three times (three months before the programme starts, at the beginning of the training and at the end of it). **Results:** In the first study, significant differences were found in outcome measures (a parent-report subscale of a socialisation measure and child performance on one subscale and total scores of an interpersonal problem-solving skills task). Results in the second study showed no significant changes in absence of the treatment during the waiting period and significant changes after the treatment in the socialisation measure. **Conclusions:** These findings suggest that the SCI-Children program causes positive impact on the participants. Further evaluation is warranted.

**Keywords:** Asperger syndrome, Autism Spectrum Disorders, group intervention, social problem-solving skills training, school-age children.

## Resumen

**Efectividad de un programa manualizado de intervención en habilidades de resolución de problemas para niños con trastorno del espectro autista (TEA).** **Antecedentes:** los niños con trastornos del espectro autista (TEA) presentan un déficit en habilidades interpersonales y de socialización. El Programa de Resolución de Conflictos Interpersonales para niños (SCI-Niños) está compuesto por 10 sesiones de una hora a la semana para trabajar habilidades interpersonales utilizando la mediación como estrategia de entrenamiento. **Método:** un primer estudio examina la efectividad del entrenamiento (diferencias Pre-Post) en una muestra de 22 niños con TEA (entre 7 y 13 años). Un segundo estudio replicó el programa en una muestra de 15 niños a los que además se evaluó en tres meses antes de empezar el programa. **Resultados:** en el estudio 1 aparecieron diferencias significativas en las medidas utilizadas (en una subescala de una escala de socialización a responder por los padres y en las puntuaciones totales y de una subescala de una tarea de resolución de problemas interpersonales realizada por los niños). Los resultados del segundo estudio mostraron que no hubo cambios en ausencia de tratamiento durante el período de espera, pero sí diferencias significativas en la escala de socialización después del entrenamiento. **Conclusiones:** los resultados sugieren que el programa SCI-Niños tiene efectos positivos en los participantes, se requieren más estudios para confirmar los efectos.

**Palabras clave:** síndrome de Asperger, Trastornos del Espectro Autista, intervención en grupo, entrenamiento en resolución de problemas, niños en edad escolar.

Difficulties that define Asperger syndrome (AS), currently within the Autism Spectrum Disorders in the *Diagnostic and Statistical Manual of Mental Disorders* ([DMS-IV] American Psychiatric Association [APA], 2013) are defined by three main diagnostic criteria: alteration in the development of social communication and social interaction across multiple contexts, and restricted and/or stereotyped behaviours, interests or activities. This category currently includes individuals with well-established previous DSM-IV diagnosis of Asperger's Disorder.

There are several types of programmes (Capadoccia & Weiss, 2011) that address intervention in social and interpersonal skills, developed in different contexts such as school, family or therapy contexts (Mills & Marchant, 2011), as well as different formats (individually, in small groups or even through computerised mechanisms). This diversity arises from the different intervention techniques and the response to different theoretical conceptualisations on what skills are important for the development of the ability to interact socially.

There are few studies that examine programmes designed to develop what are specifically referred to as interpersonal skills: the ability to react to one's own and another's interpersonal problems. In other words, *interpersonal competence* faces the problems arising from conflicting interests between people which affect their relationships (Calero & García-Martín, 1995). While different studies showed how children with ASD have difficulties in these domains (Buon et al., 2013; Channon, Charman, Heap,

Crawford, & Ríos, 2001; Montgomery, Stoesz, & McCrimmon, 2012) we only found one published study which examined the success of a manualised program training taking into account the problem-resolution process in children (Bauminger, 2002) and their results were inconclusive. Our investigation presents an intervention that promotes the development of interpersonal problem-solving skills (see description below) based on a phased training approach (D’Zurilla & Goldfried, 1971) focusing on a specific interpersonal skill each treatment session. A version for adolescents and adults (SCI-Labour; Bonete, Calero, & Fernández-Parra, 2015) has already been applied in 50 adolescents and adults trained for 10 weeks. Results showed that participants significantly improved, as measured on a socialization scale and in a social problem-solving task.

The objective of this work was to examine the effectiveness of the *Interpersonal Problem-Solving Skills Programme for Children* (SCI-Children, Calero, García-Martín, & Bonete, 2012), a manualised therapy programme that has been adjusted from the adult version (SCI-Labour) to children with AS in order to confirm its applicability. The proposal to adapt it for children aged between 7 and 13 arose from the assumption that the pre-adolescent stage is a crucial period for acquiring interpersonal problem-solving skills (Haywood & Lidz, 1997). New challenges and social interactions have to be faced at the beginning of puberty. Problem-resolution training is necessary from a very early age, as it provides the resources that favour future positive interaction experiences throughout the life cycle. This competence could be trained together with other complementary trainings (discrete social skills or cognitive-behavioural restructuring approaches) which may be used to successfully implement the problem-resolution strategy chosen to face a particular situation. It was expected that after training, the participants would achieve higher scores in outcome measures. These analyses were replicated in two independent studies in order to confirm the results.

#### Method

#### Participants

##### STUDY 1

Participants were 22 children, diagnosed with Asperger Syndrome, 21 males and 1 female, between 7 and 12 years of age ( $M = 9.81$ ,  $DT = 1.40$ ), from different Spanish provinces. The inclusion criteria were: (a) Participants had been previously diagnosed with AS (*DSM-IV-R* criteria, APA, 2000); (b) All the participants met the minimum criteria on the *Autonoma Scale for the Detection of Asperger Syndrome and High-Functioning Autism* with a score of  $> 36$  (Belinchón et al., 2005); (c) They had no major comorbid psychiatric disorders; and (d) Children had previous experience in participating in group programmes, and no disruptive behaviour according to the total problem score subscale of the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1999).

##### STUDY 2

The participants were 15 children, diagnosed with Asperger Syndrome, 12 males and 3 females, between 7 and 12 years of age ( $M = 8.87$ ,  $DT = 0.64$ ), from different Spanish provinces. These children met the same inclusion criteria as in Study 1.

Table 1  
IQ and inclusion criteria scores in samples from Study 1 and Study 2

Instruments	Study 1 (n = 22)		Study 2 (n = 15)	
	Mean	DT	Mean	DT
Verbal comprehension	110.77	21.08	116.40	14.84
Perceptive reasoning	105.45	17.46	106.93	16.97
Working Memory	93.91	18.76	88.33	9.38
Processing Speed	91.18	14.04	96.87	12.79
Total IQ	101.32	20.20	104.20	12.17
SDQ Total Problem Score	18.45	5.87	21.33	8.15
Autonoma Scale	52.45	7.67	55.47	9.26

#### Instruments

The same measures were used for study 1 and study 2.

The *Wechsler Intelligence Scale for Children IV* (WISC-IV; Wechsler, 2005) evaluates the intellectual capabilities of children between the ages of 6 and 16 years. It generates four composite scores (*Verbal Comprehension Index*, *Perceptual Reasoning Index*, *Processing Speed Index* and *Working Memory Index*) and an overall IQ score. Reliability data (Wechsler, 2005) were maintained with our sample, with a Cronbach’s alpha coefficient of .86 for the total test.

The *Evaluation for the Solutions to Interpersonal Conflicts* (ESCI, for its initials in Spanish; *Evaluación de Solución de Conflictos Interpersonales*; Calero, García-Martín, Molinero, & Bonete, 2009) measures the ability to resolve interpersonal problems with the use of 17 pictures that represent interpersonal conflicts. Four scores are obtained: *Emotions Recognition*, *Causes Attribution* and *Solutions Generation*, and *Total* score. This instrument follows the Pelechano model (1995) for the resolution process of interpersonal problems and has been previously validated with a sample of 1046 Spanish adolescents showing a satisfactory exploratory and confirmatory factor structure of 3 areas: emotion recognition, causes attribution and solutions generation. In this same study, reliability was  $\alpha = .69$ ,  $\alpha = .91$ ,  $\alpha = .81$  and  $\alpha = .90$ , respectively, for emotions, causes, solutions and total scores (Molinero, 2015).

The *Socialisation subscale* (VABS-S) and the *Maladaptive Behaviour* (VABS-MB) of the *Vineland Adaptive Behaviour Scale* (VABS-II; Sparrow, Cicchetti, & Balla, 2005) measure the social skills that are to be expected during development and are applicable to all age groups. It is a Likert-type structured interview with the parents, with three scores: 2 (*frequently*), 1 (*sometimes*) and 0 (*never*). The VABS-S subscale evaluates three areas: *interpersonal relations*, *play/leisure time* and *coping skills*. The VABS-MB subscale examines internalised and externalised maladjusted behaviour, among others.

The *Interpersonal Problem-Solving Skills Programme for Children* (SCI-Children; *Programa de Solución de Conflictos Interpersonales*, Calero et al., 2012) is an intervention based on the Pelechano model, which consists of seven phases for the resolution of interpersonal problems (Pelechano, 1995). It trains the participants using a mediation approach in which the therapist leads the child to discover the resolution process through guides, feedback on their answers and explicit help.

What is innovative in this programme is that it incorporates a mediated learning theory (Kozulin & Rand, 2000) in the

approach to these interpersonal skills, considering that by doing so, the emphasis falls on interaction with others as a basis for the teaching-learning process instead of individual success *per se*, favouring the internalisation of interpersonal skills. The principles of mediated learning have been applied to the field of therapy, generating different cognitive training programmes which continue to be used in both individual and group psychotherapy (Haywood, 2013; Carlson & Wiedl, 2013). Therapist responsible for the intervention sessions in this study (CM) was trained in the mediation approach by the authors of the manual, based on previous systematic observation during a pilot programme which included modelling and feedback.

The Interpersonal Problem-Solving Skills Programme for Children (SCI-Children; Calero et al., 2012) is a phased training approach (Pelechano, 1995). Each session focuses on one phase of the problem-resolution strategy and it is only at the end of the programme that a holistic analysis is made of the conflictive situation, by incorporating all the steps of this problem-resolution strategy to a concrete situation. Everyday problems are posed at each session with an emphasis on the key elements of the corresponding phase of the conflict-resolution process. The therapist seeks to encourage the training strategy or ability in each participant without giving them any previous instructions, working only from the knowledge the participants already possess prior to performing the work of that session. It is a programme designed for action, to generate changes in a short space of time (10 sessions).

A drawing is shown at the commencement of each session which sums up the objective of the session and examples of conflict situations arise from it; personal, interpersonal between two people and interpersonal in groups. The objectives of each session are: communication skills, identification of problematic interpersonal situations, perception of one's own feelings and those of others, and other points of view; delimitation-search for causes, generation of resolution options, consideration of consequences, planning and decision making, detection of obstacles, and ability to respond to failure. The programme comprises ten weekly, approximately one-hour sessions, in groups of four or five children with one therapist.

Based on flexibility, in that it adapts to the needs of the group, this programme is implemented in a *structured manner*. The manual includes prototypical guidelines on mediation when addressing the most relevant points to be discussed at each session. All sessions follow the same general structure, including specific examples of interpersonal problems under consideration, in addition to complementary examples to be used should the participants not generate any new ones, in order for mediation to be administered.

### Procedure

After receiving permission from the Ethics Committee for Human Research at the University of Granada, email contact was established with the Asperger Syndrome Associations of four cities in Spain, as well as with the University community of the University of Granada.

The families gave their informed consent to participate in the research, and an initial sample of 22 participants was assessed prior to the programme and after it was completed (Study 1).

Later, we had the chance to evaluate 15 children three months before the programme started (Pre-0), once again just at the beginning of the intervention (Pre-1), and after it was completed, the children carried out a post-treatment evaluation (Post) (Study 2). Each training group was composed of 4 or 5 children with a support instructor.

For both studies, the assessment at the beginning and at the end of the programme included the ESCI, as well as an interview with the parents (VABS-II) as outcome measures. The second study included an additional assessment three months before the programme started with the ESCI and VABS-II as well. In order to verify the inclusion criteria, participants were also assessed with the Autonomia scale, the SDQ and the WISC-IV before training.

Evaluations were carried out by the authors of this study who are all trained clinical psychologists.

### Data analysis

The design was quasi-experimental in two stages (presented as study 1 and study 2) with two equivalent non-random assignment

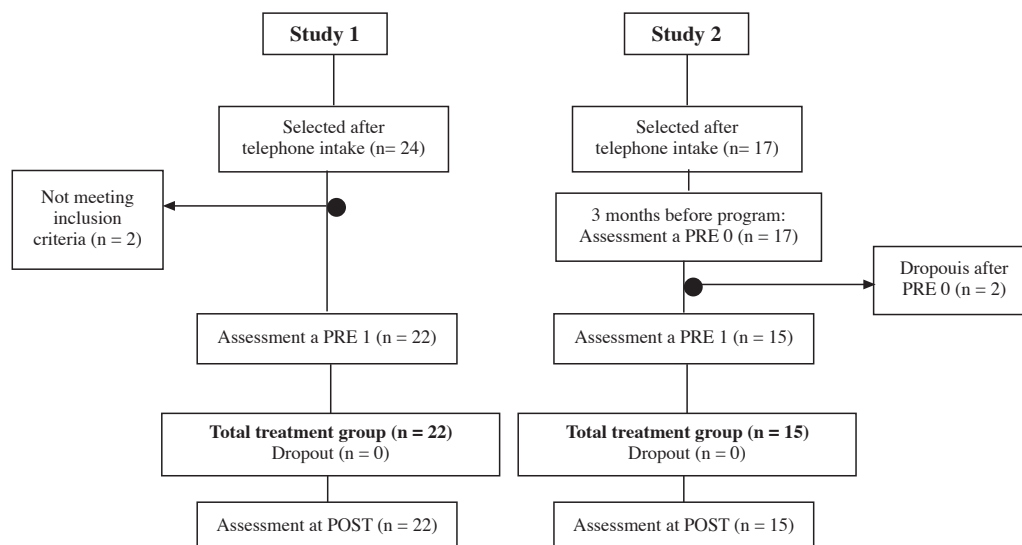


Figure 1. CONSORT flow diagram for recruitment

groups. Random assignment to groups was not able due to participants belonging to different cities. Subsequently, 9 groups were organised via convenience sampling (Lucas, 2013). All the analyses were carried out with non-parametric tests due to sample sizes.

Both studies used Wilcoxon signed rank test to compare Pre-Post treatment means in two outcome measures: ESCI (three subareas and total score) and VABS-II (VABS-S, VABS-MB subscales) for the sample of 22 participants (study 1) and 15 participants (study 2) in order to see if any changes occur in absence of the intervention. In study 2, assessment was completed in three moments: three months before programme starts, at the beginning of the training, and at the end of it. Effect sizes were reported using Cohen (1988) criteria for interpretation (Pallant, 2007).

Results

To test the groups' equivalence in the inclusion criteria variables (Study 1 and Study 2), and given the sample size, we used the non-parametric Mann-Whitney *U* technique for independent samples showing equivalency between groups (Verbal comprehension  $p = .57$ ; Perceptive reasoning  $p = .68$ ; Working Memory  $p = .28$ ; Processing Speed  $p = .37$ ; IQ  $p = .96$ ; SDQ Total Problem Score  $p = .18$ ; Autonomia Scale  $p = .19$ )

Effect of the programme

STUDY 1

In the comparison of the Pre 1 and Post-treatment outcome measures ( $n = 22$ ), Table 2 shows how descriptive statistics improved on the social problem-solving task (ESCI) and the VABS-S subscale after treatment and, the VABS-MB decreased after treatment. The Wilcoxon Signed Rank Test revealed a statistically significant improvement in test scores following participation in the training program for each of the following measures: VABS-S ( $\zeta = -1.99, p = .04$ ) with a medium effect size ( $r = .30$ ), VABS-MB ( $\zeta = -3.13, p = .002$ ) with a large effect size ( $r = 0.47$ ), as well as ESCI-S ( $\zeta = -2.26, p = .02$ ) and ESCI-Total scores ( $\zeta = -2.00, p = .04$ ) with medium effect sizes ( $r = 0.34$  and  $r = 0.30$  respectively). The median scores on these measures increased from pre-program to post-program (see Table 2).

STUDY 2

In the comparison of the Pre 0 and Pre1 outcome measures in this sample ( $n = 15$ ), in absence of the treatment, no significant differences were observed in the Wilcoxon signed rank test for any outcome measures. However, the Wilcoxon signed rank test revealed a statistically significant improvement in two of the social scores after the intervention was completed, VABS-S ( $\zeta = -2.50, p = .01$ ) with a large effect size ( $r = .46$ ) and VABS-MB ( $\zeta = -2.04, p = .04$ ) with a medium effect size ( $r = .37$ ) (see Table 3).

Discussion

For both studies, results show that the SCI-Children Programme has a positive effect on the group of children with AS. These changes can be observed on the three outcome measures: on both

the VABS-S and VABS-DB, which show the parental perceptions, and on the ESCI, which is a measure of performance applied to children. Agreement between both perspectives is essential, as children with Asperger Syndrome are not usually fully aware of their difficulties, and they generally perceive themselves as being more able than they are. In contrast, parents can present a negative bias resulting from the sensitivity with which they view the possible difficulties of their children (Cappadocia & Weiss, 2011; Polawsky et al., 2014).

While it is true that the choice of the age range of the sample endeavours to make use of the characteristic plasticity of infancy and of the new challenges in the social sphere brought by the commencement of puberty, the results of the present study are modest. In his review, Avroch (2012) observed lower effects than those found in older age ranges in programmes targeting children with autism. In line with this, the adult version of this same programme (Bonete et al., 2015) obtained higher effects in a sample of adults with the same diagnosis. This could be explained by the ability of young people and adults to be more conscious of their own learning process, as well as of the conflict resolution process which the programme endeavours to transmit. This interest in provoking an active and conscious role in the participants is reflected in

Table 2  
Descriptive statistics and Wilcoxon test for outcome measures at Study 1

Scale	Trainig period (n = 22)		Z Wilcoxon	p	r
	Pre	Post			
<b>VABS-S</b>					
Mdn	127.00	132.00	-1.99	.04	0.30
M	128.09	133.41			
SD	10.35	11.35			
<b>VABS-MB</b>					
Mdn	24.50	17.50	-3.13	.002	0.47
M	24.22	18.00			
SD	8.22	8.03			
<b>ESCI-E</b>					
Mdn	13.00	13.00	-.15	.88	0.02
M	12.81	12.95			
SD	2.70	2.77			
<b>ESCI-C</b>					
Mdn	39.00	40.00	-1.22	.22	0.18
M	36.55	37.09			
SD	6.79	6.80			
<b>ESCI-S</b>					
Mdn	10.00	10.50	-2.26	.02	0.34
M	8.77	9.81			
SD	3.43	2.72			
<b>ESCI-T</b>					
Mdn	60.50	63.50	-2.00	.04	0.30
M	58.14	59.86			
SD	11.53	10.27			

VABS-S: Socialisation scale from VABS-II; VABS-MB: Maladaptive Behavior scale from VABS-II; ESCI-E Emotion recognition from ESCI task; ESCI-C: Causes attribution from ESCI task; ESCI-S: Solutions generation from ESCI task; ESCI-T: Total scores from ESCI task.

Table 3  
Descriptive statistics and Wilcoxon test for outcome measures at Study 2

Scale	No training period (n = 15)		Z Wilcoxon	p	r	Training period (n = 15)		Z Wilcoxon	p	r
	Pre 0	Pre1				Pre1	Post			
<b>VABS-S</b>										
Mdn	117.00	119.00	-.43	.66	0.08	119.00	125.00	-2.50	.01	0.46
M	118.20	119.07				119.07	126.33			
SD	12.37	11.37				11.37	12.86			
<b>VABS-MB</b>										
Mdn	29.00	30.00	-.26	.80	0.05	30.00	26.00	-2.04	.04	0.37
M	29.40	29.33				29.33	24.73			
SD	11.75	12.83				12.83	9.81			
<b>ESCI-E</b>										
Mdn	15.00	14.00	-.08	.94	0.01	14.00	14.00	-.16	.88	0.03
M	13.87	13.40				13.40	14.07			
SD	2.10	2.53				2.53	1.87			
<b>ESCI-C</b>										
Mdn	33.00	37.00	-.66	.51	0.12	37.00	39.00	-1.42	.16	0.26
M	34.47	35.20				35.20	37.40			
SD	7.44	7.61				7.61	5.88			
<b>ESCI-S</b>										
Mdn	8.00	9.00	-1.97	.05	0.36	9.00	10.00	-.59	.56	0.11
M	7.87	9.07				9.07	9.40			
SD	1.99	1.83				1.83	1.55			
<b>ESCI-T</b>										
Mdn	54.00	61.00	-1.05	.29	0.19	61.00	62.00	-1.71	.09	0.31
M	56.13	58.00				58.00	60.87			
SD	10.38	8.85				8.85	8.31			

VABS-S: Socialisation scale from VABS-II; VABS-MB: Maladaptive Behavior scale from VABS-II; ESCI-E Emotion recognition from ESCI task; ESCI-C: Causes attribution from ESCI task; ESCI-S: Solutions generation from ESCI task; ESCI-T: Total scores from ESCI task

the different studies, through the promotion of mechanisms like metacognition, reciprocal questioning and question generation about the conflict resolution process, mind-mindedness or insightfulness, Theory of the Mind, etc. (Meins, Fernyhough, Arnott, Leekam, & Rosnay, 2013; Whalon & Hanline, 2008). Indeed, the mediation strategy this programme promotes aims for this same goal, among others. Numerous studies emphasise this need and recognise the temptation the therapist may have to carry out a directional, over-protective instruction, which could over-stimulate, motivated perhaps by the characteristics of children with Asperger Syndrome, both in social development programmes and in other learning processes (Polawsky et al., 2014). Mediation attempts to compensate for this danger, because when the therapist, parent or teacher is too directional, the self-regulated learning, exploration and metacognition behaviours decrease. The child delegates control over his learning and adopts a more passive position.

The results of this study can be interpreted as providing some evidence for the benefits to apply the meditational strategy to train interpersonal skills. This type of methodology has been used successfully in a similar programme administered to a sample of children diagnosed as gifted children (Calero & García-Martín, 2005; Gómez-Pérez et al., 2014).

In addition, we observed that these positive changes are not caused by the passage of time, as participants from the second study did not show any changes during three months without programme intervention. This methodological aspect has been emphatically recommended in recent reviews (Avroch, 2012; Cappadocia & Weiss, 2011) due to the possible influence of development.

Finally, it should be underlined that the programme showed positive effects in community settings and different environments. The children belonged to different associations, with different activities, organisation and access to resources, number of participation years and levels of training received. In this respect, different authors voice their concern on how difficult it can sometimes be to connect clinical research with therapeutic interventions (Belinchón, Boada, García de Andrés, Fuentes Biggi, & Posada, 2010; Kasari & Smith, 2013). The first of these seeks a methodological validity which emerges from the quality of the study's design and from the meticulous manipulation of the variables. The second aims to obtain the maximum quantity of positive effects, but it has to contend with the contingencies that arise from an intervention in natural environments: parental, teacher or peer involvement, simultaneity with other programmes,

limited resources, differences among participants, history, etc. This study tests a hybrid intervention strategy, with expert therapists, responsible for travelling to the different associations, allowing a faithful administration of the programme within different contexts.

In addition, the result is a programme that constitutes an integration tool for different abilities in few sessions which has been empirically tested. This characteristic makes it accessible to other professionals in clinical spheres and applicable to different contexts (schools, peer groups, etc.) without implying an extra burden for parents and children.

This study has been able to resolve some of the weak points that previous reviews highlighted when targeting this population such as the accuracy of the treatment (as it is a manualised programme, and administered by the researchers themselves, and they are trained professionals), the compensation for possible bias in the measurements (so that there is a performance measurement and reporting measurement, one that measures parental perceptions and another that evaluates the children), the variability of the surroundings (although always in an institutional therapeutic environment, the programme has been administered in different associations in different cities) and the use of standardised measuring tools, adapted to the population.

Among the limitations of the study, there was no random assignment of groups, sample sizes were small and there was no collection of measurements of the long-term maintenance of the effect of the study. It is necessary to examine the generalisation of learning to other contexts and how these findings translate into real-world skills. In this case, the ESCI is a problem solving task that responds directly to the programme contents, yet it would be advisable to rely on a direct measure of the social competence acquired in everyday situations, in natural environments and for different types of interpersonal problems. For a better control, next studies should monitor possible simultaneous educational and therapeutic strategies to analyse mediator effects. Therapist

adherence to treatment should have been independently evaluated with evaluators blind to the treatment process.

This study examines the effectiveness of an intervention in interpersonal skills on the basis of a global focus on interpersonal conflict-resolution training, through mediation strategy. It has the advantage of relying on a structured manual which, at the same time, allows “constrained flexibility”, establishing the limits of the acceptable variations in order not to lose the mediation as the teaching method (MacMahon, 2004 cited in Kasari & Smith, 2013). The results obtained are positive in a sample of children between 7 and 12 years of age, although the small sample limits the generalization of conclusions.

It will be interesting in successive studies to begin a training procedure aimed at professionals in order to expand the reach of this programme not only to Asperger Syndrome Associations, but also to schools (integrated into the curriculum or as an extracurricular activity) maintaining implementation fidelity of intervention implementation (Kasari & Smith, 2013). It is also important to examine the maintenance of the long term programme effect on the children who have taken part, as well as extending the programme, always following the same strategy, to cover different age ranges, so that everyone can have access to an analysis of interpersonal problems from a holistic approach.

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