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Effects of Super Skills for Life on the social skills of anxious children through video analysis

Iván Fernández-Martínez, Alexandra Morales, José P. Espada, and Mireia Orgilés
Universidad Miguel Hernández

Abstract

Background: Super Skills for Life (SSL) is an innovative transdiagnostic cognitive-behavioral prevention program that has demonstrated positive results targeting children's internalizing problems. SSL has a strong component aimed at enhancing social competence, including strategies such as video-feedback with cognitive preparation. This study examined for the first time the immediate impact of SSL on improving social skills in young children with anxiety symptoms, as well as mediating factors predicting SSL anxiety outcomes. **Method:** Participants were 67 Spanish-speaking children aged 6-8 years old. Children were video-recorded and assessed behaviorally through a 2 minute speech task, before and after the 8-session program. **Results:** The results revealed significant positive behavioral changes related to children' social skills in several domains. Depression acted as a mediator of change in pre- to post-intervention generalized anxiety scores. **Conclusions:** This study provides initial support for the usefulness of SSL to immediately improve social skills in young children with anxiety symptoms.

Keywords: Super Skills for Life, anxiety, social skills, prevention, children.

Resumen

Efectos de Super Skills for Life en las habilidades sociales de niños ansiosos a través del análisis de vídeo. **Antecedentes:** Super Skills for Life (SSL) es un programa de prevención transdiagnóstico cognitivo-conductual innovador que ha demostrado resultados positivos en el abordaje de problemas internalizantes en niños. SSL tiene un fuerte componente dirigido a mejorar la competencia social, incluyendo estrategias como la retroalimentación en vídeo con preparación cognitiva. Este estudio examinó por primera vez el impacto inmediato de SSL en la mejora de las habilidades sociales en niños pequeños con síntomas de ansiedad, así como los factores mediadores que predicen los resultados de ansiedad de SSL. **Método:** los participantes fueron 67 niños hispanohablantes de entre 6 y 8 años de edad. Los niños fueron grabados en vídeo y evaluados en su comportamiento a través de una tarea de habla de 2 minutos, antes y después de las 8 sesiones del programa. **Resultados:** los resultados revelaron cambios de comportamiento positivos significativos relacionados con las habilidades sociales de los niños en varios ámbitos. La variable depresión actuó como mediadora del cambio en las puntuaciones de ansiedad generalizada antes y después de la intervención. **Conclusiones:** este estudio proporciona apoyo inicial a la utilidad de SSL para mejorar de forma inmediata a su aplicación las habilidades sociales en niños pequeños con síntomas de ansiedad.

Palabras clave: Super Skills for Life, ansiedad, habilidades sociales, prevención, niños.

Psychopathology at early ages, among six-year-olds, has been found to be high, especially internalizing symptoms of anxiety and depression (Furniss, Beyer, & Guggenmos, 2006). In primary school children, from the age of six, the reported prevalence of anxiety and depression is around 7% and 2%, respectively, with anxiety disorders being the most common (Ghandour et al., 2019). For instance, Edwards, Rapee, Kennedy, and Spence (2010) found symptoms of different anxiety disorders in early childhood fitting the DSM categories, including generalized and social anxiety. Both these disorders have been frequently found at early ages, along with other anxiety disorders considered early emerging (e.g., separation anxiety) (Franz et al., 2013). If children's anxiety problems, such as social and generalized anxiety, are not properly treated, they tend to follow a stable course, increasing the likelihood of future anxiety disorders at early ages (Broeren, Muris, Diamantopoulou, & Baker, 2013; Hudson, Dodd, Lyneham, & Bovopoulous, 2011), and they may present high comorbidity with other disorders, such as depression (e.g., Cummings, Caporino, & Kendall, 2014).

Associations between children's anxiety and the lack of social skills have been supported (e.g., Miers, Blöte, de Rooij, Bokhorst, & Westenberg, 2013; Wichstrøm, Belsky, & Berg-Nielsen, 2013), and also associations between deficits in social skills and negative consequences such as an increased risk of rejection or lack of social support, academic failure, or substance use (see Milligan, Sibalis, Morgan, & Phillips, 2017). In a comprehensive review conducted by Spence and Rapee (2016), broad support was reflected in the literature for the existence of an association between socially

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Corresponding author: Iván Fernández-Martínez
Facultad de Ciencias Sociosanitarias
Universidad Miguel Hernández
03202 Elche (Spain)
e-mail: i.fernandez@umh.es

anxious children and deficits in social skills. In this line, prior findings with young children also revealed that a lack of social skills predicted anxiety disorders, including several anxiety problems such as generalized and social anxiety (Wichstrøm et al., 2013). Moreover, recent reviews like that of Huber, Plötner, and Schmitz (2019) showed that social competence plays an important role in the earliest manifestations of internalizing symptoms such as anxiety at early ages, and they considered it a relevant buffer or risk factor and suggested the suitability of designing interventions to promote social competences.

Essau and Ollendick (2013) developed the Super Skills for Life (SSL) program, an innovative transdiagnostic prevention protocol for children with internalized problems (i.e., symptoms of anxiety and/or depression). SSL is based on the principles of cognitive-behavioral therapy (CBT) and behavioral activation, and comprises eight 45-minute sessions that are delivered once a week (total duration of two months) in a group format; it can also be applied twice a week and following an individual format. Thus, the main objective of the program is the reduction of the internalizing symptomatology of children. SSL includes as part of the intervention different strategies, such as training in social skills, cognitive restructuring, behavioral activation, self-monitoring, training in problem solving skills and relaxation (Essau et al., 2014; https://www.superskillsforlife.com). This protocol also includes video-feedback with cognitive preparation that has been found useful to address adults' and children's concerns and maladaptive beliefs related to their self-image or social skills (e.g., Harvey, Clark, Ehlers, & Rapee, 2000; Morgan & Banerjee, 2010), but it has been scarcely used with children (Essau et al., 2014). In Essau et al.'s (2014) original study, SSL's effectiveness was revealed with anxious children, and significant improvements in children's social performance, including anxiety behaviors, were reported through the behavioral analysis of a 2-min speech task that children were asked to perform in front of the group, facing a video camera at pre- and post-treatment, and follow-up. Therefore, SSL has emerged as a promising program for the improvement of emotional problems, but also for children's social competence.

Essau et al. (2014) also analyzed the incremental scores in social skills as well as in self-esteem as possible mediators of the positive effects of SSL in general and social anxiety pre-post scores. However, no mediating effects were found, and the authors suggested the need for further SSL mediator research. In addition, the original study did not include a specific measure of depression, which is a primary variable targeted by the SSL program. Consequently, it was unable to examine whether possible positive changes in depression symptoms acted as a mediating factor that could explain the improvements found in anxiety scores. Recently, SSL has also proven to be effective for reducing anxiety and depressive symptoms in young Spanish-speaking children (aged 6 to 8 years) compared to a waiting list control (WLC) group (Fernández-Martínez, Morales, Espada, Essau, & Orgilés, 2019). However, despite the strong focus of SSL on improving children's social competence, its impact and usefulness to improve social skills in young children has not yet been examined.

Furthermore, Essau et al.'s (2014) original study examining possible mediators of the effects of SSL on anxiety outcomes has not been replicated with young children, as it focuses on English children from the age of 8 years. Consistent with previous findings with youths and young children showing the associations and predictive value of poorer social skills on anxiety disorders (e.g., Wichstrøm et al., 2013), particularly with social anxiety (Miers et al., 2013; Spence & Rapee, 2016), it is plausible to expect social skills to act as a mediator of the change in pre-post social and generalized anxiety scores of SSL found at early ages. This also refers to other possible mediators that the original SSL study did not consider, such as depression. In this regard, depression has been widely associated with social and generalized anxiety in children (Garber & Weersing, 2010), and there is evidence indicating that depression may precede and predict both anxiety disorders (Cummings et al., 2014; Jacobson & Newman, 2017). Moreover, previous findings have also shown that initial levels of depression symptoms predict change in anxiety symptoms and that prior reduction of depression symptoms may prevent or decrease the development of anxiety symptoms (Bettis, Forehand, Sterba, Preacher, & Compas, 2018). Therefore, it would be interesting to provide initial evidence on the role that depression variable may be acting on short-term positive changes in anxiety scores using the SSL program.

Thus, the main aim of the current study was to examine for the first time the immediate impact of the SSL program in improving social skills in young children with subclinical anxiety symptoms, analyzing gender differences. A second objective was to determine whether positive changes in social skills and depression were mediating factors that predict the positive impact of SSL on the social and generalized anxiety pre-post scores shown in the original study with young Spanish-speaking children (Fernández-Martínez et al., 2019). Based on the original SSL study (Essau et al., 2014), it was hypothesized that after the intervention children would display significant improvements in the social skills assessed, with minimal or no differences between boys and girls. Also, based on previous findings (e.g., Bettis et al., 2018; Cummings et al., 2014; Jacobson & Newman, 2017; Wichstrøm et al., 2013), it was hypothesized that social skills and depression would be acting as mediators of the change in pre- to post-treatment anxiety scores.

Method

Participants

The sample of this study is part of a larger cluster randomized controlled trial that included a total of 123 Spanish-speaking children, aged 6 to 8 years, from 10 schools of the southeastern region of Spain. Initially, twelve schools were incidentally chosen and only two of them (16.66%) refused to participate due to lack of availability. Schools were the unit of randomization in that study conducted in 2017, and they were assigned to two different experimental conditions: SSL intervention group (n = 5) or the WLC group (n = 5). One trial inclusion criterion was that parents' scores on a measure of emotional symptoms reached an established cut-off score, indicating the presence of elevated symptoms in their child. The final sample (N = 123) was selected from 182 participants (rejection rate of 32.42%) based on trial inclusion/exclusion criteria. In the SSL intervention group, the mean total anxiety score at baseline (> 27) suggested the presence of elevated anxiety symptoms in the sample as measured by the Spence Children's Anxiety Scale-Parent version (www.scaswebsite.com). All the information about the schools and participants' selection and characteristics, including the flowchart of the trial and inclusion/exclusion criteria, is available in the study by Fernández-Martínez et al. (2019).

The sample of the present study comprised 67 participants who were assigned to the SSL intervention group (Fernández-Martínez et al., 2019). Of these participants, only five children (7.46%) were not video-taped during SSL, as they did not present parental consent to make appropriate recordings of their performances. Therefore, a final sample of 62 children (M = 6.87, SD = .79; 53.2% girls) was video-recorded and behaviourally assessed at pre- and post-treatment by objective observers. Informed consent was obtained from all the parents and school principals to participate in the study. In the baseline, the rate of children exceeding the anxiety cutoff point at SCAS (27) was 53.2% (n = 33). The rate of children exceeding the cut-off point in depression in the MFQ (27) was 12.9% (n = 8).

Instruments

Depression. The Mood and Feelings Questionnaire-Parent version (MFQ-P; Angold et al., 1995) is a 34-item screening tool for depression in children. Parents rate their children's feelings and actions over the previous 2 weeks on a 3-point Likert scale: 0 (*not true*), 1 (*somewhat true*), and 2 (*true*). The MFQ-P total score is obtained by summing the scores of all the items. Higher scores indicate more severe symptoms of depression. Cronbach's α was .91 in this study using the Spanish version of the MFQ-P (Fernández-Martínez, Morales, Espada, & Orgilés, 2020).

Anxiety. The Spence Children's Anxiety Scale-Parent version (SCAS-P; Nauta et al., 2004) is a 38-item parent-report questionnaire assessing symptoms of panic/agoraphobia, separation anxiety, physical injury fears, social phobia/anxiety, obsessive compulsive disorder, and generalized anxiety disorder. Items are scored using a 4-point rating scale, ranging from 0 (*never*) to 3 (*always*). A total score indicating overall anxiety can be obtained by summing all the item scores. Higher scores indicate more severe symptoms. Cronbach's α in the current sample was .86 for the total score using the Spanish version of the SCAS-P (Orgilés, Rodríguez-Menchón, Fernández-Martínez, Morales, & Espada, 2019).

Performance ratings. The Objective Performance Questionnaire (OPQ-C; Cartwright-Hatton et al., 2003) is an 8-item instrument assessing children's social skills displayed during a public speech task facing a camera, rated by objective observers. Several domains of performance: micro-behaviors or micro-social skills, nervous behaviours, and overall global impression. Items are rated on a 4-point scale ranging from 1 (*not very much*) to 4 (*very much*). Higher scores denote greater social skills, except for nervous behaviours where higher scores indicate more anxiety behaviors. Cronbach's α was .77 in this study.

The Social Performance Rating Scale (SPRS; Fydrich, Chambless, Perry, Buergener, & Beazley, 1998) is an instrument for behavioral assessment of social skills by objective coders during videotaped social situations. SPRS assesses the following dimensions: gaze, voice quality, length, discomfort, and conversation flow. Each dimension of the scale consists of five behavioral anchors, ranging from 1 (*very poor*) to 5 (*very good*), except for discomfort, which ranges from *very high* (1) to *very low* (5). The total score was calculated by adding all the scores. The higher the score, the better the social skills observed. Cronbach's α was .78 in this study.

For this study, both the OPQ-C and the SPRS were translated into Spanish by two bilingual psychologists of the Miguel Hernández University. One translated the original English version into Spanish and the other translated the Spanish version back into English, then checked and addressed minor discrepancies.

Procedure

The current study was approved by the Ethics Committee of the authors' institution. The groups involved 4-6 participants and were led by a single facilitator. Seven facilitators participated in this intervention; all of them psychologists with a Master's degree, who were previously intensively trained in the SSL program (see Fernández-Martínez et al., 2019). In the first session and at the end of the last session, the children were asked to make a 2-minute speech in front of a video camera and the rest of the group, and were recorded. In the first session (pre-treatment) the children had to introduce themselves and talk about whatever they liked (i.e., their name, food, their favourite animal, and hobbies). At the end of the last session (post-treatment), the children were asked to talk about what they had learned in SSL, what they liked most about the program, and what skills they found most useful.

The 2-minute recordings of each child were rated by two psychologists who had a Master's degree in Child Clinical Psychology, and who were trained as observers. The evaluators were not involved in the implementation of the program and were blind to the children's anxiety scores. The ratings of the speech task videos were conducted independently, during the same time-period, and using two rating scales to assess the child's performance during the speech. In the baseline, sixty-seven parents filled out depression and anxiety measures by means of an online form before and after the intervention. Of them, 80.6% (n = 54) were mothers and 19.4% (n = 13) were fathers.

Data analysis

Gender differences in sociodemographic variables and main outcomes were analysed. Attrition analyses were run to test equivalence in sociodemographic variables and main outcomes between participants recorded and considered in the analysis of the efficacy of SSL regarding social skills (n = 62) and those who were not (n = 5). We tested homogeneity between the scores on OPQ-C and SPRS provided by two independent evaluators. Inter-rater reliability analyses were conducted using Spearman Brown. Using the final rating scores agreed by two evaluators, we ran generalized estimating equation (GEE) models for repeated measures, controlling for gender, age, baseline differences, and clustering in participating centers in each model (Fitzmaurice, Laird, & Ware, 2011; Liang & Zeger, 1986). Analyses were run with all participants, then, with boys and girls separately, and also comparing the outcomes between boys and girls. Social skills in the speech tasks and depression were analyzed as potential mediators of change between pre and post scores of generalized anxiety and social anxiety. The potential mediator models were tested using PROCESS macro syntax designed by Preacher and Hayes (2008). We used 5,000 bootstrap resample and bias-corrected bootstrap confidence intervals. Model 4 was tested (Hayes, 2013). Analyses were completed using SPSS v25.

Results

Attrition

Attrition analysis revealed that children who were recorded and considered in the analysis of the efficacy of SSL regarding social skills (n = 62) and those who were not (n = 5) were equivalent in

sociodemographic variables, including gender ($\chi^2_{(1)}$=2.04; *p*=.15; *OR*=0.22; 95% CIs [.02, 2.07]), age ($t_{(65)}$= -1.41; *p*=.16; *d*=0.62), and school level ($\chi^2_{(2)}$=4.40; *p*= .11; *d*= -0.82), and also in main outcomes: Anxiety (SCAS total score) ($t_{(65)}$=.73; *p*=.46; *d*=0.33), Generalized anxiety ($t_{(65)}$=.07; *p*=.93; *d*=0.03), and Social anxiety subscales of the SCAS ($t_{(65)}$=.52; *p*=.60; *d*=0.28), and depression (MFQ) ($t_{(65)}$=.40; *p* =.68; *d*=0.20). The mean number of sessions that children attended was 7 (*SD* = 1, range: 1-8). The 82.1% of children (*n* = 55) attended 7 or 8 sessions.

Interjudge reliability

Inter-rater reliability analyses showed high concordance and agreement among the ratings of the two independent observers when behaviorally assessing the SSL participants thorough the 2-min recordings, using the SPRS and the OPQ-C measures. Overall, the concordance index was above .95 and .93 at pre-treatment and post-treatment assessments, respectively (Table 1).

Behavioral changes in the speech task

Table 2 shows the estimated marginal means of the behavioral outcomes assessed through the 2-min speech tasks at pre and post-treatment, for the general sample and by gender.

Table 3 shows the impact of the program on the behavioral outcomes post-intervention. GEE modeling analyses indicated significant within-subject effects in all outcomes at post-test compared to pre-test for the general sample. Thus, after the SSL intervention, children significantly improved their scores on gaze, vocal quality, length of speech, discomfort, conversation flow, total SPRS score, micro-behaviors, nervous behaviors, and overall global impression during the speech (*p*-values ranging from .006 to < .001). Based on observer-ratings, these results indicated that, after the intervention, overall, the children significantly improved their social skills, including improvements in communication and micro-social skills, and global impression, as well as reductions in nervous behaviors.

Table 1
Spearman correlations for interjudge reliability

Outcomes	Pretest	Posttest
SPRS		
Gaze	.98**	.99**
Vocal quality	1**	.98**
Length	.99**	.98**
Discomfort	1**	.97**
Conversation flow	.99**	1**
Total	.99**	.95**
OPQ-C		
Micro-behaviours	.99**	.99**
1. How loud and clear was the child's voice?	.98**	.99**
2. How much did the child look at the camera?	.1**	.99**
3. How much did the child smile?	.97**	1**
Nervous behaviours	.97**	.93**
4. How nervous did the child look?	.97**	.97**
5. Did the child stumble over its words?	.95**	1**
Global impression	.98**	.98**
6. How clever did the child look?	.96**	.98**
7. How friendly did the child look?	1**	1**
8. How good was the child's speech?	.98**	.97**

Note: ** $p < .01$; SPRS = Behavioral assessment of social performance; OPQ-C = The Objective Performance Questionnaire

Gender differences

At baseline, no gender differences were found in sociodemographics, including age ($t_{(60)}$=-.39; *p*=.69; *d*=0.09) and school level ($\chi^2_{(2)}$=3.03; *p*=.23; *OR*=-0.21; 95% CIs [-0.26,-0.16]), or in the main outcomes, including anxiety ($t_{(60)}$ =-.42; *p* =.67; *d*=-0.10), generalized anxiety ($t_{(60)}$ =-1.15; *p*=.25; *d*=0.29), social anxiety ($t_{(60)}$=.35; *p*=.72; *d*=0.08), and depression ($t_{(60)}$=.25; *p*=.25; *d*=0.29). Boys and girls were also equivalent in social skills, including the three subscales of OPQ-C: observer-rated micro-behaviors ($t_{(60)}$=.43; *p*=.66; *d*=0.11), observer-rated nervous behaviors ($t_{(60)}$=-.33; *p*=.73; *d*=0.08), and observer-rated global impression ($t_{(60)}$=.67; *p*=.50; *d*= 0.16), and the SPRS total score ($t_{(60)}$=-.17; *p*=.85; *d*=-0.04).

Intervention impact were analyzed separately for girls and boys based on the observer-ratings (Table 3). For girls, the intervention revealed a significant within- subject effect in all the behavioral outcomes compared to the baseline. Significant score improvements were found for the SPRS total score and its dimensions (i.e., gaze, vocal quality, length of speech, discomfort, conversation flow), as well as for the three OPQ-C subscales (i.e., micro-behaviors, nervous behaviors, and global impression), with *p*-values ranging from .03 to < .001. Similar results were obtained for boys, whose scores also improved significantly in all the behavioral variables assessed compared to the baseline (*p*-values ranging from .03 to < .001), except for the SPRS conversation flow dimension, which was marginally significant (*p* = .07). No significant between-subject intervention effects by gender were found.

Mediators of change

Table 4 shows the 95% confidence intervals for the mediating effects. Reduction of depressive symptoms was the only significant mediator of change in pre-to-post scores of the Generalized anxiety subscale of SCAS. Improvements in the social skills behaviors assessed during the 2-min speech tasks, including the SPRS total score, micro-behaviors, global impression, and reduction in anxious behaviors (OPQ-C) were not significant mediators of change in pre-to-post scores of Generalized anxiety symptomatology. None of the potential mediators was significant for change in pre-to-post scores of the SCAS Social anxiety subscale.

Discussion

The main objective of this study was to examine for the first time the impact of SSL in improving social skills in young children aged 6-8. Overall, as expected, the results of this study revealed that SSL had an immediate impact on the social skills of young children with subclinical anxiety symptoms, who displayed better social skills after receiving the intervention. Thus, this finding indicated that the objective raters observed significant positive behavioral changes in the children's social performance between pre- and post-intervention. Particularly, at post-treatment, the children significantly increased their social skills related to gaze

Table 2
Scores in the outcomes in the pre- and post-treatment

Outcomes	Sample	Estimated marginal means (CI)	
		Pre-treatment	Post-treatment
SPRS			
Gaze	Girls	3.15 [3.05, 3.25]	3.79 [3.55, 4.03]
	Boys	3.20 [3.09, 3.32]	3.76 [3.47, 4.04]
	Total	3.18 [3.10, 3.25]	3.77 [3.59, 3.96]
Vocal quality	Girls	3.40 [3.30, 3.51]	4.37 [4.17, 4.58]
	Boys	3.47 [3.37, 3.57]	4.06 [3.84, 4.28]
	Total	3.44 [3.37, 3.51]	4.22 [4.07, 4.36]
Length	Girls	3.68 [3.61, 3.74]	4.37 [4.13, 4.61]
	Boys	3.68 [3.59, 3.77]	4.09 [3.77, 4.42]
	Total	3.68 [3.63, 3.73]	4.23 [4.03, 4.44]
Discomfort	Girls	3.39 [3.32, 3.47]	3.97 [3.77, 4.16]
	Boys	3.38 [3.32, 3.45]	3.83 [3.59, 4.07]
	Total	3.39 [3.34, 3.44]	3.90 [3.74, 4.05]
Conversation flow	Girls	3.65 [3.61, 3.70]	3.96 [3.68, 4.23]
	Boys	3.60 [3.55, 3.65]	3.84 [3.58, 4.11]
	Total	3.63 [3.59, 3.66]	3.90 [3.71, 4.09]
Total	Girls	17.30 [17.13, 17.47]	20.48 [19.83, 21.14]
	Boys	17.31 [17.12, 17.50]	19.55 [18.80, 20.31]
	Total	17.31 [17.18, 17.44]	20.02 [19.52, 20.52]
OPQ-C			
Micro-behaviours	Girls	6.85 [6.75, 6.95]	9.28 [8.88, 9.67]
	Boys	6.88 [6.76, 7.00]	9.05 [8.41, 9.70]
	Total	6.87 [6.79, 6.95]	9.17 [8.79, 9.54]
1. How loud and clear was the child's voice?	Girls	2.50 [2.41, 2.58]	3.34 [3.17, 3.52]
	Boys	2.47 [2.38, 2.56]	3.40 [3.18, 3.62]
	Total	2.48 [2.42, 2.54]	3.37 [3.23, 3.51]
2. How much did the child look at the camera?	Girls	2.22 [2.14, 2.30]	3.04 [2.82, 3.25]
	Boys	2.27 [2.17, 2.37]	2.92 [2.55, 3.30]
	Total	2.24 [2.18, 2.31]	2.98 [2.77, 3.19]
3. How much did you smile?	Girls	2.14 [2.07, 2.21]	2.74 [2.65, 3.14]
	Boys	2.15 [2.08, 2.23]	2.74 [2.45, 3.03]
	Total	2.15 [2.10, 2.20]	2.82 [2.63, 3.01]
Nervous behaviours	Girls	3.46 [3.36, 3.57]	2.49 [2.30, 2.69]
	Boys	3.43 [3.30, 3.55]	2.74 [2.49, 2.98]
	Total	3.45 [3.36, 3.53]	2.62 [2.46, 2.77]
4. How nervous did the child look?	Girls	2.24 [2.16, 2.31]	1.54 [1.36, 1.72]
	Boys	2.25 [2.17, 2.33]	1.70 [1.48, 1.91]
	Total	2.24 [2.19, 2.30]	1.62 [1.48, 1.76]
5. Did the child stumble over its words?	Girls	1.24 [1.15, 1.33]	.97 [.88, 1.06]
	Boys	1.17 [1.11, 1.24]	1.04 [.97, 1.10]
	Total	1.21 [1.15, 1.26]	1.00 [.95, 1.06]
Global impression	Girls	7.91 [7.79, 8.02]	10.06 [9.65, 10.46]
	Boys	7.96 [7.83, 8.09]	9.68 [9.22, 10.14]
	Total	7.93 [7.85, 8.02]	9.87 [9.56, 10.18]
6. How clever did the child look?	Girls	2.68 [2.63, 2.73]	3.35 [3.18, 3.51]
	Boys	2.68 [2.63, 2.72]	3.30 [3.09, 3.50]
	Total	2.68 [2.64, 2.71]	3.32 [3.19, 3.45]
7. How friendly did the child look?	Girls	2.51 [2.44, 2.57]	3.33 [3.12, 3.53]
	Boys	2.56 [2.49, 2.63]	3.18 [2.94, 3.43]
	Total	2.53 [2.49, 2.58]	3.25 [3.09, 3.41]
8. How good was the child's speech?	Girls	2.71 [2.64, 2.79]	3.38 [3.20, 3.56]
	Boys	2.74 [2.65, 2.83]	3.22 [3.01, 3.43]
	Total	2.73 [2.67, 2.78]	3.30 [3.16, 3.44]

Note: CI= Confidence Interval; SPRS = Behavioral assessment of social performance; OPQ-C = The Objective Performance Questionnaire; Higher scores denote greater social skills except for "Nervous behaviours"

Table 3
Intervention effects on speech task outcomes

Outcomes	Sample	Post-treatment	
		AOR [95% CI]	*p* value
SPRP			
Gaze	Girls	1.89 [1.39, 2.55]	< .001
	Boys	1.73 [1.23, 2.43]	.001
	Total	1.81 [1.44, 2.27]	< .001
Vocal quality	Girls	2.63 [1.98, 3.50]	< .001
	Boys	1.79 [1.38, 2.33]	< .001
	Total	2.20 [1.80, 2.69]	< .001
Length	Girls	2.00 [1.55, 2.60]	< .001
	Boys	1.51 [1.05, 2.17]	.02
	Total	1.75 [1.40, 2.19]	< .001
Discomfort	Girls	1.77 [1.40, 1.26]	< .001
	Boys	1.56 [1.20, 2.03]	.001
	Total	1.67 [1.40, 2.00]	< .001
Conversation flow	Girls	1.35 [1.01, 1.80]	.03
	Boys	1.27 [.97, 1.65]	.07
	Total	1.31 [1.08, 1.60]	.006
Total	Girls	24.09 [11.50, 50.45]	< .001
	Boys	9.40 [4.23, 20.88]	< .001
	Total	15.51 [8.91, 27.02]	< .001
OPQ-C			
Micro-behaviours	Girls	11.29 [7.29, 17.47]	< .001
	Boys	8.77 [4.52, 17.03]	< .001
	Total	10.03 [6.80, 14.80]	< .001
1. How loud and clear was the child's voice?	Girls	2.33 [1.86, 2.92]	< .001
	Boys	2.53 [1.93, 3.32]	< .001
	Total	2.42 [2.04, 2.88]	< .001
2. How much did the child look at the camera?	Girls	2.26 [1.77, 2.89]	< .001
	Boys	1.92 [1.26, 2.92]	.002
	Total	2.10 [1.65, 2.66]	< .001
3. How much did you smile?	Girls	2.13 [1.61, 2.81]	< .001
	Boys	1.79 [1.31, 2.45]	< .001
	Total	1.96 [1.59, 2.42]	< .001
Nervous behaviours	Girls	.37 [.29, .49]	< .001
	Boys	.50 [.36, .70]	< .001
	Total	.43 [.35, .53]	< .001
4. How nervous did the child look?	Girls	.49 [.40, .61]	< .001
	Boys	.57 [.44, .74]	< .001
	Total	.53 [.45, .63]	< .001
5. Did the child stumble over its words?	Girls	.76 [.64, .90]	.002
	Boys	.87 [.76, .98]	.03
	Total	.81 [.72, .90]	< .001
Global impression	Girls	8.59 [5.50, 13.42]	< .001
	Boys	5.60 [3.32, 9.45]	< .001
	Total	7.04 [4.98, 9.93]	< .001
6. How clever did the child look?	Girls	1.94 [1.62, 2.33]	< .001
	Boys	1.86 [1.48, 2.32]	< .001
	Total	1.90 [1.65, 2.19]	< .001
7. How friendly did the child look?	Girls	2.26 [1.80, 2.85]	< .001
	Boys	1.86 [1.41, 2.45]	< .001
	Total	2.06 [1.72, 2.47]	< .001
8. How good was the child's speech?	Girls	1.94 [1.56, 2.41]	< .001
	Boys	1.62 [1.24, 2.11]	< .001
	Total	1.78 [1.50, 2.11]	< .001

Note: AOR = Adjusted Odds Ratio. CI= Confidence Interval. SPRP = Behavioral assessment of social performance. OPQ-C = The Objective Performance Questionnaire. Each analysis was adjusted for the baseline measure, gender, age and school level

Table 4
Results of confidence intervals for mediating effects

	M	*SE*	Lower limit	Higher limit
Depression				
(change in social anxiety scores)	-.03	.03	-.10	.01
(change in generalized anxiety scores)	-.15	.06	-.28	-.04
SPRS total score				
(change in social anxiety scores)	-.006	.02	-.04	.04
(change in generalized anxiety scores)	-.004	.03	-.06	.06
Micro-behaviours				
(change in social anxiety scores)	-.003	.007	-.02	.007
(change in generalized anxiety scores)	-.001	.006	-.01	.009
Nervous behaviours				
(change in social anxiety scores)	-.01	.02	-.07	.02
(change in generalized anxiety scores)	.006	.01	-.03	.02
Global impression				
(change in social anxiety scores)	-.01	.03	-.09	.03
(change in generalized anxiety scores)	.01	.02	-.02	.08

Note: M = Mean*; SE* = Standard Error; SPRS = Behavioral assessment of social performance

eye, vocal quality, length of speech, discomfort during the speech, conversation flow, micro-behaviors or micro-social skills, and overall global impression; whereas they showed fewer nervous behaviors during their social performance.

Our findings are in line with Essau et al.'s (2014) original SSL study with older children (8-10 years), where objective raters reported positive behavioral changes, also considered behavioral indicators of anxiety, and the effects were, in general, statistically significant at the 6-month follow up. Our results with younger children are promising, as the effects, based on objective ratings, are immediately observable by applying the same tasks and procedure as in the original study. Furthermore, our findings indicated that there were no significant between-subject gender differences in the improvement of social skills. Thus, SSL may be a useful tool for improving young children's social performance and competence, considered in turn as protective and resilience factors against future disorders (Huber et al., 2019; Milligan et al., 2017; Wichstrøm et al., 2013), including reductions in anxious behaviors during social encounters.

Regarding the second goal of this study, depression acted as a mediator of change in pre-to-post scores on the generalized anxiety symptoms reported by Fernández-Martínez et al. (2019). Therefore, this finding suggests that the beneficial effects of SSL on generalized anxiety symptoms were due to improvements in young children's depressive symptoms. This result was expected, in accordance with studies supporting the strong associations between these disorders (anxiety and depression), and the fact that early depression may predicts later anxiety, including generalized anxiety (Cummings et al., 2014; Garber & Weersing, 2010; Jacobson & Newman, 2017). The communalities between anxiety and depression in terms of shared characteristics, mechanisms and risk factors could explain that improvement in one condition could facilitate the improvement in the other. This suggest the usefulness of developing interventions aimed at the transdiagnostic prevention of both disorders (Dozois, Seeds, & Collins, 2009), such as the SSL program. In line with previous findings (Bettis et al., 2018), our results could be of interest suggesting that comorbid depressive symptoms could play a role in later intervention outcomes regarding young children's anxiety. However, mediator analyses revealed that depression did not act as a mediator of changes in social anxiety scores. Although unexpected, this may also be consistent with Bettis et al.'s (2018) findings, where initial improvements in children's depressive symptoms did not predict subsequent changes in anxiety at post-treatment. Moreover, as found in Essau et al.'s (2014) study, better social skills did not act as a mediator of the analyzed anxiety outcomes. Overall, the reason for failing to find a mediating effect in these factors remains unclear, although a possible explanation could be the small sample size of this study. Results regarding social skills and social anxiety are in line with Spence and Rapee's (2016) review, suggesting that the causal role played by the two conditions needs further research.

This study has some limitations that should be mentioned. First, the sample comes from a localized region of Spain. This study should be replicated in the future with samples from other regions in order to generalize our findings. Second, although similar to the original SSL study by Essau et al. (2014), the sample size was small and no control group was included. In addition, the study comprised a convenience sample of schools. Therefore, future randomized controlled studies with larger samples and schools randomly chosen are needed. Third, no self-reports were used for this study due to lack of valid measures for this age range when conducting the study, which should be addressed in future studies. Further research with Spanish-speaking children should overcome these limitations and provide additional evidence of the benefits of SSL on social skills and factors operating on the program's effects on anxiety and other outcomes (e.g. depression and social skills).

Despite its limitations, the present study provides initial support for the short-term impact of SSL in improving young children's social skills. This study also revealed that the immediate effects of SSL on young children's generalized anxiety are mediated by positive changes in comorbid depressive symptoms. As such, the clinical implications of this research are mainly two. Firstly, the SSL program seems to be a valuable resource to improve the social skills of children with anxiety-related difficulties in eight sessions, being applicable in a school-based environment. Secondly, comorbid depressive symptoms of the participants of the SSL program could play a relevant role in reducing anxiety symptoms. Therefore, it could be convenient to evaluate them and attend to their evolution when the program is applied. Finally, this research extends the international support of SSL by adding evidence of its impact to improve social skills in young children with anxiety symptoms.

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