Student Diversity – Original Research

Differences in Adolescents With Down Syndrome and Asperger in a Social Skills Training Program

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Abstract

Background/Objective: Researchers have traditionally reported that individuals with Down syndrome possess a strength in their social development, yet the opposite occurs with Asperger’s syndrome. Based on this premise, we sought to assess the effectiveness of the social skills training program. Method: Thirty adolescents aged 11 to 14 years with Down syndrome and Asperger’s syndrome participated in the study. Results: Significant differences between both groups were detected in the posttreatment measures and a connection was found between adolescents’ learning potential and the benefits gained. Conclusions: The training program is effective at improving the social skills under evaluation in adolescents with Down syndrome; however, this benefit is greater among adolescents with Asperger’s syndrome.

Keywords

social skills, early adolescence, learning potential, Down syndrome, Asperger’s syndrome, experimental study

Introduction

When we talk about social development, we address areas including the development of interpersonal social skills, the capacity for play and having fun, abilities related to independence and self-help, and socially appropriate behavior (Cook & Oliver, 2011). Social development is essential to a person’s well-being, given that socialization, the ability to make friends, and to look after others affect many aspects of daily life. What is more, the capacity for people with disabilities to properly interact with others at a social level may be more important than their academic capabilities to ensure successful community integration (Cantwell et al., 2015; van Gameren-Oosterom et al., 2013, 2014; Verdugo et al., 2015).

In general terms, “interpersonal and social skills” are understood as a complex pattern of responses that prove effective when it comes to exercising self-control and exerting a direct or indirect influence on others via socially appropriate methods and procedures which can be learned (Cook & Oliver, 2011). According to Ruiz (2009), the term “skills” refers to an acquired skill set which socially frames them in an interpersonal context of interaction with others. Thus, if they are indeed learned, it cannot be assumed that they should already be known, meaning that they can be trained.

Social skills are very important for the promotion of child and adolescent psychological health. In recent years, numerous studies have demonstrated the connection between social competence and physical-mental health, considering the repertoire of social skills as a protective factor and an indicator of healthy development of quality of life, as well as being a significant predictor of academic performance (Lacunza, 2012).

From this perspective, interpersonal skills are the specific behaviors that individuals adopt to carry out functional social tasks such as actively engaging in play with their peers. However, some authors have found what appear to be important differences in social skills shown by children with Down syndrome (hereinafter DS) and children with Asperger’s syndrome (hereinafter AS). In young people with DS and AS, their main socializing influence is the family, being one of the first transmitters of knowledge, values, attitudes, roles, and habits.

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AS is a neurodevelopmental disorder characterized by abnormal social functioning, poor coordination, repetitive behaviors, and unusual speech patterns (McAlonan et al., 2002). However, AS is not associated with decreased intelligence or language delay, which differentiates it from other disorders on the autism spectrum. That said, odd speech patterns may appear which are characterized by marked social disruption, communication difficulties, a deficit in the ability to play, and a range of repetitive interests and behaviors, as well as difficulties expressing and understanding emotions (Flórez, 2014; Pérez & Martínez, 2014; Tarazi et al., 2015). Meanwhile, adolescents with DS also exhibit inflexible behavior patterns and disruptions in their pragmatic language skills (Galeote et al., 2018) as well as intellectual disability with disruptions to their cognitive development (Valencia-Naranjo & Robles-Bello, 2017). However, the ability to interact socially has traditionally been viewed as a strength in people with DS (Naess et al., 2016). They are very expressive and spontaneous, even having an excess of physical contact. This is something that should be worked on from a young age, to control certain situations, such as in the workplace (De la Rosa, 2018). They show good social understanding and find it easy to learn by imitation (Valencia-Naranjo & Robles-Bello, 2020), but the prevalence of disruptive behavior disorders is somewhat higher than that in the general population. If these disruptive behaviors were trained, they would no longer influence the learning of social skills. This is why emotional education is of great importance to promote the acquisition, control, and awareness of social skills (Llamazares & Pacheco, 2012; Robles-Bello & Sánchez-Teruel, 2020). The difficulties in establishing adequate social interactions in AS are associated with deficits in making social inferences about other people’s behaviors, which makes levels of metatization and empathy difficult, preventing understanding of the other and, therefore, feelings of positivity, (Ojea & Diéguez, 2011), emotional expression, and emotion recognition (Bauminger & Kasari, 2000).

Motivational problems have been observed when faced with social interaction and, specifically, a preference for interacting socially with adults to complete tasks (Bauminger & Kasari, 2000; Valencia-Naranjo & Robles-Bello, 2020). The above is coupled with low frustration tolerance; difficulties in accepting not getting what they want, which comes across through behaviors of rejection toward the task or the person(s) presenting said task; negativism or abandonment of the situation; an overriding fear of failure; feelings of insecurity when faced with unexpected events; their struggle to see another’s point of view and to empathize; a lack of inhibition; a need for protagonism; and a distorted personal perception. And while biology and genetics condition but do not determine all individuals, there will always be people who we can help and who benefit from this extra support given in the social and educational context.

From this perspective, we are interested in identifying how two groups of adolescents with social difficulties approach training in interpersonal skills. Thus, with this study, we seek to explore the cognitive capacity of both samples. First, performance on a standardized intelligence test and on a learning potential test, namely the Assessment of Learning Potential-2 (EPA-2; Fernández-Ballesteros et al., 2000), is compared. We expect to find significant differences in cognitive competence in favor of the AS group. Second, these groups are compared to study socialization difficulties in DS versus AS. To achieve this, between-group differences in social variables are analyzed. We expect the DS group to yield significantly higher scores than the AS group. Third and finally, we examine whether the cognitive variables predict social interaction.

Method

Participants

The sample comprised 30 adolescents aged between 11 and 14 years. It was divided into two groups: 15 boys with DS ($M = 13.2; SD = 1.9$) and 15 similarly aged boys with AS ($M = 13.9; SD = .79$). Due to the difficulty in finding girls with AS, the decision was made to match both groups by sex, that is, all male. Participants were from southern Spain and are users of a day unit with occupational therapy from a center for the care of people with intellectual disabilities, specifically the Down syndrome Association of Jaén. In this unit, they receive specialized care adapted to their disability and psycho-pedagogical support. They were asked for express written authorization from their families. The ethics committee of the University of Jaén gave written authorization for the research (Code: JUL.18/2.PRY). They were all being treated under special social skills programs; they were schooled at mainstream centers; and they were previously diagnosed. No individuals had a dual clinical and psychological pathology, nor did they present hearing or vision deficits which would rule out their participation in the study. The sample of boys with DS specifically had trisomy 21. Assessment was carried out once parental consent for study participation across both groups was obtained.

In this study, these two syndromes were selected because they are two populations that show very similar deficits in social skills: They present difficulties in mentalist tasks and in referential communication. This circumstance, when applying the program, facilitates the necessary adaptations according to the special needs of these two populations.

Instruments

“EPA-2” (Fernández-Ballesteros et al., 2000): This learning potential test is based on an analogical reasoning task, namely Raven’s Progressive Matrices. It follows a pretest–training–posttest format. The original General Scale of
Raven’s test is used during the pretest and posttest evaluations. The training stage comprises 68 items featuring similar yet not identical matrices that make up Raven’s test (Raven et al., 1993). The manual includes detailed instructions to guide the assessor-led training and outlines the solution rule for each item and the interactions that the assessor must make to ensure they are taught correctly. The final result of the evaluation is a direct post–pre gain score (GS) interpreted as an improvement due to the training provided and, therefore, a sign of the individual’s capacity for learning. The test’s psychometric properties have been analyzed across a wide range of studies. The posttraining results using the EPA have revealed a significant improvement in the Raven scores, and the GSs have proved stable over time (Calero, 1995; Fernández-Ballesteros & Calero, 2000).

“Kaufman Brief Intelligence Test” (K-BIT; Kaufman & Kaufman, 1994): This test was designed to measure verbal and nonverbal intelligence in children, adolescents, and adults. It comprises two subtests: vocabulary (covering two parts, specifically expressive vocabulary and definitions) and matrices. A score for each subtest—vocabulary and matrices—as well as an overall composite IQ score are obtained. This test has a reliability coefficient of .98 for composite IQ and .97 for the vocabulary and matrices subscales, respectively.

“Social Skills Scale” (EHS; Gismero, 2000): This very brief instrument measures assertiveness and socially skilled behavior. It provides normative data on Spanish samples albeit not on intellectual disability. The scale comprises 33 items divided into six subscales or factors: (a) “self-expression in social situations”; (b) “defense of one’s rights as a consumer”; (c) “expression of anger or disagreement”; (d) “Saying no and cutting off interactions”; (e) “Making requests”; and (f) “Initiating positive interactions with the opposite sex.” The 33-item version was adopted as the definitive version with a reliability coefficient of .88. However, to make it applicable to this study and given the populations’ characteristics, an adaptation was carried out using visual aids following the approach taken by Sequerra et al. (2016).

“Social Skills Program” (PHS; Verdugo, 2006): This program encompasses a diverse set of behaviors whose end goal is to integrate people into the community. It is widely regarded as the most appropriate intervention in the field of intellectual disability (Verdugo et al., 2005, 2006, 2007; Verdugo & Schalock, 2001). Different skills aimed at increasing social competence and environmental adaptation are trained. The program comprises six general objectives (GOs), 17 specific objectives, and 201 operational objectives. GO 1 addresses verbal and nonverbal communication skills that allow individuals to express themselves, understand, and respond to the expressions of others. GO 2 covers skills that help develop interpersonal relationships (e.g., avoiding potentially abusive situations). GO 3 encompasses instrumental skills that place emphasis on becoming more independent (e.g., managing money, receiving information on activities, filling out important forms). GO 4 covers to-be-developed behaviors when it comes to family, school, and school events, alongside the use of leisure and free time (e.g., birthday parties, visiting family members, sporting events, get-togethers). GO 5 covers road safety education, including how to move about the city safely. Finally, GO 6 addresses skills related to security measures, accident prevention, and environmentally minded civic behaviors.

Procedure Test administration (pretest–training–posttest) lasted approximately four 60-min sessions. Tests were administered in the following order: K-BIT, EPA-2, and ending with the EHS. Participants were called upon individually for assessment. Participants have never been evaluated with these tests before.

The two groups belonged to different associations. The people who carried out the evaluation were the professionals of the center who attend to them. The application of the program was carried out by a psychologist (one of the authors of this research) who had no knowledge of the objectives of the program as she was a doctoral student. All the adolescents in the DS group had attended an early childhood intervention program since birth (Robles-Bello & Sánchez-Teruel, 2013).

Intervention through the social skills program was carried out in groups, with all 15 participants from each association attending two, 2-hr-long weekly sessions during the academic year. Once training was completed, participants retook the EPA-2 and the EHS. If intervention proved effective across both groups, it would be rolled out as an intervention program open to all users. The approval of the ethics committee of the second and third authors’ university (code ABR.20/4.PRY) had previously been sought and obtained, which also conforms to the principles enshrined in the Declaration of Helsinki (Goodyear et al., 2007).

Data Analysis

A t student parametric test was used to analyze the existence of differences in the different groups and moments of measurement (pre/post). Subsequently, a multivariate regression analysis by successive steps of the social skills (independent variable) was carried out on intelligence (dependent variable), first finding the indices of goodness of fit. The level of statistical significance required in all tests was a minimum of \( p < .05 \). The statistical analysis of the data was performed using the SPSS statistical package version 22.0 (IBM Corporation, 2013).

Results

Based on the descriptive analysis, there were no significant between-group differences by participants’ age, \( F_{(29)} = .042; p = .88 \). The results obtained across both groups on the K-BIT’s vocabulary and matrices subscales and the total score are shown in Table 1. As can be observed, significant differences were found in favor of the AS group.
Regarding the EPA-2, we calculated the change after training using the formula proposed by Sergi et al. (2005) to obtain the corrected GSs on the direct GSs (Ohrmann et al., 2008). This represents a dimensional performance measure in which the post–pre difference is divided by the maximum gain that can be achieved (maximum pretest score–pretest score). The participants’ scores at pretest and posttest and the GSs are shown in Table 2. The difference between means \( t \) test on the GSs between both groups did not yield significant results. However, the differences found between the two groups of adolescents in learning potential indicate a better score in the group with Asperger.

As for the instrument that measured social variables, we can observe from the between-group difference results (see Table 3) that no significant differences were found at pretest in any subscale except for “saying no and cutting off interactions.” At posttest, there were differences across almost all subscales in favor of DS except for “expression of anger or disagreement,” which yielded no significant differences. For the subscales “self-expression in social situations,” “defense of one’s rights as a consumer,” and “initiating positive interactions with the opposite sex,” the differences were in favor of the DS group. For “saying no and cutting off interactions” and for “making requests,” the differences were in favor of the AS group.

Regarding intragroup differences, we can see in Table 4 how all differences were significant for the DS group and the same for the AS group when comparing all social skills measures between pretest and posttest.

Multiple regression analysis was used to examine which variables predicted a higher level of intelligence in this sample, subjected to this sample, and underwent a social skills
training program. Preliminary analyses for the assessment of
goodness of fit confirmed compliance with the assumptions 
of nonmulticollinearity (<5; VIF = 1.00 and 1.77; Kleinbaum 
et al., 1988) and the tolerance values (1–0.1) are between 1 
and 0.98. Moreover, there is no autocorrelation in all social 
skills, so the error independence assumption is fulfilled 
(Durbin–Watson = 1–3) and the results obtained can be gen-
eralized on the general population, being the coefficient close 
to 2 (D-W = 1.95; Yoo et al., 2014).

Specifically, the results of Table 5 (in the group of adoles-
cents with DS) refer to the social skills that have a higher 
level, self-expression in social situations (β = .47; 95% con-
fidence interval [CI] = [.11, .34]; p < .01), defense of one’s 
rights as a consumer (β = .29; 95% CI = [.1, .09]; p < .01), 
and initiating positive interactions with the opposite sex 
(β = .42; 95% CI = [.71, .92]; p < .01). However, by 
incorporating variables into the model, it has greater power 
to explain intelligence, as well as a high level of statistical 
power (1 − β = 1) and effect size (f² = 19.2; McDonald, 
2014), and allows us to state that the results are clinically 
relevant for predicting intelligence.

In Table 6, in the group of adolescents with AS, the social 
skills test factors predicting intelligence are first saying no 
and cutting off interactions (β = .42; 95% CI = [.41, .72]; 
p < .01), followed by expression of anger or disagreement 
(β = .37; 95% CI = [.09, .24]; p < .01) and making requests 
(β = .21; 95% CI = [.51, .74]; p < .01).

**Discussion**

With this study, we aimed to analyze social skills in a sample 
of adolescents with DS compared with a group of adolescents
with AS matched for age, and to examine their relationship with the level of intelligence and learning potential shown. It was deemed of interest to comparatively assess the relationship between social skills, IQ, and learning potential in both samples to essentially determine whether the social skills exhibited by adolescents with AS are different from those exhibited by adolescents with DS, given that sociability has traditionally been assigned as a strength among the latter populations (Calero et al., 2015). In other words, we are unable to confirm whether outcomes in social interaction by intelligence level can be predicted in people with intellectual disability, in addition, because of the small sample size.

In terms of the hypothesis on differences in social variables, we found that interpersonal conflict resolution confirms social difficulties in both groups, especially in AS. However, as expected, the AS group outperformed the DS group, which coincides with the results reported by Channon et al. (2001). That said, the effect observed in the group of adolescents with DS (Jiménez-García, 2013) could be explained by the pretraining that these individuals with DS received at early childhood care centers.

Clear difficulties were observed in both groups when it comes to explaining the reasons behind these social skills, with better performance by the group of adolescents with DS. These results support earlier research data, thus concluding that the AS group presented difficulties in taking into account the interpersonal reasons that lead people to resolve problems in a particular way (Channon et al., 2001). However, the DS group was capable of coming up with varied yet consistent reasons, although they experienced problems expressing them. Furthermore, the solutions being put forward by the AS group were significantly inadequate and socially poor in nature. These results may indicate that both populations lack the skills to take account of the social consequences underlying their solutions, especially in the AS group, which would also explain the difficulties faced by this group to generalize to other daily situations, as reported in earlier research studies (e.g., Park et al., 2016; Rao et al., 2008; White et al., 2007). Although these generalizations are also seen in the DS group, they seem to affect them less so than their AS peers (Carvajal et al., 2012; Martínez-Castilla et al., 2015; Oxelgren et al., 2019). In conclusion, finding qualitatively appropriate solutions appears to be a weak area in both groups, but especially in people with AS. According to Channon et al (2001), this may be a consequence of the executive difficulties that adolescents with AS experience.

Regarding interpersonal skills, significant differences were observed between both groups via both the self-report questionnaires. Once again, we see from the results that both populations exhibited social interaction problems (Lindner & Rosén, 2006; Reilly, 2012).

We observed no differences in the social skills. A first explanation would be to attribute this effect to all adolescents’ prior participation in interpersonal skills training programs, although these results are surprising, given that we expected to find differences in favor of the DS group. It appears that the AS group draws far more benefits from training in social skills programs, which was also reported by Louro (2015) and Soresi and Nota (2000). In line with Channon et al. (2001), another possibility is that adolescents with AS struggle with self-evaluation and find it difficult to predict their own inadequate behavior. This could be due to their executive difficulties coupled with their limited

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**Table 6. Values of the Regression Equation for the Prediction of the Degree of Independent Variables (Intelligence) According to Social Skills in the Group of Adolescents With Asperger’s Syndrome.**

| Model | $R^2$ | $F$ | B  | SE  | t   | $\beta$ | LL  | UL  | $1 - \beta$ | $f^2$ |
|-------|-------|-----|----|-----|-----|---------|-----|-----|-------------|-------|
| Model 1 | .44   | 411.23** | .13 | .01 | 1.78** | .42 | .12 | .98 | .40 |       |
| Self-expression in social situations | .13 | .01 | 1.78** | .42 | .12 | .98 |       |     |     |       |
| Defense of one’s rights as a consumer | -.02 | .21 | -.73* | -.12 | -.05 | .51 |       |     |     |       |
| Expression of anger or disagreement | .32 | .71 | 5.02* | .12 | .10 | .28 |       |     |     |       |
| Saying no and cutting off interactions | .82 | .79 | 4.45* | .33 | .67 | .91 |       |     |     |       |
| Making requests | .89 | .19 | 2.34* | .27 | .81 | 2.3 |       |     |     |       |
| Initiating positive interactions with the opposite sex | .15 | .05 | 1.41** | .51 | .12 | .78 |       |     |     |       |
| Model 2 | .67   | 972.80** | .96 |      |     |       |     |     | 11.3 |       |
| Expression of anger or disagreement | .37 | .24 | 19.06** | .37 | .09 | .24 |       |     |     |       |
| Saying no and cutting off interactions | .82 | .23 | 28.39** | .42 | .41 | .72 |       |     |     |       |
| Making requests | .62 | .19 | 12.01** | .21 | .51 | .74 |       |     |     |       |

**Note.** $R^2$ = corrected determination coefficient; $F$ = contrast statistic (ANOVA); $B$ = nonstandardized coefficient; $t$ = predictive variable contrast statistic; $\beta$ = result of the regression or beta equation; CI = confidence interval; LL = lower limit; UL = upper limit; $1 - \beta$ = statistical power; $f^2$ = effect size; ns = not significant; ANOVA = analysis of variance.

*p < .05. **p < .01.
participation in meaningful and relevant experiences with others, something which is frequently observed in adolescents with AS. All this would result in the inability to “put themselves in the other’s position” and to judge the way in which they would act should they find themselves in a situation similar to the one presented in the questionnaire. However, the results from the parental report are an indicator of the actual existence of difficulties in social and interpersonal skills.

There is evidence suggesting that most people reach a high level of autonomy in their daily personal care by late adolescence and in the first years of adulthood (Van Gameren-Oosterom et al., 2013), provided this has been taught to them. These individuals also become more independent outside the home setting, although they still require supervision (Van Gameren-Oosterom et al., 2013).

There are individual differences in rates of progress toward self-sufficiency, and researchers have reported a general correlation with cognitive abilities. That is, adolescents who show more progress in cognitive measures are also likely to progress more quickly in self-help skills. However, for this to happen, a very important factor must come into play, namely the family style. For example, parents who employ practical strategies to address a given situation, who seek help and advice, and who reach out to wider social circles have children that develop at a fastest pace when it comes to social independence (Hauser-Cram et al., 1999).

Several studies support the results found in this research, either confirming improvements in the acquisition of social skills in people with intellectual disabilities through social skills training programmers, or improving disruptive behavior with social skills programmers in adolescents with DS (Gutiérrez, 2018) or in the case of adolescents with AS (Ojea & Diéguez, 2011). In other cases, the problem of maintenance and generalization of social skills in different situations is reduced (Llamazares & Pacheco, 2012).

Implications

Regarding the implications of this study, it has been achieved the improvement of social skills in both groups, being greater in the group of Asperger. In the future, we will extend the study including data of female population with AS and DS. In this sense, the differences between both groups could be analyzed (as in the male group). Furthermore, it would be interesting to apply this training of social skills within schools, being a way to integrate students who have these limitations with the rest of their classmates.

The follow-up and all the work done in it can help students diagnosed with DS and Asperger to improve the following areas: increased social competence with both adults and their peers; improve the communication process: start and maintain a conversation, listen to what the other person wants to say, and sense what they want to communicate; improving poorly accepted behaviors involved in social interaction; and recognize different nonverbal messages and identify the different emotions that accompany them. The promotion and training of appropriate social skills can enable these people to link up effectively in society, whether they are recipients or active agents.

Limitations

It is important to highlight the difficulty attached to working with clinical samples at a methodological level. Reduced sample size is unavoidable and the low prevalence of AS makes it difficult to access this population. This is not yet the case for DS in Spain, given that it continues to be highly frequent among adolescents in this age bracket. Furthermore, DS prevalence in Spain has drastically fallen over the last decade. Another methodological issue deriving from the need to form homogeneous groups means that we have had to match for age and sex, which has led to an entirely male sample. This is compounded by the added difficulty of finding girls with AS. Future studies that include larger sample sizes are needed, and which even allow for the analysis of potential sex-related differences.

This is a quasi-experimental study, so the causal claims made are made but with great reservations. Therefore, we cannot openly state that it is the program that causes the change in the tests, and that it is not the maturation itself and so on that causes these changes. These are all threats to validity (Shadish et al., 2002) that can be considered as alternative explanations for the findings. Limited generalizability due to small sample size and male participants should also be major limitations. Through this research, we have observed how the DS group also encounters serious socialization difficulties comparable to those traditionally associated with the AS group in general. Moreover, the opportunities for combining static assessment procedures with learning potential assessment to properly assess performance by both groups of adolescents have come to the forefront in this research. Combining instruments can help discriminate between adolescents who experience greater difficulties and the types of help that arise as better facilitators for improving performance.

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