

Can you teach emotion to children on the autism spectrum?

An EU-funded study aimed to find out

Summary by Professor Ofer Golan, PhD.






What is this?

This is a summary of the Emotiplay cross-cultural evaluation study. For the full report see:

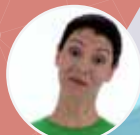
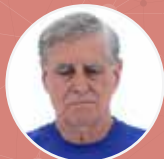
Fridenson-Hayo, S., Berggren, S., Lassalle, A., Tal, S., Pigat, D., Meir-Goren, N., ... & Golan, O. (2017).

'Emotiplay': a serious game for learning about emotions in children with autism: results of a cross-cultural evaluation. *European child & adolescent psychiatry*, 26(8), 979-992.

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The need for better solutions

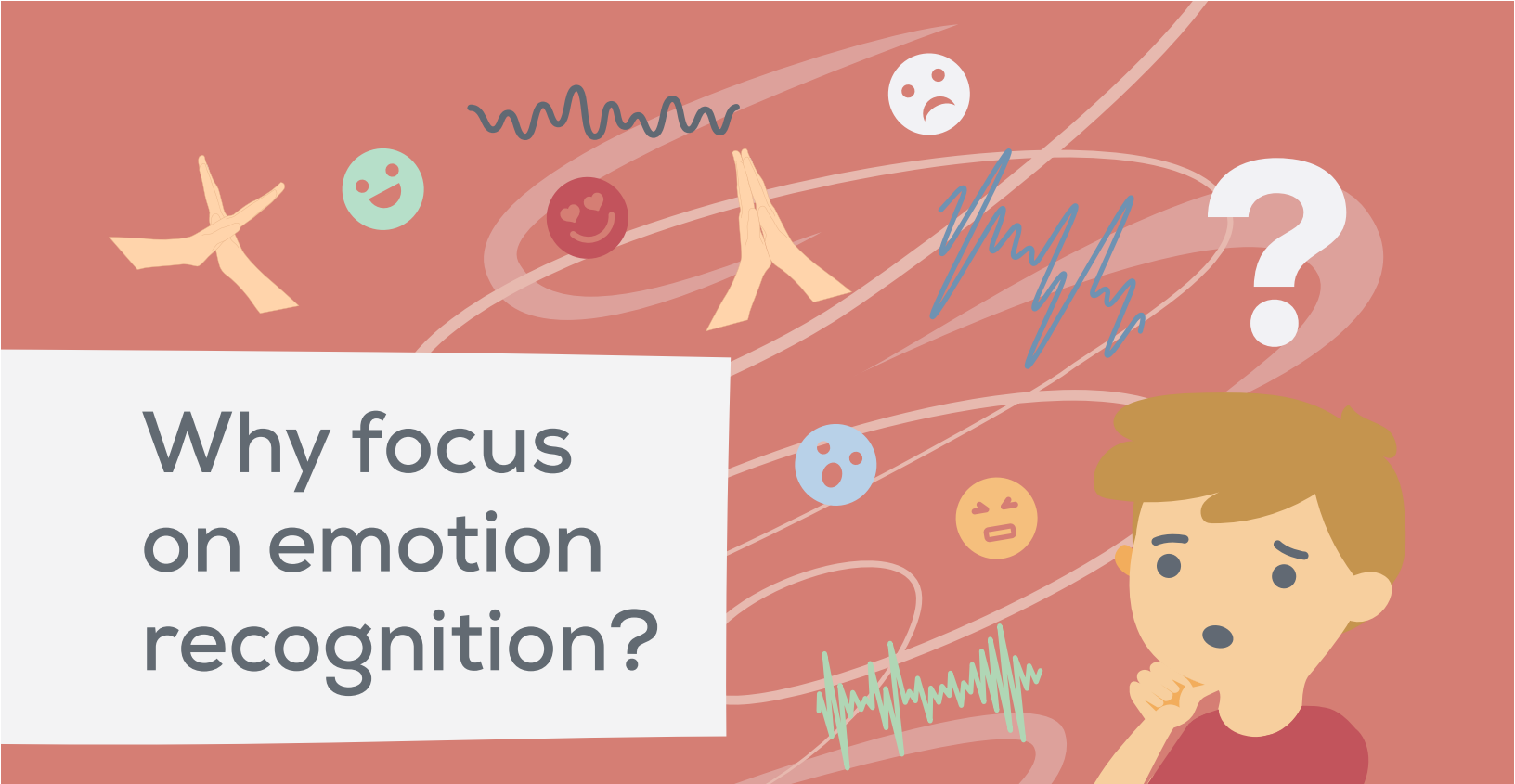


Autism is a significant global phenomenon, impacting about 2% of the total global population, and close to 20 million people in Europe and North America alone. Statistics show that these staggering numbers are only growing—in 2013, almost 2% of school children in the US were diagnosed with Autism Spectrum Disorder (ASD). Despite the prevalence, there is limited support available for children with autism, especially in remote and underserved communities. Better solutions are desperately needed.

Technology-based interventions have the potential to become critical tools to facilitate and supplement treatment for children with autism and their families. In order to better understand the potential, the European Union launched ASC-

Inclusion, a large-scale study to investigate ways in which technology can improve the inclusion of children with autism. One of the technologies assessed through ASC-Inclusion was EmotiPlay, a systematic, motivating, internet-based game that teaches children with autism to recognize emotions from faces, voices and body movement, studied separately and together. The study aimed to answer questions such as:

- Can the technology be used to teach individuals with autism about emotions in order to improve their social integration?
- Can it overcome the key challenges of motivation and generalization?
- Can the intervention be cross-culturally validated?



Why focus on emotion recognition?

Although autism is a spectrum with enormous variation, what most children with autism have in common is difficulty identifying and interpreting socio-emotional cues and social communication. Emotion recognition (ER) difficulties have been found in facial expression, vocal intonation, body language, and in their integration in context. These ER difficulties have a significant impact on the quality of life of kids on the autism spectrum, hampering social skills and social competence and leading to adaptive socialization difficulties.

There have been many attempts to teach emotional recognition. However, prior interventions yielded mixed results. For example, most studies reported limited generalization to situations not specifically included in the training program. Another challenge to ER programs is keeping the participants engaged. Many young children on the autism spectrum have reduced social motivation, and therefore their interest in ER training has to be initiated and retained externally. EmotiPlay's developers assumed that the children's intrinsic motivation to participate would increase if the program could build on their need for rules and structure and their keen eye for details and patterns.



Serious games?

Computerized intervention programs, also known as serious games (SG), are a tool designed to teach skills that are difficult or unrewarding by making them fun. EmotiPlay uses engaging games to teach all elements of emotional recognition (ER) including facial expression, tone of voice, and body language, like gestures and posture. It also trains users to integrate different cues while taking into account the context in which they occurred. The EmotiPlay SG builds on the existing strengths of kids with autism as well as their intrinsic motivation. Its rich training environment includes characters of different

age groups, genders, races, and ethnicities. It combines educational material with motivating games and rewards to create a full edutainment (educating entertainment) experience.

In addition to the online platform, a written parent-child activity guide was created with extra-curricular activities aimed to enhance the understanding of the material and its generalization into everyday life. Sample activities include creating an "emotional album" of the child's family members and an "Emotional detective" game.



The study

As part of the ASC-Inclusion project, the EmotiPlay SG was translated and culturally adapted in the UK (headed by Prof. Simon Baron-Cohen from the University of Cambridge), Sweden (headed by Prof. Sven Bolte from Karolinska Institutet), and Israel (headed by Prof. Ofer Golan from Bar-Ilan University). A team of psychologists and linguistic

editors worked closely with the game creators. The voice materials were recorded locally in each country, in its native language. All the emotion clips included in the SG were validated cross-culturally in the UK, Sweden, and Israel, as part of the EU emotions corpus .

Stage 1:

UK clinical trial

The first stage aimed to examine children and parents' acceptance of the serious game, children's motivation to use it and parents' perception of its utility. In addition, children's ability to recognize emotions from unfamiliar body language and integrative emotional scenarios were assessed, and parents' perception of their children's adaptive social functioning was examined. These data were collected before and after 8 weeks of using the SG for at least 2 hours per week. Parents were offered different extracurricular activities to practice with their children, to enhance generalization of the learned material. Fifteen children aged 6 to 9 on the autism spectrum with no cognitive impairments, participated in this stage. It was hypothesized that children will find the SG enjoyable and

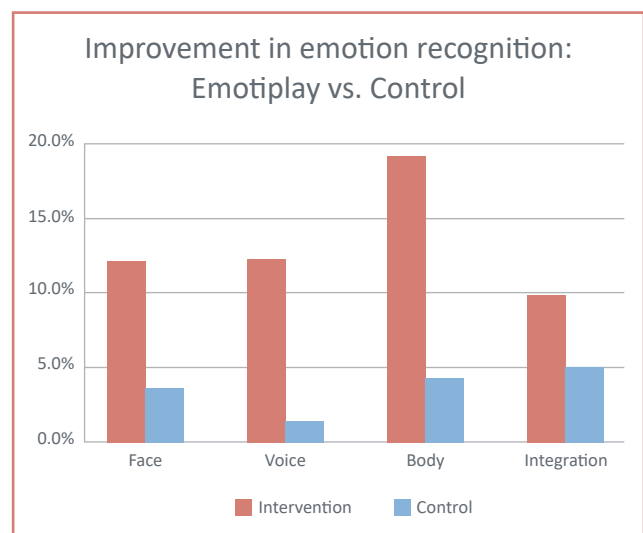
parents will feel it is useful for their children. Furthermore, it was hypothesized that children will improve their ability to recognize emotions and that parents' will rate their children's social functioning as higher, following their use of the SG.

Results showed children who used the SG significantly improved their ER abilities and were rated by their parents as having improved adaptive social functioning. Parents viewed the SG's effect on their child as positive, and felt that it was suitable for children with ASD for their 6 - 9 year old kids. Parental comments on motivational aspects of the SG and on the game's usability were considered when finalizing the SG, which was evaluated in phase 2 of the study.

Stage 2: Israeli and Swedish Randomized controlled trial

The second stage of the study examined the SG's effects by comparing the progress made by children with ASD who used the SG for 8-12 weeks with children with ASD who maintained treatment as usual and just attended the two assessment meetings. It included 43 children from Israel and 40 children from Sweden, aged 6 to 9, with autism and no cognitive impairments. Children in both countries were randomized into either an experimental group (using the SG) or a control group (maintaining treatment as usual). It was hypothesized that following intervention, all children who participated in the training program would demonstrate enhanced abilities to recognize emotions from unfamiliar facial expressions, vocal intonation, body language clips, and integrative emotional scenarios. Moreover, it was hypothesized that this improvement would be greater than that of children in the control group. It was also hypothesized that the training-induced improvement of ER skills in children with autism would result in reduced autism symptoms, as reported by parents.

The randomized controlled trial in Israel and in Sweden showed significant gains in the intervention group on all ER tasks and improved recognition of emotion in all modalities in comparison to the control group that had been treated using traditional methods during the same period. The results, illustrated in the Figure below, shows improvement of children in the intervention group in their ability to recognize emotions from facial expressions, tone of voice, body language, and the integration of multimodal cues, as compared to the control group. These findings were found cross-culturally. In addition, findings in Israel showed more generalized gains, reflected by reduced autism symptoms in participants using the SG.



The study provided support for the cross-cultural validity of EmotiPlay's SG. The internet-based format of the SG makes it relatively easy to translate and to disseminate cross-culturally.



Topics for future study

Involving support figures for enhanced generalization

In the current study, parents received a written manual, with little professional training prior to or during the intervention. Providing parents with more professional training and guidance by clinicians may improve generalization and maintenance effects. Furthermore, examinations of the SG's effectiveness when used in clinical and educational environments may offer additional evidence for its merit and increase its generalizability by connecting it with different settings in the child's social life.

Intervention-related changes in social brain areas

It is important to note that EmotiPlay's SG, like other technology-based interventions, provides its users with an explicit way of learning about emotions, whereas their difficulties are more focused on implicit social and emotional cognition. However, it has been shown that intense explicit training on emotional face processing can improve brain activation during implicit ER tasks. Future neuroimaging studies should look into intervention-related changes in social brain areas following the use of EmotiPlay's SG, which provides training on multiple modalities and their integration.



Conclusion

The ASC-Inclusion study of EmotiPlay, an internet-based serious game that teaches children with autism emotional recognition, demonstrated improved recognition of emotion in all modalities after 8-12 weeks of intervention in three cultural

contexts. The SG shows significant potential in addressing the needs of children with autism and helping them overcome emotional recognition difficulties.

About Professor Ofer Golan, PhD.



Ofer Golan is a clinical psychologist, an associate professor and the head of the Autism Research Lab at the Department of Psychology, Bar-Ilan University, Israel. He studies socio-emotional functioning in ASD, including social skills, emotion recognition, expression and regulation, and ways to develop them through parent focused, cognitive-behavioral, and technological interventions. His work has been published in leading research journals and presented in international conferences.

Prof. Golan is the founder and the clinical advisor of two Israeli clinical centres which provide evidence-based diagnosis and intervention services to children, adolescents and adults with ASD and their families, and in addition train clinicians and disseminate evidence-based interventions nationwide. Prof. Golan is a member of the expert committee, which advises the Israeli Ministry of Health on ASD best practice. He is the chair of the steering committee for the Israeli National Autism Research Center, and an honorary visiting fellow at the Autism Research Centre, University of Cambridge, UK.