Are early interventions for autism effective?

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A meta-analysis on the efficacy of early intervention for autistic children was recently published in the high impact journal *Psychological Bulletin*. These results have a tremendous importance for decision making in the clinical and political spheres concerning autism. The researchers focused exclusively on non-medicinal interventions for autistic children between 0 and 8 years of age. Seven different types of early interventions were analysed[1]:

1 Behavioral interventions (ex : EIBI, PECS, DTT)

2 Developmental interventions (ex : DIR, floortime, Hanen)

3 Naturalistic developmental behavioral intervention (NDBI) (ex : ESDM, PVT, JASPER)

4 Treatment and Education of Autistic and Communication Handicapped Children (TEACCH)

5 Sensory interventions

6 Zootherapy

7 Technology-based interventions

The different intervention targets were grouped in 15 categories. These targets could involve core autism characteristics such as social communication or stereotypic behaviors, or could also be outside these core characteristics, such as language, playing behaviors, adaptive functioning or problematic behaviors.

A **meta-analysis** is a scientific study that combines and analyzes results from multiple studies conducted on the same topic. The studies included in a meta-analysis must satisfy predetermined quality criteria and are subject to inclusion and exclusion criteria, such as participants' age. Researchers can then analyse all the studies at once and draw conclusions from these studies' results in a meta-analysis.

Taken from 130 different groups of autistic children, for a total of 6240 participants, Sandbank and colleagues extracted 1615 intervention change *effect sizes* from early intervention studies. The size of the effect indicated how much change occurred after the intervention. After having arranged these effects to make them comparable, they were able to interpret them, while accounting for research study quality. Authors also conducted moderation analyses, which looks at other factors that may influence the relation between the cause (intervention) and the effect (change measured). In this case, the authors wanted to know whether the effects (the change) attributed to the intervention could be explained by the similarity between the intervention target and the intervention type or by the similarity between the intervention setting and the setting in which the intervention change was measured.

For example, if the intervention specifically trains the child's joint attention during a construction game with blocks and then measures the effectiveness of this intervention by measuring changes in joint attention or changes in joint attention in this same construction game context, it is possible that the proximity between the intervention and the variable measured is responsible for the change observed. In contrast, if joint attention is trained with the assumption that this function must be mastered in order to acquire language, and then the effectiveness of the intervention on language progress is measured, this explanation cannot be invoked.

An **effect size** is a statistical index that estimates the importance of a difference that is found in a research study. For example, if a difference in language skills is found in a group of autistic children that received an intervention compared to a group of autistic children that did not receive it, the effect size allows us to measure how big this difference is.

The authors made 3 important conclusions based on their evaluation of intervention efficacy.

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1. To learn more about the included interventions, we encourage you to read the original article. The examples provided are not exhaustive and are meant to help the readers identify some of the interventions they might be familiar with.

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Conclusion 1 :
If the quality of studies is not considered, 3 of the 7 types of interventions are effective. These include the behavioral interventions, developmental interventions, and the NDBI.

Conclusion 2 :
If only the randomized controlled trials are considered, the NDBI interventions are the only interventions deemed effective. The same conclusion is made when the authors **exclude studies in which parents were the ones rating an intervention's effectiveness**. Asking a parent to judge the intervention's effectiveness introduces a possible bias as parents know that the child received the intervention.

Original Article:
Sandbank, M., Bottema-Beutel, K., Crowley, S., Cassidy, M., Dunham, K., Feldman, J. I., ... & Woynaroski, T. G. (2020). Project AIM: Autism intervention meta-analysis for studies of young children. *Psychological Bulletin*, 146(1), 1.

Conclusion 3 :
When the quality criteria are combined, meaning that only randomized controlled trials and studies using non-biased measures for change are considered, there was **NO effective intervention for any of the 15 analysed intervention targets!**

Randomized controlled trials are used to measure an intervention's effectiveness. This study design involves random distribution of participants to an intervention group or a control group (no intervention). These two groups are then compared, once the intervention group receives the intervention. Randomized controlled trials are the gold standard method in any medical study that examines a treatment's efficacy. This design ensures that possible sources of bias are minimized. For example, the person in charge of measuring the treatment's efficacy (the change) is not aware of the treatment condition of any participant (treatment group or placebo). This person should also be neutral toward the intervention's effectiveness (no interest in whether it works, have nothing to gain from it such as recognition or money).

The authors from this meta-analysis conclude that the NDBI could be a promising type of intervention to support autistic children's developmental abilities but that they lack conclusive scientific and evidence-based data. They invite parents and clinicians to be cautious when reading research findings from different intervention studies in autism.

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Fondation les petits trésors is proud to support the publication of **Sur le Spectre** magazine. Of course, we talk about what is being done in autism research, but above all we popularize it. Valérie Courchesne and her team tell us about the research, and it is fascinating.

We are pleased to present you our new visual identity and a revamped logo. Warm colors, a head-home that represents our own inner worlds, an asterisk that testifies to the uniqueness, the complexity, but also the beauty that lies within our heads. No matter what the state of our mental health, we are unique, different, original. It's up to you to find the qualities that drive you.

Moreover, a brand new team is taking the reins to make the Foundation grow and shine throughout Quebec. Having served for three years on the Foundation's Board of Directors, Michel Quintal is now at the helm of general management, accompanied by Sylvie Lauzon as project manager, Josiane Lapointe as operations manager and Émilie Tourigny Brouillette as executive assistant. An outstanding and complementary quartet, motivated to accomplish great things!

We hope that you will continue to support the Fondation les petits trésors in its efforts to support families, research, clinical care and awareness of mental health and autism. Together we can improve the lives of hundreds of young people and their families!

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