Developmental Age Gains on the PEP-3 Following Targeted Cognitive Remediation in Autistic Children with High Support Needs: A Retrospective Cohort Study

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BACKGROUND

- Autistic children with high support needs often show limited progress with standard interventions, underscoring the need for **individualized, respectful support** programs [1,2].
- The **SACCADE model** is a structured neurodevelopmental framework aligned with international best-practice principles by offering individualized, multimodal, and evolving support that integrates AAC, adapts environments, involves families, and respects neurodiversity [3].
- Support is delivered through **targeted cognitive remediation** adapted to autistic learning profiles, leveraging **visuospatial** and **perceptual strengths**.
- It targets sensorimotor integration, cognitive functions (e.g., attention, flexibility, abstraction), and language development.
- A central component is the SACCADE Conceptual Language (SCL), a visual Augmentative and Alternative Communication (AAC) system that uses **graphic codes** to represent concepts, facilitating **understanding** and **reciprocal communication**.
- The model was co-developed by an **autistic professional**, ensuring alignment with autistic perspectives and priorities.

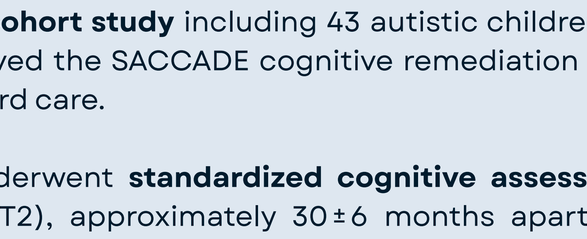
OBJECTIVE

To assess whether targeted cognitive remediation leads to **measurable developmental gains** in autistic children with high support needs, compared to standard care.

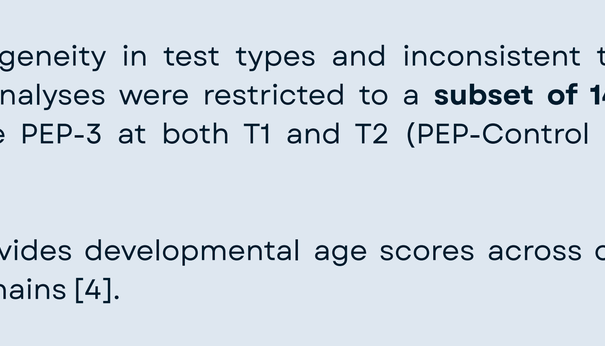
METHODS

1. **Retrospective cohort study** including 43 autistic children with high support needs: 26 received the SACCADE cognitive remediation intervention, and 17 received standard care.
2. Participants underwent **standardized cognitive assessments** at two time points (T1 and T2), approximately 30 ± 6 months apart. Assessment tools included the Weschsler scales, KABC, and PEP-3.
3. Due to heterogeneity in test types and inconsistent test-retest pairings, comparative analyses were restricted to a **subset of 14 participants** who completed the PEP-3 at both T1 and T2 (PEP-Control n = 9; PEP-SACCADE n = 5).
4. The **PEP-3** provides developmental age scores across cognitive, language, and motor domains [4].
5. The SACCADE intervention was delivered by **trained professionals** using a neurodevelopmental framework tailored to autistic learning profiles.
6. **Statistical analysis:** Independent-samples t-test (equal variances assumed) was used to compare developmental age gains between groups. Chronological age and time between assessments were included as covariates.

AN EXAMPLE OF THE SACCADE CONCEPTUAL LANGUAGE™ (SCL™)



An example of "the daisy" and "the fork," both SCL™ tools.



RESULTS

- No significant differences were found between groups in age (Mann–Whitney, p > .05).
- A small but statistically significant difference in intervention duration was observed in the full sample (p = .027), though this was not clinically meaningful and was not present in the PEP-3 subgroup (p = .518).
- The distribution of intervention types (e.g., speech therapy, psychomotor therapy, psychology, specialized education), expressed as a percentage of total service time, was comparable between groups.
- Due to heterogeneity in assessment tools (Wechsler, KABC, PEP-3), analyses were restricted to a homogeneous subset of 14 participants assessed with the PEP-3 at both T1 and T2.
- In this subset, the **SACCADE group showed significantly greater gains in developmental age** in the **Cognitive Verbal/Preverbal** (CVP) domain compared to the control group.

PEP Subgroup	N	Δ Developmental Age (months)	Age at T1 (years)	Follow-up Duration (months)
Control	9	10,22 ± 8,47	4,85 ± 1,40	27,72 ± 3,93
SACCADE	5	22,80 ± 12,48	4,86 ± 1,31	29,80 ± 5,58

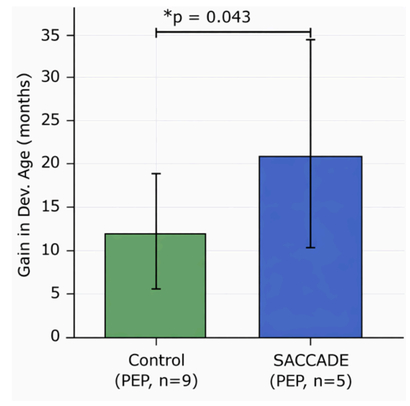


Figure: Mean gain in developmental age (months) in the PEP-3 Cognitive Verbal/Preverbal domain from T1 to T2. Error bars = ±1 SD. p = 0.043.

DISCUSSION

- **Preliminary evidence** indicates that a tailored, neurodiversity-informed cognitive remediation model (SACCADE) can yield meaningful developmental progress in autistic children with high support needs.
- **Strengths-based approach**: The intervention's individualized design respects autistic processing and potentially facilitates cognitive growth by leveraging each child's unique strengths.
- **Notable improvement**: Children who received the SACCADE intervention showed greater improvement in a key cognitive domain (verbal/preverbal reasoning skills) compared to those receiving standard care.
- **Assessment consistency**: This gain was only evident in participants assessed with the same standardized tool (PEP-3) at both time points, underscoring the importance of consistent outcome measures to detect true changes.
- **Limitations**: The study's retrospective design, small homogeneous subset, and potential selection bias limit the generalizability of these findings. Results remain exploratory and should be interpreted with caution.
- **Future directions**: Larger, prospective studies with more participants and uniform assessments are needed to confirm and extend these preliminary findings.

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