REHABILITACIÓN NEUROPSICOLÓGICA EN LA ESCLEROSIS MÚLTIPLE

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Alteraciones cognitivas en la esclerosis múltiple (EM)

- 40-65% de las personas con Esclerosis Múltiple (EM) reportan que tienen alteraciones cognitivas que tienen un impacto importante en su integración social y en las capacidades para el trabajo.

- Se relacionan tanto con los procesos de desmielinización como con la pérdida axonal.
  - Velocidad en el procesamiento de la información
  - Funciones ejecutivas
  - Atención
  - Memoria
Cognitive and neuropsychiatric disorders among multiple sclerosis patients from Latin America: Results of the RELACCEM study

F. Caceres, S. Vanotti, R.H.B. Benedict, RELACCEM Work Group

Atención (SDMT)
Memoria de trabajo (PASAT)
Memoria verbal (Selective reminding test)
Memoria visual (BVMTR)
Memoria espacial (7/24)
Funciones ejecutivas (Fluidez verbal)

Table 2 Comparison between groups on cognitive and neuropsychiatric outcomes.

<table>
<thead>
<tr>
<th>Cognitive function</th>
<th>MS M ± SD</th>
<th>HC M ± SD</th>
<th>p</th>
<th>d</th>
<th>% MS Impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLG</td>
<td>32.3 ± 10.7</td>
<td>39.4 ± 10.0</td>
<td>0.003</td>
<td>0.7</td>
<td>17.3</td>
</tr>
<tr>
<td>SDMT</td>
<td>44.1 ± 13.5</td>
<td>57.9 ± 12.8</td>
<td>0.000</td>
<td>1.0</td>
<td>21.8</td>
</tr>
<tr>
<td>PASAT-3</td>
<td>39.2 ± 15.1</td>
<td>48.1 ± 9.8</td>
<td>0.004</td>
<td>0.7</td>
<td>12.7</td>
</tr>
<tr>
<td>PASAT-2</td>
<td>32.1 ± 13.9</td>
<td>42.3 ± 11.4</td>
<td>0.001</td>
<td>0.9</td>
<td>14.5</td>
</tr>
<tr>
<td>SRT TL</td>
<td>47.9 ± 10.1</td>
<td>58.2 ± 6.4</td>
<td>0.000</td>
<td>1.3</td>
<td>33.6</td>
</tr>
<tr>
<td>SRT DR</td>
<td>7.7 ± 2.9</td>
<td>10.4 ± 1.7</td>
<td>0.000</td>
<td>1.0</td>
<td>19.2</td>
</tr>
<tr>
<td>7/24 TL</td>
<td>28.3 ± 5.9</td>
<td>31.4 ± 5.4</td>
<td>0.001</td>
<td>0.6</td>
<td>3.6</td>
</tr>
<tr>
<td>7/24 DR</td>
<td>5.7 ± 1.7</td>
<td>6.3 ± 1.2</td>
<td>0.000</td>
<td>1.0</td>
<td>5.5</td>
</tr>
<tr>
<td>BVMTR TL</td>
<td>18.5 ± 7.5</td>
<td>25.3 ± 6.1</td>
<td>0.000</td>
<td>1.1</td>
<td>27.3</td>
</tr>
<tr>
<td>BVMTR DR</td>
<td>7.1 ± 2.6</td>
<td>10.0 ± 1.5</td>
<td>0.000</td>
<td>1.9</td>
<td>30.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neuropsychiatric symptoms</th>
<th>MS M ± SD</th>
<th>HC M ± SD</th>
<th>p</th>
<th>d</th>
<th>% MS Impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>10.9 ± 8.4</td>
<td>5.4 ± 5.3</td>
<td>0.001</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>NPI</td>
<td>7.8 ± 15.8</td>
<td>0.6 ± 1.0</td>
<td>0.001</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Factor I Euphoria</td>
<td>2.8 ± 6.4</td>
<td>0.1 ± 0.6</td>
<td>0.000</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>Factor II Apathy</td>
<td>2.7 ± 5.3</td>
<td>0.2 ± 0.4</td>
<td>0.000</td>
<td>7.0</td>
<td></td>
</tr>
</tbody>
</table>

Notes: All comparisons control for the effects of age.
Abbreviations: PASAT=Paced Auditory Serial Addition Test, SRT=Selective Reminding Test, WLG=Word List Generation, SDMT=Symbol Digit Modalities Test, BVMTR=Brief Visuospatial Memory Test Revised, TL=Total Learning, DR=Delayed Recall.


Propósito de la rehabilitación neuropsicológica

1. Reducir los déficits cognitivos

2. Reducir los efectos adversos de los déficits

3. Mejorar la conciencia del déficit para que puedan afrontar mejor los retos de la vida diaria

4. Incidir sobre otras áreas no directamente tratadas: depresión, ansiedad, fatiga, cambios de personalidad, calidad de vida
Changes of brain resting state functional connectivity predict the persistence of cognitive rehabilitation effects in patients with multiple sclerosis

Laura Parisi¹, Maria A Rocca¹,², Flavia Mattioli³, Massimiliano Copetti⁴, Ruggero Capra⁵, Paola Valsasina¹, Chiara Stampatori³ and Massimo Filippi¹,²
Table 2. Results of neuropsychological evaluations (means ± standard deviations) of the treated and control groups at the three study time points.

<table>
<thead>
<tr>
<th>Neuropsychological tests</th>
<th>Control group</th>
<th>p valuea</th>
<th>Treated group</th>
<th>p valuea</th>
<th>p valueb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t0 (n=10)</td>
<td>t1 (n=10)</td>
<td>t2 (n=9)</td>
<td>t2 vs. t0</td>
<td>t2 vs. t1</td>
</tr>
<tr>
<td>COWA/P</td>
<td>30.6 (9.2)</td>
<td>30.0 (11.2)</td>
<td>31.1 (9.9)</td>
<td>0.1</td>
<td>0.06</td>
</tr>
<tr>
<td>COWA/S</td>
<td>33.0 (10.1)</td>
<td>35.0 (8.0)</td>
<td>31.5 (10.1)</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>PASAT 3”</td>
<td>110.0 (11.9)</td>
<td>9.7 (16.4)</td>
<td>15.2 (18.5)</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>PASAT 2”</td>
<td>3.9 (8.3)</td>
<td>4.9 (9.4)</td>
<td>6.8 (10.6)</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>SRT/LTS</td>
<td>26.0 (10.7)</td>
<td>25.2 (11.3)</td>
<td>30.2 (11.7)</td>
<td>0.1</td>
<td>0.06</td>
</tr>
<tr>
<td>SRT/CLTR</td>
<td>17.7 (8.3)</td>
<td>16.3 (11.6)</td>
<td>21.1 (14.6)</td>
<td>0.6</td>
<td>0.3</td>
</tr>
<tr>
<td>SRT/D</td>
<td>5.2 (2.25)</td>
<td>5.7 (2.83)</td>
<td>6.3 (2.55)</td>
<td>0.03</td>
<td>0.1</td>
</tr>
<tr>
<td>10/36 SPART</td>
<td>16.5 (4.7)</td>
<td>16.3 (4.4)</td>
<td>15.5 (4.6)</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>10/36 SPART D</td>
<td>5.2 (2.3)</td>
<td>5.4 (2.3)</td>
<td>5.4 (2.3)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>SDMT</td>
<td>35.0 (14.8)</td>
<td>34.8 (18.2)</td>
<td>34.7 (16.3)</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>TEA ms am</td>
<td>714.6 (230.9)</td>
<td>612.8 (117.2)</td>
<td>500.1 (302.4)</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>TEA ms vm</td>
<td>1079.4 (329.0)</td>
<td>1048.7 (193.4)</td>
<td>734.5 (434.7)</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>WCST te</td>
<td>55.7 (15.3)</td>
<td>41.3 (20.7)</td>
<td>49.5 (20.5)</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>WCST pr</td>
<td>52.2 (21.7)</td>
<td>39.8 (27.5)</td>
<td>36.8 (24.6)</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>WCST pe</td>
<td>42.7 (14.6)</td>
<td>29.0 (19.5)</td>
<td>32.22 (15.10)</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>MADRS</td>
<td>12.5 (8.9)</td>
<td>14.7 (8.9)</td>
<td>17.1 (12.9)</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>MSQoL</td>
<td>174.33 (33.1)</td>
<td>157.56 (22.1)</td>
<td>171.13 (33.4)</td>
<td>1</td>
<td>0.09</td>
</tr>
</tbody>
</table>

a: longitudinal generalized linear models, Bonferroni adjusted for multiple comparisons.
b: p value, group F time interaction.

COWA/P: Controlled Oral Word Association Test with phonemic cue; COWA/S: Controlled Oral Word Association Test with semantic cue; PASAT 3” : Paced Auditory Serial Addition Test 3 s; PASAT 2”: Paced Auditory Serial Addition Test 2 s; SRT/LTS: Selective Reminding Test long term storage; SRT/CLTR: Selective Reminding Test consistent long term retrieval; SRT/D: Selective Reminding Test delayed recall; 10/36 SPART: 10/36 Spatial Recall Test; 10/36 SPART D: 10/36 SPART delayed recall; SDMT: Symbol Digit Modalities Test; TEA; Test of Everyday Attention; am: auditory stimulus; vm: visual stimulus; WCST: Wisconsin Card Sorting Test; te: total errors; pr: perseverative responses; pe: perseverative errors; MADRS: Montgomery–Asberg Depression Scale; MSQoL: The Multiple Sclerosis Quality of Life.
Neuropsychological rehabilitation for multiple sclerosis (Review)

Rosti-Otajärvi EM, Hämäläinen PI

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2014, Issue 2

http://www.thecochranelibrary.com
Objetivo:

- Evaluar los efectos de la rehabilitación neuropsicológica sobre: ejecución cognitiva, estado emocional y percepción del bienestar

**Criterios de selección:**

Ensayos controlados aleatorizados o cuasi aleatorizados que evaluarán los efectos de la rehabilitación neuropsicológica en la EM, en comparación con otro tipo de intervención o con la no intervención.

**Estudios analizados:**

- 20 estudios (inicialmente 6,500) que cumplieran los requisitos. 966 participantes con EM, la mayoría del tipo remitente recurrente.

**Resultados:**

- Evidencia muy baja de que la rehabilitación neuropsicológica reduzca los síntomas cognitivos.
Memoria

- Listas de palabras, imágenes, rutas, números, historias...

Atención

- Textos girados o invertidos, laberintos, figuras ambiguas, difusas o encubiertas

Visoespacial

- Juegos de mosaicos y tareas de navegación

Funciones ejecutivas

- Organización, planeación y estrategias de solución de simulaciones realistas de un conjunto de tareas programadas en el tiempo

Resolución de problemas

- Rompecabezas que requieren de un razonamiento deductivo, organización y análisis de hechos.
<table>
<thead>
<tr>
<th>Dominio</th>
<th>G Control Puntaje promedio</th>
<th>Entrenam cogni VS controles</th>
<th>Efecto relativo (95% IC)</th>
<th>Número de participantes y de estudios</th>
<th>Calidad de la evidencia (grado)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atención</td>
<td>12.6</td>
<td>0.06 DE mayor</td>
<td>DEM=0.06 (-0.02-0.41) p=0.08</td>
<td>573 (5 estudios)</td>
<td>☑ ☑ ☑ ☑ ☑ Bajo¹</td>
</tr>
<tr>
<td>Velocidad de procesamiento</td>
<td>-410.9</td>
<td>0.15 mayor</td>
<td>DEM=0.015 (-0.33-0.62) p=0.55</td>
<td>176 (4 estudios)</td>
<td>☑ ☑ ☑ ☑ ☑ Muy bajo¹,²,³</td>
</tr>
<tr>
<td>Span de memoria</td>
<td>5.8</td>
<td>0.54 DE mayor</td>
<td>DEM=0.54 (0.2-0.88) p=0.002</td>
<td>150 (2 estudios)</td>
<td>☑ ☑ ☑ ☑ ☑ Bajo³,⁴</td>
</tr>
<tr>
<td>Memoria de trabajo</td>
<td>8.6</td>
<td>0.33 DE mayor</td>
<td>DEM=0.33 (0.09-0.57) p=0.006</td>
<td>288 (3 estudios)</td>
<td>☑ ☑ ☑ ☑ ☑ Muy bajo¹,³</td>
</tr>
<tr>
<td>Memoria verbal inmediata</td>
<td>4.3</td>
<td>0.2 DE mayor</td>
<td>DEM=0.2 (-0.02-0.41) p=0.08</td>
<td>360 (4 estudios)</td>
<td>☑ ☑ ☑ ☑ ☑ Bajo³,⁴</td>
</tr>
</tbody>
</table>

(1) Severas limitaciones en la implementación del estudio
(2) Heterogeneidad alta, inexplicable
(3) Bajo número de participantes
(4) Una limitación crucial en la implementación del estudio

DE= Desviación estándar. DEM: Diferencia estandarizada de la media. IC=Intervalo de confianza
<table>
<thead>
<tr>
<th>Dominio</th>
<th>G Control Promedio</th>
<th>Entrenamiento cognitivo VS controles</th>
<th>Efecto relativo (95% IC)</th>
<th>Número de participantes y de estudios</th>
<th>Calidad de la evidencia (grado)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funciones ejecutivas</td>
<td>-6.6</td>
<td>0.35 DE mayor</td>
<td>DEM=0.35 (-0.03-0.73)</td>
<td>112 (2 estudios)</td>
<td>☐☐☐☐ Muy bajo¹,³</td>
</tr>
<tr>
<td>Depresión</td>
<td>-28</td>
<td>DE=0.26</td>
<td>DEM=0.23 (-0.23-0.75) p=0.29</td>
<td>196 (5 estudios)</td>
<td>☐☐☐☐ Muy bajo¹,²,³</td>
</tr>
</tbody>
</table>

(1) Severas limitaciones en la implementación del estudio  
(2) Heterogeneidad alta, inexplicable  
(3) Bajo número de participantes  
(4) Una limitación crucial en la implementación del estudio

**DEFINICIÓN DE LOS GRADOS DE EVIDENCIA.**

- ☐☐☐☐ Muy bajo. Poca certeza sobre la estimación.
- ☐☐☐☐ Bajo. Es muy probable que mayor investigación cambie las estimaciones.
- ☐☐☐☐ Moderado. Es probable que mayor investigación pueda cambiar las estimaciones.
- ☐☐☐☐ Alta. Es poco probable que más investigación pueda cambiar las estimaciones.
Retrieval practice is a robust memory aid for memory-impaired patients with MS

James F Sumowski¹,², Victoria M Leavitt¹,², Amanda Cohen¹, Jessica Paxton¹,², Nancy D Chiaravalloti¹,² and John DeLuca¹,²,³

Abstract
Memory impairment is prevalent in multiple sclerosis (MS). Retrieval practice is a powerful memory technique whereby retrieving information (quizzing oneself) leads to better memory than restudying. In a within-subjects experiment, 12 memory-impaired MS patients encoded verbal paired associates (VPAs) through massed restudy (MR), spaced restudy (SR), or retrieval practice (RP). Half of VPAs were tested after short delay (30 minutes) and half after long delay (one week). RP robustly improved memory more than restudy. Short delay: MR=15.6%, SR=27.1%, RP=72.9%. Long delay: MR=1.0%, SR=4.2%, RP=24.0%. RP was the best memory technique for nearly all patients after both short and long delays.
MR= Restudio masivo (mass restudy) 9, 10, 11; 16,17,18... 3 ensayos consecutivos sin interrupciones
SR= Restudio espaciado (spaced restudy) 5, 12... • ensayos de otros procedimientos
RP= Práctica en recuperación (retrieval practice) 6, 8, 13, 15... 3 ensayos de otros procedimientos
Results
There was a large main effect of learning condition after the short delay ($F_{(2, 22)} = 60.90, p < 1 \times 10^{-9}; \eta^2 = 0.85$; Figure 2(a)). Patients recalled 72.9% of verbal paired associates studied through RP, compared to only 15.6% through MR ($p < 1 \times 10^{-6}$) and 27.1% through SR ($p < 1 \times 10^{-4}$). SR led to better memory than MR ($p = 0.03$). This effect of RP was enduring, as the effect of the learning condition remained after the long delay ($F = 16.72, p < 1 \times 10^{-4}; \eta^2 = 0.60$; Figure 2(b)). Patients recalled 24.0% of verbal paired associates studied through RP, compared to only 1.0% through MR ($p < 0.001$) and 4.2% through SR ($p = 0.004$). MR and SR did not reliably differ from each other ($p = 0.191$).

Discussion
RP improved memory much more than restudy strategies in MS patients with severe memory impairment, even after a week-long delay. RP was the most effective memory strategy for nearly every patient, bolstering confidence that RP would improve real-life memory functioning. RP is a compensatory approach to memory rehabilitation, as it improves memory without repairing/restoring the neurophysiologic basis of memory function. As such, RP will be effective only if patients learn to incorporate RP into their daily routines. For instance, patients wishing to learn information in a newspaper article, training manual, or textbook may engage in intermittent self-quizzing throughout their reading (i.e. after each paragraph or page). This act of RP will result in greater subsequent memory than rereading the information multiple times. Despite this, college students and MS patients mistakenly identify MR (i.e. cramming) as the most effective memory strategy. Therefore, education, training, and practice will be required for patients to replace MR with the more effective RP technique.

The precise mechanisms underlying the memory benefits of RP are unknown, but the effect is consistent with the principle of transfer appropriate processing, which posits that memory is enhanced when there is an overlap between the operations employed during learning and those employed during recall. Indeed, given the double dissociation between brain regions associated with learning and delayed retrieval, RP during learning may activate and strengthen the same neural networks during learning that are then used for subsequent delayed recall, thereby facilitating that subsequent recall. Functional neuroimaging research is needed to better understand the neurophysiologic mechanisms underlying RP.

We acknowledge limitations and future directions. Our sample was relatively small, although this is mitigated somewhat by the within-subjects design and robust results.
Predictors and impact of the working alliance in the neuropsychological rehabilitation of patients with multiple sclerosis

Eija Rosti-Otajärvi a,⁎, Anu Mäntynen b, Keijo Koivisto b, Heini Huhtala c, Päivi Hämäläinen d

Keywords: Working alliance; Neuropsychological rehabilitation; MS

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Objective: The aim of this study was to evaluate the effects of the baseline patient-related (cognitive, mood and interpersonal problems, and general physical functioning) outcome and illness-related (duration and severity of disease) on the alliance, as well as the effects of the alliance on rehabilitation outcome in neuropsychological rehabilitation among MS patients.

Methods: Fifty-six patients with relapsing remitting MS received multimodal neuropsychological intervention (attention retraining, learning strategies, psychoeducation, psychological support, homework assignments) conducted once a week in 60-minute sessions for thirteen consecutive weeks. After the intervention, both patients and therapists evaluated the alliance with the short form of the Working Alliance Inventory. None of the baseline factors was related to the alliance. Better patient-evaluated alliance was associated with greater beneﬁt from the intervention as evaluated by therapists.

Results: Better therapist-evaluated alliance was associated with greater beneﬁt from the intervention as evaluated by therapists. Horvath and Greenberg[3] developed the Working Alliance Inventory (short form) and showed that alliance in psychotherapy is a critical therapeutic element for a desirable outcome[1]. The most commonly used deﬁnition for alliance is that of Bordin[2]: The working alliance is the combination of 1) client and therapist agreement on goals; 2) client and therapist agreement on the utility and effectiveness of the therapeutic relationship; and 3) the development of a personal bond between client and therapist.

Conclusion: Therapist alliance may relate to positive neuropsychological rehabilitation outcomes, such as mood, anxiety, interpersonal problems, and general psychological functioning. Over the past few decades, meta-analytic studies have shown that the alliance is a highly positive factor in psychotherapy. In particular, the positive effects of the alliance are related to subjective improvement and subjective evaluations of the therapy, as well as to objective outcome measures, such as symptom reduction and functional recovery. However, the factors contributing to rehabilitation outcome are not well known and additional research is called for to investigate the mechanisms by which the alliance impacts rehabilitation outcomes.

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2.4. Data analyses

Pairwise and Wilcoxon tests were employed to measure differences between the alliance ratings of therapist and patient. Statistical comparisons between the severity of the disease and the alliance ratings were computed using Mann–Whitney U-tests and Student's t-tests. When the therapist's estimate of benefit (moderate, some extent, obvious) was compared to the alliance ratings, the analysis of variance (ANOVA) and the Kruskal–Wallis test were used. The Tukey honest significance difference test was used for post hoc pairwise comparisons following ANOVAs, and Mann–Whitney comparisons following Kruskal–Wallis tests.

In order to obtain composite scores to different cognitive domains, Z-scores for each cognitive domain (Z verbal memory, Z visual memory, Z attention-executive functions, and Z fluency; see equations below) were created[25]. To obtain Z-scores, a reference group of 24 healthy controls was used[35].

\[
Z_{\text{verbal memory}} = \frac{Z_{\text{BSRT} - \text{long term storage}} + Z_{\text{BSRT} - \text{consistent long term retrieval}} + Z_{\text{BSRT} - \text{delayed recall}}}{3}
\]

\[
Z_{\text{visual memory}} = \frac{Z_{10 \text{ total correct}} + Z_{10 \text{ delayed recall}}}{2}
\]

\[
Z_{\text{attention-executive functions}} = \frac{Z_{\text{PASAT3}} + Z_{\text{PASAT2}} + Z_{\text{SDMT}}}{3}
\]

\[
Z_{\text{fluency}} = Z_{\text{COWAT}}
\]

The rehabilitation outcomes were the mean change between the follow-up (after six months) and the baseline assessment in cognitive domains and self-report questionnaires, as well as the T-score on the GAS (see Fig. 1). Parametric (Pearson's) and non-parametric (Spearman's) correlation was used to evaluate the association between alliance and baseline factors, as well as between alliance and rehabilitation outcome.

3. Results

3.1. WAI ratings between patients and therapists

The overall alliance ratings differed significantly between the patients and the therapists: the patients evaluated the alliance as better than the therapists (mean WAI total score 77.2 SD (4.6), range 67–84 vs. mean WAI total score 70.7 SD (6.3), range 53–81, \( p < 0.001 \)). Similarly, the patients reported stronger agreement on the utility and efficacy of the things done in rehabilitation (mean WAI task 25.5 (1.9) vs. 23.1 (2.4), \( p < 0.001 \)), stronger personal bond (mean WAI bond 25.3 (2.0) vs. 23.9 (2.2), \( p < 0.001 \)), and stronger agreement on goals (mean WAI goal 26.4 (1.6) vs. 23.7 (2.0), \( p < 0.001 \)) than the therapists. However, the correlation of the overall alliance ratings between the patients and the therapists was significant (WAI total score \( r = 0.418 \), \( p = 0.001 \)), as were the correlations between the patients and the therapists in agreement on the utility and efficacy of the things done in rehabilitation (WAI task \( r = 0.373 \), \( p = 0.005 \)), in personal bond (WAI bond \( r = 0.302 \), \( p = 0.024 \)), and in agreement on goals (WAI goal \( r = 0.355 \), \( p = 0.007 \)).

3.2. Relationship between working alliance and baseline variables

The correlations between alliance ratings and baseline factors are summarised in Table 2. Neither the cognitive status of the patients nor self-reported cognitive, depressive or fatigue symptoms at baseline correlated significantly with the therapist-evaluated alliance. However, the perceived psychological burden correlated with the therapist-evaluated alliance: the therapists evaluated the alliance as better in those patients who reported less burden at baseline.

Performance on the visual memory at baseline correlated significantly with the patient-evaluated patient–therapist agreement on goals: the patients with poorer performance reported a greater agreement. Similarly, patients with poorer performance on attention-executive functions at baseline reported a stronger bond between

Fig. 1. Flowchart illustrating the research design. The sources and the time points of the assessments, as well as the analysed variables.
RESULTADOS

1. La alianza terapeuta-paciente no tuvo efecto sobre las funciones cognitivas

2. Paciente: Un mayor decremento en los síntomas de fatiga y más logros en las metas de la rehabilitación

3. Terapeuta: Juzga que hubo un mayor beneficio de la intervención

4. Conclusión: Una alianza positiva terapéuta-paciente se relaciona con mejores resultados de la rehabilitación neuropsicológica
Neuropsychological rehabilitation does not improve cognitive performance but reduces perceived cognitive deficits in patients with multiple sclerosis: a randomised, controlled, multi-centre trial

Anu Mäntynen¹, Eija Rosti-Otajärvi², Keijo Koivisto³, Arja Lilja⁴, Heini Huhtala⁵ and Päivi Hämäläinen⁴

102 pacientes con EM-RR con déficits de atención subjetivos y objetivos asignados al azar al grupo experimental y de control.

Sesiones de 60’ una vez a la semana durante 13 semanas

Entrenamiento: Ejercicios computarizados en atención y memoria de trabajo, psicoeducación, entrenamiento en estrategias de aprendizaje.

Evaluación: Símbolos y dígitos; percepción de los déficits y GAS (goal attainment Scaling)
were also asked to report whether the evaluation was based on the patient's test performance, self-rating questionnaires, comments or behaviour during the assessment, or on a simple guess. The study protocol was published in advance (ClinicalTrials.gov identifier: NCT01492023).

The pre-specified hypothesis was that strategy-oriented neuropsychological rehabilitation improves processing speed and reduces perceived cognitive deficits in MS and individual goals set for the rehabilitation are reached.

Statistical analyses
Statistical comparisons of the background data and baseline assessments between the two groups were computed using Fisher's exact tests for nominal data, Mann-Whitney U-tests for non-normally distributed data, and Student's t-tests for normally distributed data.

All outcome measures were analysed on the basis of the intention-to-treat protocol. Rehabilitation outcomes were analysed using repeated-measures analysis of variance (ANOVA), assessing possible differences over time (baseline, three months and six months), possible differences between groups (intervention and control), and the interaction between time and group.

Results
Baseline comparisons
There were no significant differences between the intervention group and the control group in any of the background variables (Table 1). Additionally, the groups were similar with respect to self-reports concerning the perceived cognitive deficits, quality of life, mood, fatigue and impact of the disease at baseline. The objective cognitive performance was similar between the groups except for the delayed visuospatial recall (10/36 delayed recall), where the intervention group performed better than the control group (mean 7.8± 2.1 vs 6.8± 1.8, p = 0.009). Furthermore, the intervention group reported fewer cognitive symptoms (MSN Q-P) than the control group (mean 28.7± 9.2 vs 32.5± 9.3, p = 0.046).

Primary outcome measures
There was no significant difference between the intervention and the control group in performance on the SD MT (mean baseline 46.2± 9.8 vs 45.5± 8.4, end of the intervention 49.8± 10.2 vs 47.5± 8.4, at six months 50.6± 12.1 vs 48.2± 8.2, p = 0.316) after the intervention. There was a significant difference between the intervention and control group in the perceived deficits (PDQ; mean baseline 36.0± 11.9 vs 38.2± 12.6, end of intervention 28.7± 12.0 vs 37.3± 13.0, six months 27.9± 11.7 vs 36.8± 12.6, p < 0.001, effect size ηp2 = 0.077, respectively) after the intervention. The intervention group perceived significantly fewer cognitive deficits at the end of the intervention and after six months than the control group (Figure 2). The third primary outcome measure concerned achievement of the personal goals for the intervention. The results showed that the personal goals for the intervention were well achieved (GAS t score; mean 56.2± 8.5, range 41.0–75.0).

Table 1. Baseline socio-demographic characteristics of the intervention and control groups.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intervention group (n = 58)</th>
<th>Control group (n = 40)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>43.5± 8.7</td>
<td>44.1± 8.8</td>
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</tr>
<tr>
<td>Sex: (n)</td>
<td></td>
<td></td>
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<tr>
<td>Female/male</td>
<td>45/13</td>
<td>31/9</td>
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</tr>
<tr>
<td>Education in years</td>
<td>13.6± 2.3</td>
<td>13.8± 2.6</td>
<td>0.833</td>
</tr>
<tr>
<td>Duration since MS diagnosis in years</td>
<td>9.2± 6.6</td>
<td>10.1± 7.1</td>
<td>0.517</td>
</tr>
<tr>
<td>EDSS: (n/%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>54/93.1</td>
<td>37/92.5</td>
<td>1.000</td>
</tr>
<tr>
<td>4.5–5.5</td>
<td>4/6.9</td>
<td>3/7.5</td>
<td>1.000</td>
</tr>
</tbody>
</table>
| EDSS (the Expanded Disability Status Scale); SD: standard deviation; MS: multiple sclerosis. aStudent's t test. bFisher's exact test. cMann-Whitney U-test.
BRIEF COMMUNICATION

Working Memory Mediates the Relationship between Intellectual Enrichment and Long-Term Memory in Multiple Sclerosis: An Exploratory Analysis of Cognitive Reserve

![Diagram showing mediation model between Intellectual Enrichment, Working Memory Capacity, and Long-term Memory.](image-url)
Conclusiones

Entrenamiento en memoria de trabajo

El entrenamiento cognitivo debe ser intensivo

Nuevas tecnologías: videojuegos activos

La alianza terapéutica debe ser prioritaria

La rehabilitación neuropsicológica no debe centrarse en la reducción de los déficits cognitivos.
Propósito de la rehabilitación neuropsicológica

1. **Reducir los déficits cognitivos**

2. **Reducir los efectos adversos de los déficits**

3. **Mejorar la conciencia del déficit para que puedan afrontar mejor los retos de la vida diaria**

4. **Incidir sobre otras áreas no directamente tratadas: depresión, ansiedad, fatiga, cambios de personalidad, calidad de vida**
GRACIAS

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