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Congruent movement training (CMT) for patients with spatial neglect: Perspectives of end-users on clinical implementation

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ABSTRACT

Spatial neglect (SN) is a disabling consequence of stroke requiring intensive rehabilitation. A prior study demonstrated that contralesional eye- and reaching movements can facilitate SN recovery (Congruent Movement Training, CMT). To increase CMT's accessibility, a tablet-based CMT game was designed. In addition, as therapy time is restricted, clinical implementation would be facilitated if CMT can be delivered in sessions not supervised by a clinician. In this study, end-user feedback was gathered on the tablet-based CMT and treatment delivery strategies. Fifteen clinicians and 10 SN patients played and evaluated the CMT game. The clinicians almost unanimously indicated a need to revise the in-game feedback on how patients played the game. Clinicians also deemed it feasible that some patients would use CMT training in unsupervised sessions. Eight right-hemispheric patients were able to use the CMT training and were positive about their experience. Two left-hemispheric patients were not able to use the training due to language comprehension difficulties. Six patients believed they could use CMT training independently. The results revealed two implementation barriers: the design of the feedback on game performance, and the accessibility for left-hemispheric patients. The results also clarified that unsupervised training is considered feasible by clinicians and patients.

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KEYWORDS

Spatial neglect; serious game; rehabilitation; implementation; end-users

Key messages regarding feasibility

(1) What uncertainties existed regarding the feasibility?

Prior to this study it was uncertain whether clinicians would be willing to adopt the CMT training in their clinical care routines and whether they deemed it

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feasible to provide CMT training as part of supervised or unsupervised training. In addition, it was unclear whether patients would be able to interact with the CMT training (understand task instructions, goals of the task, operate the software, ...).

(2) What are the key feasibility findings?

The feedback by the clinicians identified an important intervention characteristic that requires revisions. In addition, we identified that clinicians and patients consider the delivery of CMT training in an unsupervised way as feasible. In future clinical trials, a mixed treatment delivery strategy (combination of supervised and unsupervised sessions) should thus be considered. Last, we identified that the CMT training might not be accessible to patients with left-hemispheric stroke. This is an important potential barrier for further studies and implementation as this patient group represents a large proportion of the clinical target group. It must therefore be further explored how CMT training can be adjusted to reach this patient group.

(3) What are the implications of the feasibility findings for the design of the main study?

This study clarified that the design of the CMT training must be revised before continuing towards a larger study. Second, it clarified that it is worth exploring the feasibility of an unsupervised training protocol.

Background

Spatial neglect (SN) is a prevalent disorder after stroke, with prevalence estimates varying widely (30–90%) depending on the time poststroke onset and type and combination of diagnostic tests used (Chen et al., 2015; Esposito et al., 2020). The core deficit underlying SN is an impairment of lateralized attention, resulting in slower, less, or even an absence of conscious processing of contralesional information (Bartolomeo et al., 2012; Corbetta & Shulman, 2011). In addition, patients with SN suffer from nonlateralized attention deficits (Robertson, 2001). SN patients stay longer in hospitals and rehabilitation centres (Bosma et al., 2023), and recover less in general. The negative impact of SN has been demonstrated on several outcomes, such as motor recovery (Nijboer et al., 2014), activities of daily living (Nijboer, Van de Port, et al., 2013), social and societal participation (Di Monaco et al., 2011; Hammerbeck et al., 2019), and caregiver burden (Bosma et al., 2020). SN can persist over time, with studies indicating a prevalence of 15% to 40% in the chronic poststroke phase (e.g., 6 months (Moore et al., 2021), 1 year (Nijboer, Kollen, et al., 2013), and 20 months poststroke (Linden et al., 2005)). As such, there is a consensus that effective treatment of SN is highly important.

Recently, congruent movement training (CMT) was introduced as a new treatment for SN (Elshout et al., 2021). In CMT training, patients are trained to make eye and hand movements simultaneously to the same contralesional location. Traditional neglect therapy, in which patients are repeatedly trained on pen-and-paper visual search tests, also frequently include a combination of eye- and hand-movements towards the contralesional side of space. However, whether the hand-movements improved the effectiveness of the therapy had not yet been examined. In a proof-of-concept study, the CMT training was more effective than a training that only consisted of contralesional eye movements in a single-site single-blinded RCT including 19 patients who were randomly allocated to CMT or eye movement training (Elshout et al., 2021). In addition, the clinical potential of CMT was deemed to be high given that the training was limited to 5 h (10 half-hour scheduled sessions), which is low relative to common stroke rehabilitation dosages averaging 54 h (Lohse et al., 2014). For this reason, further research to obtain a higher level of evidence for the effectiveness of CMT training is warranted.

Although this intervention has shown promise, many clinical innovations have not been implemented in practice (Kirchner et al., 2020). Therefore, it is essential to examine how interventions can be implemented and what factors might act as barriers and facilitators. The latter is important to move towards novel studies which can provide higher-level evidence for CMT's effectiveness. One barrier for obtaining higher levels of evidence and clinical implementation is the fact that treatment is typically delivered in clinician-supervised sessions (see for instance Elshout et al., 2021; Huygelier et al., 2025). This intensive time-investment restricts the possibility to expand patient recruitment to multiple hospital sites, consequently contributing to small-scale efficacy trials (see for instance Huygelier et al., 2025). It is therefore important to explore to what extent we can deviate from this model of treatment delivery. To this end, in a first stage, end-user feedback was gathered regarding the treatment delivery strategy. This feedback can identify how the CMT training can be adjusted to meet the expectations of end-users and aid in preparing larger-scale efficacy/implementation studies.

Following the Consolidated Framework for Implementation Research (Damschroder et al., 2009), the current study aimed: (1) to identify which peripheral intervention characteristics need to be adapted in order for the intervention to be deemed acceptable by therapists for supervised and unsupervised treatment delivery, (2) examine patient's belief and willingness to use CMT training in supervised and unsupervised sessions, and (3) examine therapist's and patient's general affect towards the intervention. In addition, we describe patients' performance on the CMT to contextualize the feedback of the patients.

Methods

Participants

Therapists (i.e., occupational therapists, physical therapists, (neuro)psychologists, and speech therapists) working at De Hoogstraat Rehabilitation Center Utrecht, The Netherlands were invited to participate in this feasibility and user-experience study. The therapists were invited to participate in the study through e-mails sent by two clinicians who worked in the centre and who were involved in a project to implement improvements in clinical practice (“Knowledge Brokers”). The only inclusion criterion for professionals was that therapists had to be involved in the clinical assessment and/or treatment of patients with SN, as they needed to be able to estimate the applicability of the current revised version for the patient population (i.e., patients with SN admitted for in-patient rehabilitation).

Additionally, patients with SN admitted for in-patient rehabilitation were recruited in between May 2022 and May 2023. The inclusion criteria to participate in the study were (1) the presence of SN, assessed as part of usual care (see later for description); (2) aged above 18 years; and (3) sufficient ability to comprehend instructions and questions, and to communicate during the interview. This ability was estimated by the clinical team.

Patient recruitment was terminated when the planned sample size of 10 patients was reached. The sample size was determined based on the maximum reachable sample size in the recruitment period of one year in the rehabilitation hospital. No record was kept of refusals to participate, following the ethical guidelines of the local ethics committee. No participants dropped out.

CMT training

Configuration of the CMT trials

The CMT training was played on a 12.9-inch iPad Pro. In the CMT training, patients replicate a 9-item template grid (upper left corner of the tablet, [Figure 1\(A\)](#)) on an empty target grid, directly beneath the template. On the opposite side of the template and target grid (here on the right side), the target item is presented, which has to be allocated in the corresponding location in the target grid. The participants provide their responses by selecting the target item and placing it on a location in the target grid. The participants can place a new target item on a previously placed item, but only 9 items per trial were presented. The original CMT design consisted of a puzzle with 3 primary colours ([Figure 1\(B\)](#), Elshout et al., 2021). To increase the replayability and difficulty of the CMT training, 3 new shapes were introduced (i.e., fruit, doors and shapes). In addition, several variations of the task were added in which the shapes that patients have to match differed ([Figure 1\(B\)](#)).

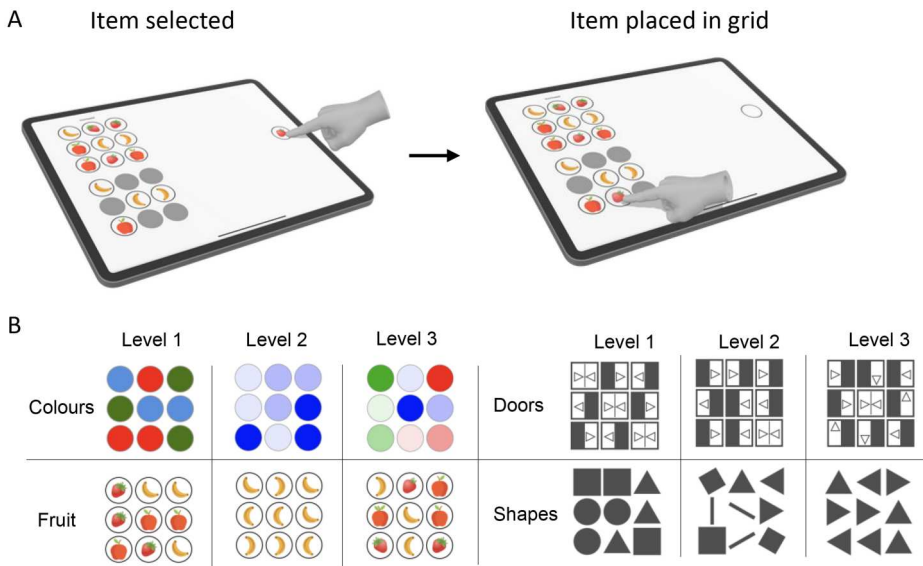


Figure 1. (A) Layout of a trial during the revised CMT and illustration of how patients have to place an item in the grid. (B) Overview of the revised CMT conditions and levels.

CMT: outcome measures

A first general performance index is whether the grid was entirely correctly reproduced (i.e., puzzle accuracy). To fill a grid completely accurately, one must always place a new item at a grid location matching the template and always choose a new and empty grid location. Thus, an incomplete puzzle can arise from errors matching the items (i.e., shape matching errors, placing an item at a wrong location) or from placing an item at an already accurately filled grid location (i.e., revisits).

Cognitive and neglect screens

Dutch Oxford cognitive screen (OCS-NL)

The OCS-NL is a pen-and-paper short screen for impairments in several cognitive domains often affected by stroke: language (picture naming, semantics, sentence reading), memory (orientation, verbal, and episodic), praxis (imitating meaningless gestures), numerical cognition (number writing and calculation), executive functions (trail making test), and attention (hearts cancellation test). In addition, a simple confrontation test is used to screen for visual field defects. Each subtest score is contrasted to an age-corrected normative cut-off (Huygelier, Schraepen, Demeyere, et al., 2020) and the OCS-NL has been validated for cognitive screening in acute and subacute stroke patients (Huygelier et al., 2022).

In the hearts cancellation test, patients have to mark (cancel) all full-outlined hearts (50 targets), while ignoring hearts with a gap on the left or right side (100 distractors) on an A4-sized page in landscape orientation. Three scores are

calculated: the total number of cancelled targets, the difference in cancelled targets between the left and right side (egocentric bias) and the difference in cancelled distractors with a left or right gap (allocentric bias).

SN screening (usual care)

To screen for SN in the rehabilitation facility, clinicians relied on unstructured observation, the Balloons test and/or the Catherine Bergego Scale.

Catherine Bergego Scale

The Catherine Bergego Scale is a validated 10-item structured observation scale which aims to measure the impact of neglect on activities of daily living. Each item is rated from 0 ("no neglect") to 3 ("severe neglect"). Total scores were retrieved from patient's medical files. The score ranges from 0 to 30 with 6 as a cut-off for "mild neglect" (Ten Brink et al., 2013).

Balloons test

The Balloons test is a pen-and-paper visual search test consisting of two parts. In the first part, patients have to mark 20 balloon shapes (targets) among 180 circles (distractors). In the second part, patients have to mark 20 circles among 180 balloon shapes (Diesfeldt, 2012). The total number of cancelled targets and difference in cancelled targets per part were retrieved from patient's medical files. If patients cancel less than 17 targets in total or if less than 45% of the cancelled targets are located on the contralesional side of the page, the score is indicative of SN (Diesfeldt, 2012).

Semi-structured interviews and questionnaires

Therapists. We developed a short questionnaire with a small number of closed- and open-ended questions to gauge therapist's feedback on the CMT task. We specifically aimed to know whether the following characteristics of the CMT intervention required revisions: (1) the instructions on how to play the game, (2) whether the goal of the CMT task was clear (i.e., goal of completing the puzzles), and (3) whether the feedback towards patients on how they are completing the CMT puzzles required revisions. We used yes-no questions with an open-ended question to make suggestions for improvements. In addition, the therapists were asked to indicate whether they would be willing to use the CMT training in therapy. Finally, they were asked how they would use CMT training (one-on-one supervised therapy sessions, group sessions or other methods). In addition to these specific questions, therapists received the opportunity to provide additional remarks to provide richer information.

Patients. Patients were asked to rate a set of 10 questions on a 5-item scale ranging from "totally disagree" to "totally agree". The set of questions was based on a prior end-user study in stroke patients (Huygelier, Schraepen,

Lafosse, et al., 2020). Among the questions, six were derived from the Intrinsic Motivation Questionnaire (McAuley et al., 1989) and the Cross-Media Presence Questionnaire (Lessiter et al., 2001). The questions were asked by the researcher in an interview format. In addition, patients were asked 3 open-ended questions to supplement the Likert-rated questions. We asked patients “How did you experience the game?”, “Would you change something about the game and what would that be?”, and “Which of the four tasks did you like best?”.

Procedure

All sessions with therapists and patients took place in De Hoogstraat rehabilitation centre. Therapists received an explanation of the CMT training and were then invited to try out the CMT training in two 1-hour group sessions. Clinicians were informed that the researchers were interested in their perspectives and feedback about the CMT training and whether they considered it feasible to implement in practice. After trying out the CMT training, the therapists completed a questionnaire asking about their opinions. Suggestions made by therapists were audio-recorded and transcribed after the sessions. These sessions were led by author HH (female, postdoctoral researcher, trained as clinical psychologist, PhD).

Patients participated in a single 1-hour session. Patients were first informed about the objectives of the study and the CMT training. Patients were informed that the researchers were interested in their perspectives as end-users about the CMT training. A semi-structured interview was conducted to obtain technology experience, demographic, and medical information. The Dutch Oxford Cognitive Screen was subsequently administered (Huygelier et al., 2022; Huygelier, Schraepen, Demeyere, et al., 2020). The researcher then presented and explained the CMT game. Once the patient understood how the CMT game worked, the patient completed at least two rounds of each of the four CMT puzzles of level 1 (i.e., colour, fruit, doors, shapes, [Figure 1](#)). The researcher helped patients handle the app when necessary. After finishing the CMT game, patients were asked about their experience and allowed to provide feedback. Patient interviews were conducted by authors HH and TvD (male, Master’s Degree in Psychology). The study sessions were the first contact between the researchers and the clinicians / patients.

As no new (not already captured by the questionnaires) information emerged from the interviews with patients and therapists, interviews were not extensively coded for a thematic analysis.

Results

Therapists

Fifteen therapists (14 female) participated. The average age of the therapists was 40.7 years (SD = 10.1, 27–61 years) and therapists had worked for 12

years in the rehabilitation centre (SD = 9.2, 2–35 years) on average. Among the therapists, there were 5 occupational therapists, 4 psychologists, 3 speech therapists, 2 nurses, and 1 physiotherapist.

Therapists gave their opinions on several questions (Figure 2). The majority of the therapists evaluated the instructions and goals of the game as being *clear* (Figure 2). Therapists provided several suggestions during the interviews on how to improve the instructions, such as providing a manual with written instructions for therapists and including verbal instructions for patients in the app (i.e., in game instructions). Most therapists evaluated the feedback in the CMT training as *unclear* (Figure 2). Several therapists during the interview stressed ($n = 8$) the importance of automatic and immediate feedback after every response of the patient. In addition, two therapists suggested including feedback on the applied strategy.

Therapists indicated a willingness to implement the CMT training when some adjustments were made (e.g., clearer feedback on performance). The majority of the therapists indicated that they would implement the CMT training in different ways depending on the patient's abilities (e.g., patients playing independently or supervised by the therapist or informal caregiver). Some therapists indicated that they would only use the CMT training in a supervised setting. Finally, during the open-ended interviews, the therapists indicated that it was important to develop a clear treatment protocol, including information regarding which patients can use and benefit from CMT training and for which patients the training is most suitable (e.g., severity of SN, subtypes of SN, comorbidities, fatigue).

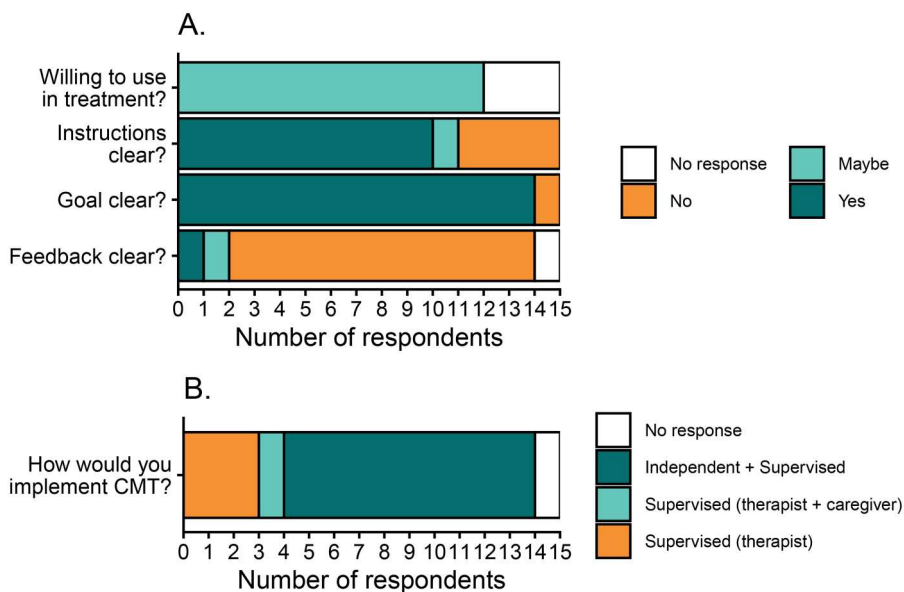


Figure 2. Responses of therapists on closed questions.

Patients

Patient descriptives

Ten patients with SN participated in the study. All patients were Dutch (except one patient supervised by her son who translated all instructions, feedback, and questions). All patients were right-handed prior to their stroke. CBS scores were available for eight patients, with all available CBS scores above the cut-off of 6 (Table 1) (Ten Brink et al., 2013). The Balloons test was available for 7 patients, with all patients scoring above clinical cut-offs for SN on at least one part of the test (A or B) (Table 1). For patient 3, no CBS or Balloons test was available in the patient's medical record. The patient did score impaired on the visual field test of the Dutch Oxford Cognitive Screen (Figure 3). On the hearts cancellation test 6 patients had impaired total performance (score < 43) and 3 an egocentric bias above the clinical cutoff score (score > 2) (Huygelier, Schraepen, Demeyere, et al., 2020).

Feasibility, performance, and patient user experience

The patients completed 9.7 puzzles on average (SD = 3.3). For two patients (patient 3 and 8 with left-hemispheric stroke and aphasia as a result), the instructions to play the CMT tasks were not clear after several step-by-step demonstrations by the researcher and providing feedback on patient's responses on how to play the game. One patient completed only 4 puzzles of which only 1 was accurate, while the other patient did not complete any puzzle without instructions by the researcher (Table 2). The other patients (all right-hemispheric stroke patients) completed all the CMT puzzles that were initiated. Among the puzzles they completed, 61% were completely accurate (SD = 26%). On average patients made 6% matching errors (SD = 6%). Patients revisited locations (i.e., placed items on already correctly filled grid locations) with an average of 5% (SD = 3%). The median time to select the item was 2.5 s (SD = 1.96) and the median time to place the item in the grid was 1.3 s (SD = 0.52).

All ten patients answered ten questions about their user experience on a 5-item scale (1 = strongly negative, 3 = neutral, 5 = strongly positive) (Figure 4). The average game rating was positive across patients ($M = 3.6$, $SD = 0.95$, Range: 1.7– 5). The majority of patients indicated that they were interested in the game ($n = 9$), that the tablet was easy to use ($n = 8$), that the game was challenging ($n = 8$) and that the goal of the game was clear ($n = 8$). The majority of patients were positive about using the CMT training again ($n = 7$) and indicated that they could use it independently ($n = 6$) (Figure 4).

Patients were asked which version of the CMT training they preferred (i.e., colour, fruit, doors or shapes). Patients differed in their preferences with 4 patients choosing colour, 2 choosing doors and 3 patients choosing fruit. When asked about their reasons behind these choices, 4 patients indicated preferring the easiest task (patients 1, 4, 6, and 7), whereas 2 patients chose the one that they experienced as most challenging (patients 2 and 9).

Table 1. Patient characteristics.

Patient	Age (Years)	Education (1–7) ^a	Sex	Tablet PC ^b	Smart-phone ^b	Lesion Side	Time poststroke (Days)	Stroke Type	Barthel Index ^c	Motricity ^d		CBS Total (/30)		Balloons (A)		Balloons (B)	
										Leg (/100)	Arm (/100)	Total	R-L	Total (/20)	R-L	Total (/20)	R-L
1	65	5	M	<1/w	>1/d	R	31	I	2	0	0	28	13	7	6	0	
2	61	6	M	>1/w	>1/w	R	42	I	5	83	0	23	/	/	12	8	
3	58	5	M	0	0	L	115	H	7	75	76	/	/	/	/	/	
4	69	5	M	0	>1/d	R	75	I	9	59	0	15	20	0	13	7	
5	53	7	F	>1/d	>1/d	R	228	I	6	23	14	20	/	/	/	/	
6	61	5	M	0	0	R	38	I	7	0	0	27	4	2	2	0	
7	38	5	M	>1/d	>1/d	R	33	I	18	75	34	13	16	4	13	5	
8	54	5	F	0	>1/d	L	96	I	2	/	/	8	/	/	/	/	
9	64	5	M	>1/d	>1/d	R	72	I	9	75	100	6	20	0	17	-3	
10	57	5	M	>1/d	>1/d	R	45	H	11	100	100	/	12	4	7	3	

Notes: F = female, M = male, L = left, R = right, I = ischemic stroke, H = hemorrhagic stroke, w = week, d = day, R-L = difference in cancelled targets right and left page. Scores above the clinical cut-offs for SN are indicated in bold.

^aLevels of education following the Dutch classification system (Verhage): 1 (less than 6 years formal education) – 7 (completed higher education, obtained a Master of Science degree).

^bFrequency of using a tablet or smart-phone prior to stroke.

^cBarthel Index = a measure of independence in activities of daily living scored on a 20-point scale (0 = fully dependent).

^dMotricity Index = a measure of hemiplegia in arms and legs with scores ranging from 0 (no voluntary movement) to 100 (normal strength) (Wade, 1992).

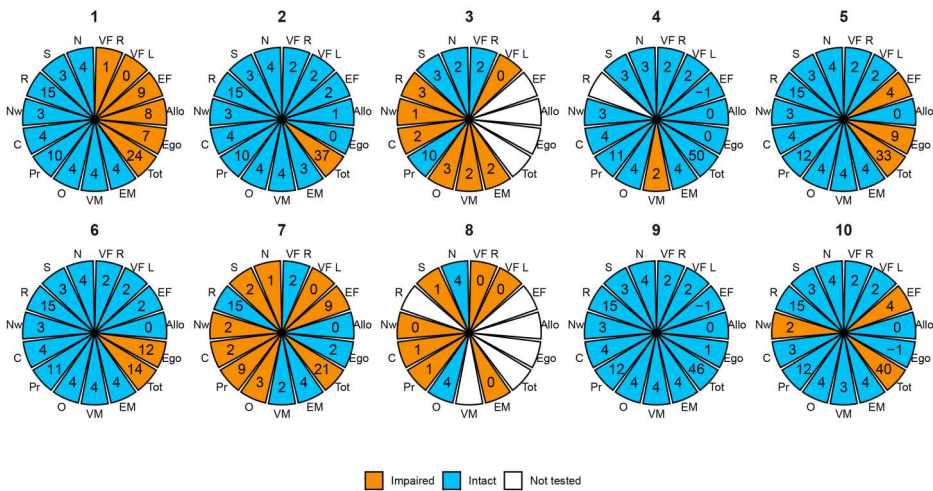


Figure 3. Test scores on the Dutch Oxford Cognitive Screen per case. Each slice depicts a subtest: N = picture naming, S = semantics, R = reading, Nw = number writing, C = calculation, Pr = praxis, O = orientation, VM = verbal memory, EM = episodic memory, Tot = Hearts Cancellation total cancelled targets, Ego = Hearts Cancellation egocentric bias, Allo = Hearts Cancellation allocentric bias, EF = executive functions, VF L = left visual field, VF R = right visual field. The colour indicates whether the score was “impaired” or “intact” using normative cut-offs (Huygelier, Schraepen, Demeyere, et al., 2020).

Table 2. CMT performance per patient.

Patient	Puzzles (n)	Accurate Puzzles	Matching errors	Revisits
1	10	.70	.07	.04
2	17	.77	.02	.05
3	4	.25	.14	.06
4	9	.78	.01	.02
5	9	.44	.05	.11
6	9	.33	.19	.07
7	10	.80	.02	.02
8	0	0.0	–	–
9	9	1.0	0.0	.04
10	10	.40	.08	.07

Discussion

SN remains an important poststroke cognitive impairment for which better treatment is needed. CMT has shown promise with SN patients improving more on conventional SN tests after CMT than a training relying solely on eye movements (Elshout et al., 2021). An important barrier for conducting large multicentre trials is the fact that treatment delivery typically requires one-on-one patient-clinician contact. For this reason, other treatment delivery strategies are being explored in which patients are more autonomous. Previous studies have shown the potential of SN telerehabilitation using a non-technological treatment protocol (Rossit et al., 2019) and have explored the barriers and facilitators for a technological tele-rehabilitation protocol (Morse et al., 2020). In the current study, we explored an

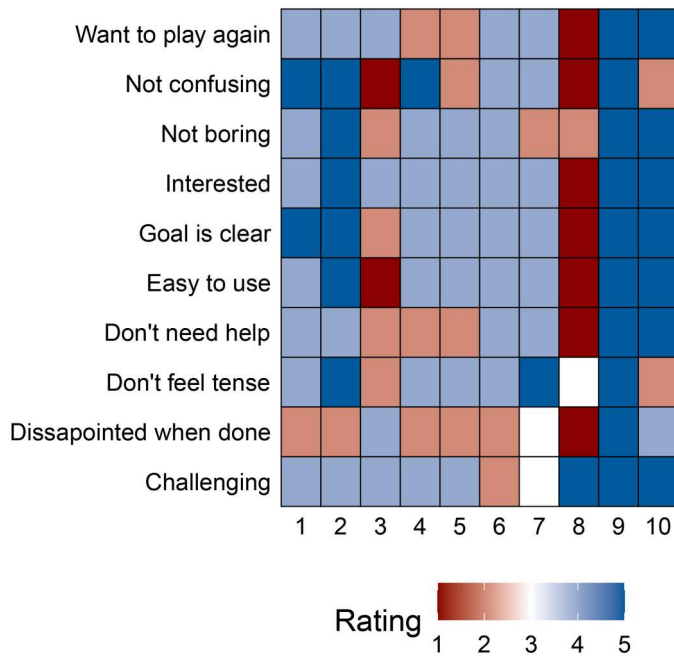


Figure 4. Ratings of patients (1–0) on questions about their user experience. Ratings 1–2 represent negative ratings, whereas ratings of 4–5 represent positive ratings.

“intermediate” treatment delivery strategy in between the current ways of providing in-patient treatment and telerehabilitation, focusing on the end-user perspectives regarding a supervised versus unsupervised treatment delivery strategy while patients resided in a rehabilitation facility. To this end, we gathered end-user feedback from therapists and patients. Such end-user feedback is crucial to increase the uptake of clinical innovations (Jarvis et al., 2024), which requires multiple rounds of end-user feedback (Chen & Krch, 2022).

We identified two barriers for further clinical implementation. A first barrier was the design of the feedback in the game. The therapists were willing to implement the training in clinical practice, but they emphasized the importance to include immediate feedback on responses (e.g., errors, correct responses, and strategies) in the game design. The importance of such feedback has previously emerged as an important theme in an end-user study for SN telerehabilitation (Morse et al., 2020). A second barrier for implementation is the accessibility of the training to patients who suffer from language difficulties following left-hemispheric stroke. That is, the two left-hemispheric stroke patients who participated in the study had difficulties understanding the game instructions. This barrier for implementation has also emerged in another study on the use of VR for SN assessment (Palmans et al., 2025). Many SN studies exclude left-hemispheric stroke patients and therefore do not acknowledge this important limitation of current treatment strategies. It is consequently essential in the future to examine how SN treatments can be designed to reach this target group.

Although two important barriers emerged, most therapists indicated that the CMT training could be implemented in different ways depending on the patient (i.e., independent versus supervised use). Consistent with the perspective of the therapists, 6 out of the 10 patients indicated that they felt that they could use the CMT training independently. Patients' perspectives were also positive in general, with positive remarks about the instructions, complexity, and hardware and software. With respect to complexity, there were individual differences, with some patients preferring an easier puzzle to solve (puzzles that they *experienced* as easy), whereas others preferring more challenging assignments (puzzles that they *experienced* as challenging).

We obtained feedback from a diverse group of patients with respect to the severity of SN and comorbidities. The patients were a representative sample of right-hemispheric and left-hemispheric stroke patients – an often overlooked group with respect to SN – admitted to a centre for in-patient rehabilitation. However, the willingness to adopt novel interventions may be lower in other clinical centres, as the participating centre – and the therapists – can be viewed as early adopters of innovative healthcare solutions. They have extensive experience implementing new technology in their clinical care routines. Thus, they may be more open and positive about the potential clinical value of novel techniques. Therefore, follow-up studies in multiple centres are essential. This first iteration clarified important aspects to improve in the CMT training and the suggestions offered by the therapists reveal important themes that generalize across training tools (see for instance Morse et al., 2020). The current study reveals that patients and professionals deem unsupervised training during in-patient rehabilitation as feasible, revealing a potential approach for increasing treatment-dosage. In summary, the current study shows promise for the implementation of the CMT training in clinical practice in a protocol consisting of supervised and unsupervised sessions.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Authors' contributions

HH prepared the study materials and ethical application, collected and analysed data, created figures and tables and helped writing the manuscript. SC funded and developed the CMT software, conceptualized the project and reviewed and

approved the manuscript. TvD aided in preparing study materials, collecting and managing data and preparing figures, reviewed and approved the manuscript. SS conceptualized the CMT training, reviewed and approved the manuscript. TN supervised the project and made a major contribution to writing the manuscript. The Knowledge Broker Neglect Study Group facilitated recruitment of patients and therapists, aided in local ethical application, advised the researchers and reviewed and approved the manuscript.

Data availability statement

Data can be made accessible upon request to the authors.

Ethics approval and consent to participate

All participants gave their informed consent. The study was approved by the Faculty Ethical Committee of the University Utrecht and the local Ethical Committee of De Hoogstraat Rehabilitation Center (no. 05072022).

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