

Cognitive Stimulation Therapy for Dementia

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KEYWORDS

- Dementia • Cognitive stimulation therapy • CST • Psychological treatment
- Psychosocial intervention • Cognition • Quality of life • Well-being

KEY POINTS

- Cognitive stimulation therapy is a psychological treatment for people with mild and moderate dementia.
- It is offered in both a group and individual format showing various benefits on cognitive functioning, quality of life, and quality of the caregiving relationship.
- The intervention provides a fun and meaningful approach toward staying mentally stimulated and engaged.
- The World Alzheimer's Report 2014 recommends cognitive stimulation therapy to be offered routinely to people with dementia around the world.
- In the future, cognitive stimulation therapy based approaches will hopefully grow and be made available to people who want and need it the most.

INTRODUCTION

Cognitive stimulation therapy (CST) is a brief psychological treatment for people with mild to moderate dementia. It offers a person-based approach to help people with dementia to stay mentally stimulated and engaged while providing an optimal learning environment. Over the course of 20 years, CST has grown to be widely used with 3 CST manuals published to date. Currently, CST is the only nonpharmacologic therapy

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49 recommended by the National Institute for Health & Clinical Excellence guidelines
50 (2006) for treating cognitive symptoms of dementia in the UK. These guidelines advise
51 that CST should be available to people with dementia regardless of medication
52 received. In addition, nearly all memory services in the UK currently offer CST in reg-
53 ular groups with people with dementia.¹ On a global level, CST is now recommended
54 to be offered routinely to people with dementia around the world in the World
55 Alzheimer's Report produced by Alzheimer Disease International in 2011. The Interna-
56 tional CST Center at University College London (UCL) has supported the adaptation
57 and/or implementation of CST in more than 25 countries. Furthermore, the first 2 inter-
58 national CST conferences brought together researchers, clinicians, and other stake-
59 holders from around the world to discuss past work and to exchange new and
60 exciting ideas regarding CST. In Hong Kong, delegates learned about the concept
61 of a virtual feature for CST groups where people would be able to attend CST groups
62 from the comfort of their homes, connecting with others via a video/audio channel on a
63 technological device. CST shows measurable benefits on cognition and quality of life
64 (QoL) comparable with the effects of some antidementia medication. In addition, it is
65 cost effective² and very much enjoyed by people with dementia. All of these factors
66 have undoubtedly supported the national and international uptake of the intervention.

67 The field of CST remains ever evolving and further to what has been achieved so far,
68 there is much to look forward to in terms of innovations.

70 BACKGROUND

71
72 CST was developed 20 years ago at a time when there were few psychological thera-
73 pies available for people with dementia and the potential for engagement in mentally
74 stimulating, enjoyable activities in everyday life to preserve cognitive health and pro-
75 tect against decline had not been realized. From the perspective of the population,
76 there was a clear need to have something available that would provide people with de-
77 mentia with a meaningful way to spend their time. Clinicians and policymakers antic-
78 ipated the development of new antidementia medication because the benefits of
79 tacrine, the only pharmacologic therapy available, were modest and the risks of
80 adverse events made the drug unsuitable for some people with dementia. Therefore,
81 the field of psychological treatments remained unexplored and trials for psychological
82 interventions were often small in scale and methodologically unsound. From a
83 research perspective, the need for more rigorous investigation of new and/or existing
84 psychological therapies for people with dementia was evident. Considering both the
85 gaps in research and the needs of people with dementia, a research team in the UK
86 set out to develop a novel, psychological therapy whose evaluation would be built
87 on a strong methodological foundation comparable with that of pharmacologic
88 treatments.³

89 The first steps toward developing CST included the review of evidence from existing
90 psychological therapies which could serve as a strong foundation. This review
91 included 2 systematic literature reviews on reality orientation (RO) and reminiscence
92 therapy, 2 widely used psychological approaches. In addition, the work on CST was
93 influenced by Breuil's approach to cognitive stimulation.⁴ Whereas RO is described
94 as the presentation and repetition of orientation-based information, Breuil's approach
95 differed from traditional RO by setting out to engage people in enjoyable cognitive
96 tasks provided in a group format. Breuil and colleagues (1994)⁴ conducted a random-
97 ized, controlled trial among 56 people with dementia and found their cognitive stimu-
98 lation approach had positive effects on cognitive functioning. The workgroup went on
99 to combine the effective techniques from key therapies (RO, reminiscence therapy

and, Breuil and colleagues's work) and multisensory stimulation to form the CST program.

CST consists of 14 twice-weekly group sessions (Table 1) that take place over the course of 7 weeks.⁵ All sessions are diverse in nature and the program offers a wide array of topics to ensure it meets the group's interests and cognitive abilities. Every CST group has personalized elements to it, such as choice of a group name and song. These are displayed on an RO board during the session. Sessions last 45 minutes including a 10-minute noncognitive warmup and a 10-minute closing activity (summary and/or the group song). CST is typically delivered by a trained health care professional or care assistant to groups of 5 to 8 people. The facilitators are encouraged to adhere to the key principles of CST, which helps to create the most optimal environment for mental stimulation and enjoyment. Examples of the 18 key principles are mental stimulation, using reminiscence as an aid to the here and now, implicit learning, fun, choice, building/strengthening relationships, and focusing on opinions, rather than facts. These features are unique to CST.

EVIDENCE

The development of CST followed the guidance of the Medical Research Council framework for developing complex interventions.⁶ This framework includes a development–evaluation–implementation process in which all the phases interact with each other.

The first draft version of CST was taken forward in a pilot study.⁷ A total of 27 people with dementia, recruited from a day center and 3 residential homes, were included. Seventeen were randomized to the treatment group receiving CST and 10 were allocated to a treatment as usual control group. The results were promising and indicated that for the CST treatment group there were positive signs regarding cognition, and depression and anxiety seemed to be reduced compared with the control group.

Table 1
Cognitive stimulation therapy sessions

Session	Content
1	Physical games
2	Sound
3	Childhood
4	Food
5	Current affairs
6	Faces/scenes
7	Associated words
8	Being creative
9	Categorizing objects
10	Orientation
11	Using money
12	Number games
13	Word games
14	Team games

Data from Spector A. Introduction. In: Yates LA, Yates J, Orrell M, et al, editors. Cognitive stimulation therapy for dementia: history, evolution and internationalism. 1st edition. Oxford (England): Routledge; 2017. p. 177–93.

151 No negative effects were observed as a result of the treatment. The positive findings
152 from this pilot study formed a strong argument for investigating the effects of CST in a
153 large randomized, controlled trial.

154 After a few adjustments to the CST program according to the findings from the pilot
155 study, a single-blind, multicenter randomized, controlled trial was conducted that
156 included 201 people with dementia.⁸ The participants were distributed over 23 CST
157 groups and were recruited from 5 day centers and 18 care homes. The following inclu-
158 sion criteria applied to all participants:

- 159 • *Diagnostic and Statistical Manual of Mental Disorders, fourth edition, criteria for*
160 *dementia*⁹;
- 161 • Score of between 10 and 24 on the Mini Mental State Examination¹⁰;
- 162 • Some ability to communicate and understand (eg, ability to give informed
163 consent);
- 164 • Able to see and hear well enough to participate in the group and make use of
165 most of the material in the program; and
- 166 • No major physical illness, learning disability, or other disability that could affect
167 participation.

168 These inclusion criteria have been commonly applied in CST studies since, and are
169 now referred to as the Spector and colleagues (2003) standardized criteria.

170 Participants were randomized to either a CST group (n = 115) or a treatment as
171 usual control group (n = 86). Researchers aimed to assess benefits across several
172 outcomes measures with primary outcomes of cognitive functioning and QoL. The trial
173 results were positive: participants in the CST group showed significant improvements
174 in cognitive functioning as measured by the Mini Mental State Examination¹⁰ and the
175 Alzheimer's Disease Assessment Scale Cognitive Subscale (ADAS-Cog)¹¹ compared
176 with the treatment as usual group. Self-rated QoL was higher in the CST group as
177 measured by the Quality of Life-AD.¹² Last, there was a positive trend for communica-
178 tion (Holden Communication Scale).¹³ No significant differences were found for the
179 secondary outcomes such as functional ability, anxiety, and depression.

180 The trial met some challenges and the research team made key observations that
181 helped them to better understand the results.¹⁴ One of the limitations was the short
182 follow-up period, which consisted of 8 weeks and did not allow for any evidence
183 regarding long-term effects of CST. In addition, none of the staff-rated scales showed
184 any significant benefits (behavior, mood, communication). The researchers did
185 observe a considerable amount of variation between centers in terms of the effects
186 on the outcome measures. This finding could be due to the role of staff members
187 and the quality of the environment, but also to the level of impairment of participants.
188 At times, if people with dementia were functioning quite well already, there was little
189 room for significant improvement. It could also be difficult to run groups with people
190 with different stages of dementia because those with mild impairment sometimes
191 grew frustrated with participants with a greater degree of impairment. To maximize
192 the effectiveness of the intervention, it is crucial to create an optimal learning environ-
193 ment, including pitching the sessions to an appropriate level according the needs of
194 the group participants. Despite these challenges, the significant improvements on
195 the primary outcome measures and the fact that people with dementia really enjoyed
196 CST encouraged the research team to publish the CST training manual and to make it
197 more widely available.

198 A few years later, the CST findings from the trial were supported with qualitative data
199 when researchers investigated the experiences of people with dementia, carers, and
200 group facilitators who attended CST groups.¹⁵ This study included 38 participants
201

202 recruited from 3 existing CST groups. Two main themes (along with 7 subthemes)
203 emerged from the focus groups and interviews: positive experiences of being in the
204 group and changes experienced in everyday life. Participants shared many reflections,
205 some of which are highlighted herein. Regarding changes in everyday life, participants
206 reported noticing some benefits in their memory:

207 *Yes, remembering the recent events have been a lot more simple and a lot more*
208 *logical than it was certainly.*

209
210 *—Person with dementia*

211 Cognitive benefits in other areas such as communication were also observed by
212 carers.

213 *She's clearer on the telephone. Clearer I suppose in the way she holds the con-*
214 *versation it's not that she speaks differently. It's just that the flow of the conversa-*
215 *tion is a little easier.*

216
217 *—Carer*

218 Personal experiences reported by participants support the notion of CST being a
219 positive and mentally stimulating experience, which is in line with previous quantitative
220 findings.¹⁵

222 MAINTENANCE COGNITIVE STIMULATION THERAPY

223 The first CST trial showed positive results. However, the need for more research
224 regarding potential longer term outcomes and more CST content for people with
225 dementia in general, led to the development of an extended version of CST called
226 maintenance CST (MCST).¹⁶ The MCST program includes the regular 7-week CST
227 program with an extension of an additional 24 weekly maintenance sessions. **Box 1** **Q7**
228 gives an overview of all the MCST themes in the published MCST manual.

229 Before finalizing the MCST program, an exploratory pilot study was conducted in 4
230 residential homes.¹⁷ After completion of the standard CST program, 2 residential
231 homes were offered 16 once weekly MCST sessions and the 2 remaining homes
232 served as treatment as usual control groups. Thirty-five participants were recruited
233 for the study which were allocated to 1 of the 3 groups: (1) MCST and CST (n = 8),
234 (2) CST only (n = 12), and (3) no CST (n = 15). Results indicated a continuous, signif-
235 icant improvement at follow-up on cognitive functioning as measured by the Mini
236 Mental State Examination among participants receiving MCST (CST plus MCST)
237 compared with the CST only or the no CST groups. No significant effects were found
238 for QoL, communication, or behavior after MCST. It was evident that a fully developed
239 MCST program was needed to formally investigate the effects of CST delivered over a
240 longer term basis.¹⁷

241 The researchers considered the theory behind the original CST program and the
242 findings from the exploratory pilot study while finalizing the MCST program. In line
243 with CST, MCST was developed according to the Medical Research Council frame-
244 work and used a mixed methods approach.¹⁶ Evidence from the following sources
245 were combined: (1) a Cochrane review of cognitive stimulation for people with de-
246 mentia,¹⁸ (2) a Delphi consensus process (involving key stakeholders), (3) focus
247 groups with key stakeholders, and (4) a Delphi survey. This process led to the
248 development of the MCST manual, which includes themed sessions and resembles
249 the consistent structure of CST (eg, group name/song, noncognitive warmup).¹⁹
250 The finalized MCST program was evaluated in a large-scale randomized, controlled
251 trial.
252

Box 1**Maintenance cognitive stimulation therapy sessions themes**

My life

Current affairs

Food

Being creative

Number game

Team games, quiz

Sound

Physical games

Categorizing objects

Household treasures (new)

Useful tips (new)

Thinking cards (new)

Visual clips (new)

Art discussion (new)

Faces/scenes

Word game

Associated words, discussion

Orientation

Using money

Data from Orrell M, Forrester L. Group cognitive stimulation therapy: clinical trials. In: Yates LA, Yates J, Orrell M, et al, editors. Cognitive stimulation therapy for dementia: history, evolution and internationalism. 1st edition. Oxford (England): Routledge; 2017.

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The MCST trial was a single-blind, multicenter, pragmatic randomized, controlled trial of the effects of MCST groups after the completion of the standard CST program versus CST followed by treatment as usual.²⁰ A total of 236 participants were recruited from 9 care homes and 9 community services (eg, day centers). After completion of the original CST program, participants were randomly allocated to either the additional MCST program (n = 123) or the treatment as usual control group (n = 113). Participants were assessed at baseline before randomization had taken place, at 3 months, and after 6 months. Similarly, with the previous CST trial, the primary outcomes measures were the ADAS-Cog¹¹ and QoL-AD.¹²

Trial results indicated that, at the 6-month follow-up, the MCST treatment group showed significant improvements in self-rated QoL-AD compared with the treatment as usual control group.²¹ At the 3-month follow-up, results showed positive effects for people with dementia on the proxy-rated QoL (Dementia Quality of Life questionnaire)²² by carers and care staff, and daily activities (Alzheimer's Disease Cooperative Study Activities of Daily Living Inventory).²³ No significant effects were found on the ADAS-Cog or other secondary outcomes at either follow-up.

The most notable difference between the findings from the MCST trial and the first CST trial was the absence of improvements on cognition after MCST.²¹ Because dementia is associated with a progressive decline in cognition, participants in both the

304 MCST and the control group were likely to have shown cognitive deterioration at the
305 6 month follow-up. This decline might have limited further cognitive improvement with
306 MCST after the standard CST program. Another key finding came from a substudy of
307 the MCST trial that investigated the use of acetylcholinesterase inhibitor medication in
308 combination with MCST. The substudy found that less cognitive decline occurred in
309 the MCST group taking acetylcholinesterase inhibitor medication compared with the
310 MCST group without medication and the treatment as usual group. This finding indi-
311 cates that better results might be obtained if pharmacologic treatments are combined
312 with CST. The research team concluded that more research is needed regarding
313 continued CST because this was the first rigorous trial of MCST and the results
314 did not seem to be conclusive. However, because the significant improvements on
315 QoL owing to MCST were an encouraging finding, the research team published the
316 MCST manual.

317 318 **INDIVIDUAL COGNITIVE STIMULATION THERAPY** 319

320 With the increasing evidence for the benefits of CST and its uptake in routine ser-
321 vices, the need to offer CST through different avenues became apparent. It was
322 acknowledged that CST is not always accessible for those who are either unwilling
323 or unable to attend groups. Taking their needs and wishes in consideration, the in-
324 dividual version of CST (iCST) was developed. Unlike CST and MCST, iCST is home
325 based and is facilitated by an informal carer (eg, a family member, friend, or anyone
326 who is close to the person with dementia) or a paid carer (eg, home support
327 worker).

328 The development of iCST followed the Medical Research Council framework and
329 included several research activities.²⁴ In the first stages of development, people
330 with dementia, carers, and care staff were asked to share their feedback and thoughts
331 on the idea of iCST in an informal survey. The research team then reviewed existing
332 literature of CST, MCST, one-to-one programs of cognitive stimulation, and RO.
333 The evidence collated from the literature was then reviewed by a small group of key
334 stakeholders such as carers and health care professionals who provided their advice
335 on important considerations for the adaptation of CST to iCST. These activities led to
336 the first draft of sessions 1 to 12 of the iCST manual, which were appraised in focus
337 groups and interviews with people with dementia and carers. Participants were gener-
338 ally positive about the iCST materials and also shared their views on mentally stimu-
339 lating activities and the feasibility of iCST. The research team proceeded with a field
340 testing phase of the full program, which included both informal carers and paid carers.
341 Both quantitative (eg, questionnaires, rating of enjoyment, interest, communication,
342 and level of interest) and qualitative data (eg, through telephone support) were
343 collected. Last, a 2-stage modified Delphi consensus process (online survey and con-
344 ference) was used to reach consensus on themes that participants of focus groups,
345 interviews, and field testing could not agree on. The sample consisted of academic,
346 health care professionals, researchers, and carers.^{24,25}

347 The iCST intervention follows the same principles of group CST; however, a few ad-
348 justments had to be made to make it suitable for use at home. Instead of the introduc-
349 tion and closing element of group CST, iCST sessions begin with a discussion of
350 orientation information and current affairs followed by a themed activity. Each iCST
351 session lasts around 20 to 30 minutes and each CST and MCST session was split
352 to create 2 iCST sessions, which resulted in a 75-session program lasting over
353 25 weeks. **Box 2** gives an overview of the iCST session themes; some themes occur
354 more than once. The iCST omits the key principles geared toward the group process;

Box 2**Individual cognitive stimulation therapy session themes**

My life

Current affairs

Food

Being creative

Number games

Quiz games

Sounds

Physical games

Categorizing objects

Household treasures

Useful tips

Thinking cards

Visual clips discussion

Art discussion

Faces/scenes

Word games

Slogans (new)

Associated words discussion

Orientation

Using money

Childhood (new)

Data from Yates LA. Individual cognitive stimulation therapy (iCST). Group cognitive stimulation therapy: clinical trials. In: Yates LA, Yates J, Orrell M, et al, editors. Cognitive stimulation therapy for dementia: history, evolution and internationalism. 1st edition. Oxford (England): Routledge; 2017. p. 69–88.

rather, it stimulates discussion between the person with dementia and the carer and encourages them to enjoy the time they spend together.

The final iCST program was tested in a multicenter, single-blind, large-scale randomized, controlled trial.²⁶ A total of 356 participants were recruited from a variety of community settings and allocated to either the iCST intervention group (n = 180) or the treatment as usual control group (n = 176). All participants met the Spector and colleagues (2003) standardized criteria with the addition of the following 2 criteria: living in the community and the availability of an informal carer. The main outcome measures were cognition (ADAS-Cog)¹¹ and QoL for the person with dementia (QoL-AD),¹² and QoL of the carer (Short Form-12).²⁷ The primary and secondary outcomes measures were completed at 3 time points: baseline, first follow-up at 13 weeks, and second follow-up at 26 weeks. Throughout the trial, participants received support from the research team in the form of regular telephone support and monitoring visits. The trial results demonstrated no differences between the iCST and treatment as usual control group on any of the primary outcome measures at both follow-up time points. However, for one of the secondary outcome measures,

406 significant improvements in the quality of the caregiving relationship from the person
407 with dementia's perspective were found. For the carers, scores on a secondary QoL
408 measure (EQ-5D)²⁸ were significantly better in the iCST group at the second follow-
409 up.²⁶

410 The results of this trial are not consistent with previous CST findings and the
411 following reflections may help us to better understand the iCST evidence. Because
412 the iCST is a longer intervention, the findings might indicate that a short-term, more
413 intense dose of CST could be more beneficial or effective. The social setting provided
414 during the group CST might also be crucial to enhancing cognition and QoL; thus,
415 lacking this feature, the iCST may not elicit benefits. It is suggested, in previous
416 research, that improvements in cognition from the CST mediate improvements in
417 QoL for people with dementia.¹⁸ Hence, the lack of change in cognition experienced
418 by iCST participants could explain the lack of results on QoL. The greatest challenge
419 of the trial proved to be adherence to iCST. The research team observed that, on
420 average, dyads completed just less than one-half of the recommended 75 sessions
421 over 25 weeks. Although, before the trial, during the development phase, carers deter-
422 mined the current iCST format to be feasible, in reality carers identified several barriers
423 to delivering the intervention after the trial, such as time constraints, physical health
424 problems, and motivation.

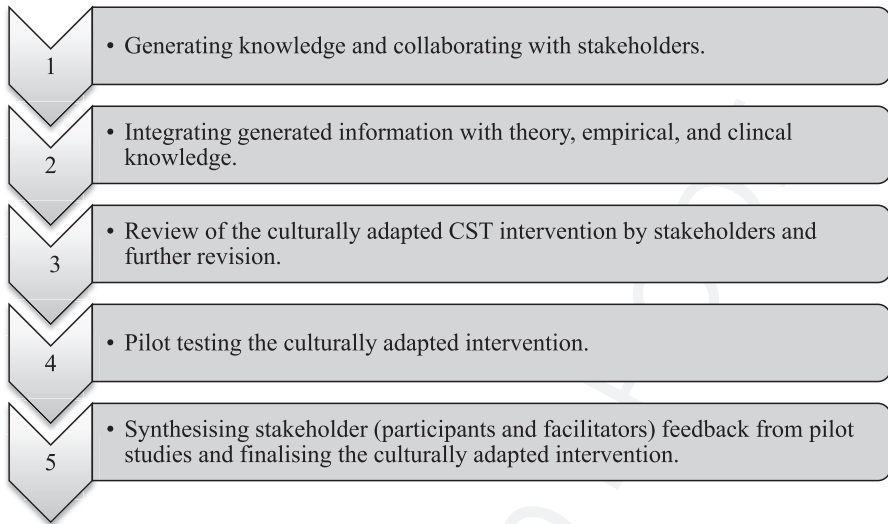
425 Despite the lack of significant effects on cognition and QoL, this trial was innovative
426 for several reasons. The iCST trial is the largest known piece of CST research to date
427 and it is the first trial investigating a home-based, carer-led format of CST. This trial
428 demonstrated that, in general, carers are able to deliver an intervention, which is a
429 key finding supporting carer-led interventions. The observed improvements in the
430 quality of the caregiving relationship are encouraging and could enhance the QoL of
431 people with dementia. The results from this trial are not conclusive and there is a
432 need for continued research on iCST to determine its exact effectiveness.

433 INTERNATIONAL COGNITIVE STIMULATION THERAPY

434 CST was initially developed and implemented in the UK and, after its success, began
435 to attract international attention. Given the cultural differences in almost every country,
436 in addition to the language barriers, it was deemed crucial to have some kind of
437 framework in place that could facilitate the adaptation of CST. Therefore, the research
438 team at UCL set out to create guidelines that could inform the process of adapting
439 and translating the CST content and structure without compromising on its
440 effectiveness.²⁹

441 The research team reviewed existing frameworks and theoretic methods that have
442 been developed to guide the cultural adaptation of existing interventions. Of the
443 frameworks reviewed, the formative method for adapting psychotherapy was chosen
444 to develop the CST guidelines owing to its community-based developmental
445 approach.³⁰ This is a bottom-up approach in which people with dementia and other
446 service users are consulted as a preliminary step to uncover their ideas and opinions
447 (eg, how dementia is perceived in their culture). This step is essential because it pro-
448 vides an early understanding of how CST can be catered toward the needs of service
449 users in that specific country. The formative method for adapting psychotherapy
450 approach together with evidence from existing international CST groups resulted in
451 guidelines consisting of 5 phases, which are described in [Fig. 1](#).

452 Currently, CST is used in all of the following developed and developing countries:
453 Australia, Brazil, Canada, Chile, China, Denmark, Germany, Greece, Hong Kong, In-
454 dia, Israel, Italy, Ireland, Indonesia, Japan, Nepal, the Netherlands, New Zealand,



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Fig. 1. The 5 phases of cognitive stimulation therapy adaptation guidelines.

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Nigeria, Philippines, Portugal, Singapore, South Africa, South Korea, Tanzania, Turkey, and the United States.³¹ CST is especially relevant for developing countries because it provides an effective low-cost intervention to help improve cognition and QoL. Establishing the international CST center at UCL has been a crucial step toward making CST more widely available because the center has been facilitating collaborations and knowledge exchange between the more than 25 countries currently offering CST.

COGNITIVE STIMULATION THERAPY IN THE UNITED STATES: A CASE STUDY

CST has been successfully adapted and implemented in the United States.³² The first comprehensive CST program was developed at the Perry County Memorial Hospital, a small rural hospital in southeastern Missouri. Before its development, professionals received visits and CST training from members of the UCL research team. CST was found to be easily adaptable for the US population because the language barrier was minimal and sessions that focused on universal topics such as faces and scenes or food allowed for cultural adaptation.³² After the adaptation of group CST, researchers compared pre-CST and post-CST data among both community-based and residential-dwelling people with dementia ($n = 79$) in which they found scores for cognition and QoL to be higher after the CST. These findings have been encouraging and allowed for the expansion of CST at Perry County Memorial Hospital from one, 6-member CST group to 10 CST groups currently running every week catering for 90 people with dementia. With regard to iCST, a family carer (daughter of a person with dementia) evaluated it quite positively as illustrated by the following quote:

From discussion they had over architecture to deep thoughts on top news stories to exploring timeless paintings to simply relishing in discussing the glorious days of old, dad lover every moment. These weekly visits continued throughout dad's stay in the hospital and extended to his home post discharge. Dad would continue on in thought and articulate communication. Their session bled over into the everyday. And over time, dad became increasingly more fluent and lucid.

508 The US research team continues to provide CST training around the country and
509 plans to establish a US CST National Training Center are underway. The team hopes
510 to publish an adapted CST manual in the near future.

511 SUMMARY AND FUTURE DIRECTIONS

512 The CST journey has spanned for more than 20 years so far and innovations continue
513 to be made in this field. When CST was developed, it helped to fill the existing gap in
514 evidence-based psychological treatments for people with dementia. In this regard, it
515 can be seen as a fundamental step toward shifting some of the focus from pharmaco-
516 logic treatments to psychological ones. The positive effects of CST further amplified
517 the importance of looking beyond antidementia medication and it fueled the realization
518 that the two might actually provide the most optimal benefits to people with dementia
519 when combined. Findings regarding experiences of people with dementia were just as
520 encouraging; people have reported enjoyment and even increased confidence after
521 CST. Therefore, CST has managed to provide both a meaningful and stimulating
522 way for people with dementia to spend their time. The success of the original group
523 CST made it possible to go even further and develop extensions of group CST
524 ensuring that the intervention can be offered to people with different needs. In addition,
525 the adaptation guidelines made it possible for CST to successfully be adapted
526 and offered in a variety of countries around the world.

527 Still, there is more to be explored in the field of CST because some questions remain
528 unanswered. The optimal dose for long-term CST is unknown and future research
529 could help to give an indication of what the most beneficial duration and frequency
530 of CST could be. Other work could focus on experimenting with iCST; for example,
531 enhancing methods of support and training could help to improve adherence. In terms
532 of exploring different platforms for CST, incorporating technology seems to be an
533 attractive option; the use of technology can benefit the cognitive functioning of older
534 people. A pilot study in Italy has investigated a tablet-based version of CST that can be
535 delivered at home.³³ Results suggest the need for more research in this area.

536 For the future, we hope to maintain this growth of CST and explore different avenues
537 for offering CST on both a national and international level. We aim to continue connecting
538 stakeholders from around the world at our CST conferences and generate
539 ideas and discussions on what works and what can be done even better. This would
540 help to create an even better understanding of CST and encourage other researchers
541 and clinicians to explore the field of CST so that CST will continue to be available to
542 people with dementia who want and need it.

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