Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Avista

Trinity Centre for Ageing and Intellectual Disability

Engaging the Brain Through Cognitive Stimulation Therapy (CST)

A Feasibility Randomised Controlled Trial for Adults with an Intellectual Disability.

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A Message from Pamela Dunne, Advanced Nurse Practitioner in Dementia, Avista

It is with great pleasure that I reflect on the results of our recent collaboration with the Trinity Centre for Ageing and Intellectual Disability (TCAID). This feasibility study has been a vital step forward in our mission to enhance the lives of people with intellectual disabilities who are at risk of dementia.

From my clinical perspective, the most encouraging finding is the high level of engagement we saw from participants. Not only was the Cognitive Stimulation Therapy (CST) programme acceptable to the individuals we support, but the high attendance and retention rates demonstrate that it can be practically and effectively delivered within our day services. Avista's mission is to work together with people to live their best lives through the delivery of quality services and this study is testament to our person-centered approach and the dedication of our staff.

This partnership has proven that by working together, we can translate complex research into tangible, real-world supports that truly make a difference. In our current strategic plan, Avista has shown its commitment to develop specialist services in line with national policy and in collaboration with stakeholders like TCAID. Looking ahead, Avista is committed to integrating CST into our services across Dublin, Limerick and north Tipperary. We will continue to build on this success by refining our training, sharing resources, and ensuring that our post-diagnostic care model is a national leader in enhancing the wellbeing and dignity of people with intellectual disabilities.

A Message from Prof Mary McCarron, Director of The Trinity Centre for Ageing and Intellectual Disability (TCAID)

This pioneering feasibility study marks a significant collaboration between Avista clinicians and researchers at the Trinity Centre for Ageing and Intellectual Disability (TCAID). Together, we addressed a critical gap in care: the limited availability of non-pharmacological, post-diagnostic interventions for people with intellectual disabilities at increased risk of dementia.

As life expectancy rises, there is an urgent need for practical, person-centered, and evidence-based supports. This project demonstrates that Cognitive Stimulation Therapy (CST) can be delivered effectively within day services, promoting healthy ageing and improved quality of life for this population.

Our partnership has shown CST to be both feasible and highly acceptable, offering a scalable, inclusive model of care. To build on this success, the next steps include larger trials, long-term impact evaluation, and embedding CST into routine service delivery through continued training, resource refinement, and policy support.

Avista is committed to expanding CST across its services, and TCAID will continue to guide its evaluation. Together, we aim to make CST a core part of post-diagnostic care—enhancing inclusion, dignity, and wellbeing for people with intellectual disabilities across Ireland.

Acknowledgements

The ‘Engaging the brain through cognitive stimulation therapy’ research team would like to sincerely thank all the participants who committed their time in taking part in the CST groups over seven weeks. Your contributions, insights, and enthusiasm made this project both possible and enjoyable.

We are also so grateful to the management and day service staff at Avista for their ongoing support particularly the Clinical Nurse specialists in the Memory Assessment and Post-diagnostic Support Services: Catherine O’Loughlin, Lynn Galligan, Louise O’Reilly and Marleen Hynes. Their roles as group facilitators and data collectors were essential to achieving the project’s objectives.

Our heartfelt thanks go to the international advisory panel, for their valuable guidance. We are especially grateful to Dr Afia Ali and Professor Angela Hassiotis, for generously sharing their expertise and key resources, including the CST Supplementary manual with adaptations for people with intellectual disabilities.

We would also like to acknowledge the TCAID PPI panel members with lived experience of intellectual disability, whose ongoing involvement helped ensure the research remained accessible and meaningful to participants.

Finally, we extend our sincere appreciation to Anne Brennan, and the Nursing & Midwifery Planning & Development Unit, HSE Dublin North East for funding this project. Your support made this journey possible.

Project Team

Ms Pamela Dunne, Principal Investigator, Avista.

Prof Mary McCarron, Principal Investigator, TCD.

Ms Iara Faria Synnott, Research Assistant, TCD.

Ms Pavithra, Research Assistant, TCD.

Collaborators

Ms Lisa Lavelle, Director of Nursing, Avista.

Prof Philip McCallion, Senior Academic Advisor to IDS-TILDA and Professor of Social Work, Temple University, Philadelphia, Pennsylvania, USA.

Ms Catherine O'Loughlin, Clinical Nurse Specialist in Dementia, Avista.

Ms Lynn Galligan, Clinical Nurse Specialist in Dementia, Avista.

Ms Louise O'Reilly, Clinical Nurse Specialist in Dementia, Avista.

Ms Marleen Hynes, Clinical Nurse Specialist in Dementia, Avista.

Expert Advisory Panel

Dr Afia Ali, Dr Eimear McGlinchey, Ms Evelyn Reilly, Mr James Kelly, Ms Marianne Fallon, Ms Martina Leigh, Ms Mei Lin Yap, Dr Michelle Kelly, Dr Sean Shanahan.

Table of Contents

List of Tables

2. Methodology

3. Findings

List of Figures

2. Background

3. Findings

List of Abbreviations

ANP - Advanced Nurse Practitioner

CNS - Clinical Nurse Specialist

CRS - Community residential services

CST - Cognitive Stimulation Therapy

DS - Down Syndrome

GF - Group Facilitator

HSE - Health Service Executive

NMPDU - Nursing and Midwifery Planning and Development Unit

PFR - Participant Feedback Recorded

PPI - Public and Patient Involvement

TCD - Trinity College Dublin

TCAID - Trinity Centre for Ageing and Intellectual Disability

1. Background

People with intellectual disability are living longer, and this increase in lifespan reflects advancements in healthcare, inclusion, and community-based supports (McCarron et al., 2011). This longevity also increases the risk of complex health conditions associated with age, such as dementia (McCarron et al., 2023). In Ireland, there are currently over 64,000 people living with dementia, and this number is expected to double in the coming decades (HSE, 2020; HSE, 2023). Previous evidence suggested that the incidence of dementia among people with intellectual disabilities was comparable to that of the general population (Zigman, 2004). However, more recent literature indicates that the incidence could be up to five times higher in this population (Strydom et al., 2013), with rates significantly elevated among individuals with Down syndrome (DS) (McCarron et al., 2014, 2017; Strydom et al., 2010).

This increased prevalence is likely due to lower cognitive reserve associated with pre-existing cognitive impairments, which may accelerate the onset of symptoms once neuropathological changes occur (Strydom et al., 2013). Down syndrome, the most common genetic cause of intellectual disability, is classified as a genetically determined form of Alzheimer's disease. The presence of trisomy 21 leads to triplication of the amyloid precursor protein (APP) gene, resulting in the overproduction of amyloid-β plaques, which contribute to the development of dementia (Fortea et al., 2021). Consequently, people with DS tend to receive a dementia diagnosis earlier than those with other causes of intellectual diability, with the average age of diagnosis being 55 years for individuals with DS (McCarron et al., 2014; McCarron, 2017), compared to 70–74 years in people with intellectual disability of other aetiologies (Strydom, 2013).

The updated Lancet Commission report (2024) reaffirmed the potential for reducing dementia risk through interventions targeting 14 modifiable risk factors. Individuals with intellectual disabilities, including those with DS, often experience limited social networks, reduced educational and employment opportunities, and lower levels of physical activity—factors all associated with increased dementia risk (McCausland et al., 2016; Burke et al., 2014; McCarron et al., 2011). As such, it is critical to include individuals at higher risk of developing dementia in research, especially adults with intellectual disability, to explore the benefits of non-pharmacological interventions targeting these modifiable risks.

Cognitive Stimulation Therapy (CST) is an evidence-based, non-pharmacological intervention shown to improve cognition and quality of life in people with dementia (Saragih, 2022). The National Institute for Health and Care Excellence (NICE, 2018) recommends the use of such interventions to enhance cognition or mitigate cognitive decline in individuals with dementia. In Ireland, the Health Service Executive's Model of Care for Dementia (2023) has endorsed CST as a recommended therapeutic option (Kelly et al., 2024). Adults ageing with an intellectual disability, particularly those with

Down syndrome, may similarly benefit from evidence-based interventions such as CST.

Given that Cognitive Stimulation Therapy (CST) was originally designed for individuals with dementia, and that there is currently limited empirical evidence supporting its feasibility in populations with intellectual disabilities, it advances the translation of interventions and is ethically appropriate to begin looking at the feasibility of introducing CST to individuals with intellectual disability who are at risk of developing dementia. Necessary adaptations and the assessment of key feasibility parameters will then be established before extending the intervention to individuals with co-occurring intellectual disability and dementia. The present study intentionally included only individuals with intellectual disability without a formal dementia diagnosis, to better evaluate the feasibility of CST within a more controlled and less clinically complex population of people with intellectual disability.

According to the Medical Research Council (MRC) guidance for developing and evaluating complex interventions (Craig et al., 2008), an initial feasibility and piloting phase is essential for testing procedures, estimating recruitment and retention rates, and informing sample size calculations. The updated framework (Skivington et al., 2021) further emphasizes the importance of establishing intervention feasibility and efficacy in controlled settings before proceeding to effectiveness trials in real-world environments.

The programme developed by Spector et al. (2003) is typically delivered in 14 sessions over 7 weeks, consisting of twice-weekly 45-minute sessions, with an optimum group size of 5 participants

The 14 sessions involved activities to stimulate cognitive abilities like executive function using word tasks, number association games, orientation, and reminiscence (Spector et al 2003; Ali et al 2023). The programme begins with participants choosing a name and a song for their group. The group's name, along with details such as the date, time, weather, and location, is showed on an 'orientation board.' The introduction of each session also involves a conversation about the group’s theme song and weekly news. The CST manual offers two levels of activities tailored to the needs and abilities of the groups. An intellectual disability-specific supplementary version to the CST manual was developed (Ali et al., 2023). All sessions and activities were modified to suit this population, offering person-centred alternatives more responsive to interests and ability of the group.

1.1 Project Objectives

The aim of the project was to investigate the feasibility of implementing group Cognitive Stimulation Therapy (CST) with adults who have an intellectual disability and are at risk of developing dementia. For this purpose, the supplement to the CST manual, an adaptation for people with intellectual disability (Ali et al., 2023) was used.

More specifically, the primary objectives were to explore:

Figure 1. 1: Primary Project Objectives

Secondary objectives examined the impact of group CST on cognition, quality of life and global function using standardised outcome measures completed at baseline and post intervention.

Figure 1. 2: Secondary Project Objectives

2. Methodology

2.1 Ethical Considerations

Ethical approval was granted for the project by the Faculty of Health Sciences, Trinity College Dublin and Avista CLG research ethics committee.

An accessible, easy-to-read information pack was provided to all potential participants with an intellectual disability. Selected individuals were invited to meet with the researchers, who offered further explanation of the project and supported them in making an informed, independent decision about participation.

Informed consent was obtained from all self-consenting participants, facilitated through the use of easy-to-read materials and total communication approach employed by the researchers.

Validation by the TCAID PPI panel-comprising of adults with lived experience of intellectual disability was integrated into every element of the proposed project.

This included:

1. Consultation with TCAID Ambassador liaison officer, an employee with intellectual disability, and the PPI Panel in the development of accessible project materials, such as evaluation forms.
2. Collaboration with the same stakeholders in designing accessible content and reports for dissemination.
3. Active participation of the TCAID Ambassador liaison officer in user-led knowledge exchange events

2.2 Study Design

This study employed a **mixed-methods convergent design**, integrating both quantitative and qualitative approaches to explore the feasibility and acceptability of delivering group Cognitive Stimulation Therapy (CST) to adults with Intellectual disabilities.

2.2.1 Participant Recruitment and Allocation

Participants were recruited from **Avista day and residential services**.

Inclusion criteria:	Exclusion criteria:
• Adults with mild to moderate level of intellectual disability. • Ability to provide explicit consent. • Age criteria for individuals with Down syndrome: 35 and above. • Age criteria for individuals with intellectual disability from other aetiology: 50 years and above.	• Diagnosis of dementia. • Adults under the age of 35 years • Adults with severe to profound levels of intellectual disability

Two hundred and fifty accessible, easy-to-read information packs were distributed, resulting in 56 expressions of interest. Following the application of inclusion and exclusion criteria, 30 individuals with intellectual disabilities were deemed eligible to participate in the study.

Table 2. 1: Participant Allocation by Site and Group

Site	Total Participants	Intervention Group	Control Group
Group 1	12	6	6
Group 2	9	5	4
Group 3	9	6	3
Total	**30**	**17**	**13**

Note: *Each of the three CST intervention groups were formed in accordance with CST guidelines, with 5–6 participants per session to promote optimal engagement and group cohesion.*

Following confirmation of eligibility, potential participants were invited to meet with the research team. During these meetings, the project was explained in an accessible format, and individuals were supported to ask questions and make an informed, independent decision about participation.

Cluster randomisation then established the conditions, with three clusters formed based on geographical location following the expression of interests. These clusters were then randomly assigned to an intervention group and a control group. The use

of clusters was intended to promote equitable access and reduce travel burden for participants. All participants received a baseline assessment.

The intervention group received CST twice a week for 45 minutes, over a period of 7 weeks. The program began, while the control group received usual care. The CST intervention group started within 10-15 days of baseline assessments. In contrast, the control group continued with usual care during this period. The post-intervention assessments were carried out for all the participants within 2 weeks of completing the 7-week CST programme. For ethical and for moral reasons, the control group was offered CST after all post-intervention assessments were completed. Delivery and timing were the same regardless of geographic location.

Both the intervention group as well as the control group finished the baseline (T1) and post-intervention (T2) assessments. However, data used to address the primary objectives of the study - namely feasibility and acceptability -were collected only from the intervention group via a 'participant feedback' form and 'facilitator's observation log'. All assessments and data collection were conducted by an Advanced Nurse Practitioner (ANP) and Clinical Nurse Specialists (CNSs) in Avista Memory Assessment and Post Diagnostic Support Service.

2.3 Sample and Baseline Characteristics

Table 2. 2: Participant Demographics and Baseline Assessment Score

Characteristics	Intervention Group (n=17)	Control Group (n=13)	All (n=30)
Age mean (s.d.)	50.2 (8.0)	52.4(7.6)	51.6 (8.1)
Age (Down Syndrome) mean (s.d.)	44.5 (6.7)	44.8 (3.7)	44.6 (5.6)
Age (Intellectual disability other aetiology) mean (s.d.)	56.5 (3.3)	57.1 (4.9)	56.8 (4.0)
Female: Male ratio	4.7:1 (14,3)	3.3:1 (10,3)	4.0:1 (24, 6)
Level of Intellectual Disability (Moderate: Mild ratio)	2.4:1 (12, 5)	3.3:1 (10, 3)	2.7: (22, 8)
CAMCOG-DS mean (s.d.)	64.9 (12.3)	65.9 (17.1)	65.3 (14.2)
HRQoL-16 mean (s.d.)	62.3 (6.6)	63.9 (5.5)	63.0 (6.0)
OARS mode (range)	4 (4 to 5)	4 (2 to 5)	4 (2 to 5)

There were no statistically significant differences in demographics and baseline assessment scores between the intervention and control groups, indicating the groups were comparable at baseline. Variables such as age, gender, type of intellectual disability and level of intellectual disability showed similar distributions across groups, reducing the likelihood of demographic factors influencing study outcomes.

2.4 Procedure

The intervention was delivered by the Advanced Nurse Practitioner (ANP) and Clinical Nurse Specialists (CNSs) in Avista Memory Assessment and Post Diagnostic Support Service, with support from day-service staff. A total of 16 Avista staff from day services and the Memory Assessment and Post-diagnostic Support Services, completed a one-day Cognitive Stimulation Therapy (CST) training workshop delivered through the Engaging Dementia network.

In line with CST guidelines, each group was consistently facilitated by two trained staff members. To ensure fidelity in programme delivery, all CNSs and ANP also undertook a calibration session using the supplementary CST manual adapted for people with intellectual disabilities (Ali et al., 2023). This additional training, provided by Trinity College researchers, reviewed each of the 14 person-centred CST sessions and included an assessment component. Facilitators were required to achieve a minimum score of 80% on a post-training questionnaire to be certified for delivery.

The intervention was implemented across three Avista centres, with each assigned a designated space for the duration of the programme. CST sessions were delivered twice weekly for 45 minutes for 7 weeks. Each session was structured into three segments:

Opening (15 minutes): Group members recalled the group name, sang the CST theme song, and reviewed the session agenda.

Main Activity (25 minutes): The core therapeutic activity, designed around a specific theme was conducted.

Closure (5 minutes): The group summarised the session's content, and facilitators introduced the theme for the next session.

2.4.1 Outcome Measurements

Data addressing the primary objectives of the study - feasibility and acceptability were collected using the ‘Participant Feedback Form’ and the ‘Facilitator’s Observation Log’, completed exclusively for the intervention group. These tools captured both quantitative and qualitative data.

After each of the 14 CST sessions, participants remained for additional minutes to complete an easy-to-read feedback form, co-developed with input from the TCAID PPI

Panel, ensuring accessibility and relevance. The form included 7 items with a 3-point response scale: 'yes/ I don't know/ 'no' questions addressing enjoyment, perceived difficulty of the activity, and willingness to repeat the activity. It also included open-ended questions where participants could describe their favourite part of the session or identify anything they found difficult.

Similarly, the Facilitator's Observation Log was completed by group facilitators after each session for each participant. This tool gathered observations related to engagement levels, activity difficulty, frequency of breaks, and other relevant indicators of participant experience and session delivery.

To address the secondary objectives, standardised outcome measures were used to evaluate changes over time in cognition, global functioning, and health-related quality of life. The following instruments were employed:

- The CAMCOG-DS II (Cambridge Cognitive Examination for Older Adults with Down's Syndrome- Second Edition):
  A validated and reliable cognitive screening tool designed for individuals with mild to moderate intellectual disabilities. It is particularly effective for detecting and monitoring cognitive decline and dementia in individuals with Down Syndrome, with minimal floor and ceiling effects. (Nadeau et al 2023) Recent studies have also highlighted its high completion rates and applicability across diverse cultural settings (Ivain et al 2025).

- The OARS (Older Americans Resources and Services) Multidimensional Functional Assessment questionnaire (OMFAQ) Activities of Daily Living section:
  A widely used, validated instrument for assessing global functioning in older adults. The ADL section provides a concise overview of an individual's ability to perform essential daily tasks independently (Haywood et al, 2006).

- HRQoL-IDD-16 (Health-Related Quality of Life for Individuals with Intellectual and Developmental Disabilities):
  A valuable self-reported measure tailored for adults with mild to moderate intellectual and developmental disabilities living in community settings. While quality-of-life assessments often rely on proxy reporting due to their complexity, there is increasing recognition of the importance of capturing the authentic voices of individuals with intellectual disability. This measure is designed to be accessible and supports participants in expressing their own lived experiences (Pett et al, 2021).

2.5 Data Analysis

A mixed-methods approach was employed to analyse the data collected in this study. This comprehensive strategy was chosen to enhance understanding by integrating the

breadth of quantitative findings with the depth of qualitative insights (Creswell & Plano Clark, 2018). The concurrent use of both data types allowed for a more nuanced interpretation of the feasibility and acceptability of delivering group CST to adults with intellectual disabilities.

The integration of quantitative and qualitative findings during the interpretation phase enabled a comprehensive assessment of the intervention's feasibility, helping to identify both measurable outcomes and contextual factors that influenced participant experience and implementation success.

2.5.1 Quantitative Data

Quantitative data from participant feedback forms and standardised outcome measures (CAMCOG-DS II, OARS ADL, and HRQoL-IDD-16) were analysed using descriptive statistics to summarise central tendencies (e.g., means, medians) and variation (e.g., standard deviation). These results provided a snapshot of participant engagement, cognitive functioning, quality of life, and global functioning before and after the intervention. Pre to post-comparisons to address secondary objectives utilised repeated measures ANOVA and Mann–Whitney U test.

2.5.2 Qualitative Data

A reflexive thematic analysis was conducted following the framework outlined by Braun and Clarke (2006, 2021) to analyse qualitative data collected from group facilitators through observation notes and focus groups. This method was selected for its flexibility and systematic approach, which supports the exploration of both anticipated and unexpected patterns within the data. This involved a systematic process of coding, identifying patterns, and grouping responses, generating themes that reflected participants' experiences and the practical considerations of delivering CST in this context.

The qualitative component validated and enriched the quantitative findings, identifying key patterns and overarching themes through inductive and data-driven interpretation. This allowed for the emergence of themes that were grounded in the data rather than driven by pre-existing theories.

This mixed-methods convergent design ensured the findings were underpinned in the lived experiences and perspectives of the participants, capturing nuances and insights that may not have been anticipated before this feasibility study.

3. Findings

3.1 Feasibility of Recruitment and Retention

Recruitment information packs were distributed to a total of 250 adult potential participants attending Avista Day and residential services. From these, expressions of interest were received from 56 individuals (22.4%) of the packs sent. All 56 potential participants were screened to confirm whether they met the eligibility criteria, resulting in 53.5% (n=30 eligible) participants (53.5%), all of whom consented to take part, representing a 100% consent rate among eligible individuals.

Importantly, the study achieved a 100% retention rate, with no dropouts throughout the duration of the intervention. All enrolled participants took part in the study as planned. However, assessments at both time points (T1 and T2) could not be completed for one participant (3.33%) due to response acquiescence bias (answered yes to all items) at baseline (T1) and there were scheduling difficulties at follow-up (T2).

3.2. Feasibility of Implementation

3.2.1 Logistics

The study was implemented across three Avista day-service locations, with each group allocated a dedicated room that was reserved for the seven-week intervention period. These rooms were selected to ensure they provided adequate space for participants, facilitators, and required materials or equipment. Each group was supported by a minimum of two trained facilitators, who delivered all sessions consistently throughout the intervention, in line with CST guidelines. Based on these logistical arrangements, the implementation of the programme was deemed feasible.

Scheduling feasibility was also evaluated, particularly concerning the time of day that sessions were conducted. Of the total sessions delivered, 54.8% were conducted in the morning, while 45.2% were in the afternoon. A chi-square test revealed no significant association between session timing and participant attendance ($p > 0.05$), suggesting that flexibility in session scheduling did not negatively impact participation.

While the standard CST manual recommends a 45-minute session duration, adjustments were made to meet the needs of participants with an intellectual disability. On average sessions lasted 53 minutes, reflecting the additional time required for reasonable accommodations, participant engagement, and completion of feedback forms at the end of each session. These modifications were necessary to ensure that the intervention remained inclusive and person-centred for this population.

3.3 Overall Adherence

Adherence to the Cognitive Stimulation Therapy (CST) programme was strong across the intervention group. Individual attendance ranged from 8 to 14 sessions out of the total 14 delivered.

- **94.1% (n = 16)** of participants attended **more than 70%** of the sessions (i.e., 10 sessions or more).
- **Only 5.9% (n = 1)** participant attended **fewer than 70%** of sessions.
- **17.6% (n = 3)** of participants **achieved full attendance**, completing all 14 sessions.

On average, participants attended 11 out of 14 sessions, resulting in an average **adherence rate of 78.5%.** These figures indicate a high level of engagement and consistency, suggesting that the intervention was acceptable and manageable for the majority of participants with intellectual disabilities.

Attendance was further analysed at the session level, focusing on the number of participants attending each session across all groups. As presented in Table 3.1, full attendance (n = 17; 100%) was recorded in two sessions:

- Session 6: Faces and Scenes,
- Session 12: Number Games.

The lowest attendance was observed in Session 8: Being Creative, with 10 participants attending (58.8%). Attendance for all other sessions ranged from 12-16 participants, representing 70.5% to 94.1% attendance rates.

Reasons for non-attendance were well documented for sessions 1 to 9 but were not consistently reported from Session 10 onward. Analysis of attendance patterns revealed no clear trends or systematic drop-offs related to the order of sessions; absences appeared random across the programme.

Overall, across the sessions:

- **7.1% (n = 17)** of absences were attributed to appointments or illness.
- **10.1% (n = 24)** of absences occurred without an explanation.

These findings reflect a generally high level of session-by-session attendance, further supporting the feasibility of CST delivery within this population.

Table 3. 1: Attendance for Each Session by Each Intervention Group

Session name & number	Attendance	Absence
Session 1 Physical Games	14 (1 group of 4, 2 groups of 5)	3 (2 appointment or sickness, 1 reason not mentioned)
Session 2 Sound	16 (2 groups of 5, 1 group of 6)	1 (1 appointment or sickness)
Session 3 Childhood	12 (1 group of 3, 1 group of 4, 1 group of 5)	5 (5 appointment or sickness)
Session 4 Food	13 (1 group of 3, 2 groups of 5)	4 (4 appointment or sickness)
Session 5 Current Affairs	14 (1 group of 3, 1 group of 5, 1 group of 6)	3 (1 appointment or sickness, 2 reason not mentioned)
Session 6 Faces and Scenes	**17** (1 group of 5, 2 groups of 6)	0
Session 7 Word Association	14 (2 groups of 4, 1 group of 6)	3 (3 reason not mentioned)
Session 8 Being Creative	10 (2 groups of 3, 1 group of 4)	7 (3 appointment or sickness, 4 reason not mentioned)
Session 9 Categorising Objects	14 (2 groups of 4, 1 group of 6)	3 (1 appointment or sickness, 2 reason not mentioned)
Session 10 orientation	15 (1 group of 4, 1 group of 5, 1 group of 6)	2 (2 reason not mentioned)
Session 11 Using Money	16 (2 groups of 5, 1 group of 6)	1 (1 reason not mentioned)
Session 12 Number Games	**17** (1 group of 5, 2 groups of 6)	0
Session 13 Word Games	12 (2 groups of 3, 1 group of 6)	5 (5 reason not mentioned)
Session14 Team quiz	13 (1 group of 3, 1 group of 4, 1 group of 6)	4 (4 reason not mentioned)

3.3.1 Session-Level Adherence

Data were analysed for 17 participants across 14 sessions, resulting in 238 possible data points per domain (14 sessions × 17 participants).

- **Full session attendance** was achieved in **95.4%** of instances (n = 188).
- **Activity completion** was achieved in **99.0%** of instances (n = 194).

Adherence was also assessed in two domains:

Full session attendance defined as participants being present from beginning to end of each session and activity completion defined as participants fully engaging in and completing the session's core activity.

Levels on non-attendance appeared to occur at random and were not linked to any specific site or cluster suggesting it was unlikely influenced by location related factors.

These findings demonstrate **a consistently high level of engagement and adherence** across the intervention period, **reinforcing the feasibility and acceptability** of delivering CST to adults with intellectual disabilities in a group format.

3.4 Group Size and Session Attendance

Although the three intervention groups were initially formed with five or six participants, occasional absenteeism led to some variation. Across the 42 total sessions (14 sessions × 3 groups), group size per session ranged from three to six participants. No session was conducted with fewer than three attendees.

Table 3. 2: Distribution of Group Sizes Across Sessions (n = 42 sessions)

Group Size	Number of Sessions	Percentage (%)
6 participants	12	28.6%
5 participants	13	31.0%
4 participants	9	21.4%
3 participants	8	19.0%

Table 3. 3: Individual-Level Attendance by Group Size (n = 197 recorded instances)

Group Size	Number of Attendances	Percentage (%)
6 participants	72	36.5%
5 participants	65	33.0%
4 participants	36	18.3%
3 participants	24	12.2%

Despite variability, most sessions adhered to CST recommendations for optimal group size (5–6 participants), with only a minority conducted at the minimum threshold of 3 participants. This distribution supports the feasibility of maintaining engagement even with fluctuating attendance.

3.4.1 Participant Engagement

Participant engagement and session dynamics were documented through the Group Facilitator's Form, which captured observations on engagement levels, activity completion, and the number of breaks taken. Concurrently, participants completed the Participant Feedback Form with support, documenting their subjective experience of each session.

These data offer insight into how fluctuations in group size may impact session quality and participant engagement in real-world settings, supporting future planning for optimal group dynamics.

Table 3. 4: Engagement with Group Facilitator, Peers/Group, and Activity in Each Group Size

Group size	Engagement	Fully	Partially	Did not engage	Missing
3	With Group Facilitator	87.5% (n=21)	8.3% (n=2)	0%	4.2% (n=1)
	With the Group	91.7% (n=22)	8.3% (n=2)	0%	0%
	With the Activity	91.7% (n=22)	4.2% (n=1)	4.2% (n=1)	0%
4	With Group Facilitator	94.4% (n=34)	5.6% (n=2)	0%	0%
	With the Group	86.1% (n=31)	11.1% (n=4)	2.8% (n=1)	0%
	With the Activity	80.6% (n=29)	11.1% (n=4)	5.6% (n=2)	2.8% (n=1)
5	With Group Facilitator	83.1% (n=54)	12.3% (n=8)	4.6% (n=3)	0%
	With the Group	89.2% (n=58)	7.7% (n=5)	3.1% (n=2)	0%
	With the Activity	81.5% (n=53)	13.8% (n=9)	4.6% (n=3)	0%
6	With Group Facilitator	95.8% (n=69)	2.8% (n=2)	1.4% (n=1)	0%
	With the Group	95.8% (n=69)	1.4% (n=1)	2.8% (n=2)	0%
	With the Activity	84.7% (n=61)	11.1% (n=8)	4.2% (n=3)	0%

Table 3. 5: Activity Completion with Support or Independently in Each Group Size

Activity completion				
Group size	**Fully independently**	**With support**	**Did not complete**	**Missing**
3	62.5% (n=15)	33.3% (n=8)	4.2% (n=1)	0%
4	75% (n=27)	25% (n=9)	0%	0%
5	70.8% (n=46)	29.2% (n=19)	0%	0%
6	80.6% (n=58)	16.7% (n=12)	1.4% (n=1)	1.4% (n=1)

Table 3. 6: Number of Breaks Required in Each Group Size

Number of breaks			
Group size	**1**	**2**	**3**
3	8.3% (n=2)	0%	0%
4	13.9% (n=5)	2.8% (n=1)	0%
5	12.3% (n=8)	1.5% (n=1)	1.5% (n=1)
6	0%	0%	0%

Analysis of participant engagement across different group sizes revealed distinct facilitator interaction, peer interaction, and activity completion.

Full engagement with both the facilitator and peers was most frequently observed in the sessions involving six participants, suggesting that the largest group size fostered more dynamic group interactions. Interestingly, engagement with the activity itself, such as active participation in exercises and task focus, was highest in sessions with only three participants, possibly due to increased individual attention and reduced social distraction.

However, despite the increased activity engagement observed in smaller groups, the proportion of participants who did not engage with the activity in the three-person groups was comparable to that of larger group sizes, indicating variability and overall high engagement in individual responsiveness regardless of group size.

Of particular note, the highest rate of activity non-completion was recorded in sessions with three participants, suggesting that while smaller groups may enhance focus for some, they might not consistently support sustained participation across all individuals. In contrast, activity completion rates were highest in groups of four and five, with all participants completing the tasks, either independently or with support from facilitators.

Regarding the need for breaks, participants in groups of six did not require any breaks during sessions. Conversely, in all other group sizes (three, four, and five participants), at least one participant required a break per session, with between one and three breaks being recorded.

3.5 Acceptability

3.5.1 Enjoyment Ratings by Session

Enjoyment was the most positively endorsed domain, with **100% of participants reporting enjoyment in 6 of the 14 CST sessions.**

Table 3. 7: Sessions with 100% Enjoyment Ratings

Session	Theme	Enjoyment (%)	n
Session 1	Physical Games	100%	14
Session 2	Sound	100%	16
Session 9	Categorising Objects	100%	14
Session 11	Using Money	100%	16
Session 12	Number Games	100%	17
Session 13	Word Games	100%	12

Table 3. 8: Sessions with High (but <100%) Enjoyment Ratings

Session	Theme	Enjoyment (%)	n
Session 5	Current Affairs	92.9%	13
Session 7	Word Association	92.9%	13
Session 10	Orientation	93.3%	14

Table 3. 9: Sessions with Lower Enjoyment Ratings

Session	Theme	Enjoyment	n
Session 4	Food	76.9%	10
Session 14	Team Quiz	84.6%	11

3.5.2 Perceived Ease and Difficulty

Most participants reported finding CST activities easy, indicating that the content was well-matched to their abilities.

Table 3. 10: Sessions Rated as Easy by ≥90% of Participants

Session	Theme	Easy (%)	n
Session 3	Childhood	91.7%	11
Session 5	Current Affairs	92.9%	13
Session 6	Faces and Scenes	94.1%	16
Session 8	Being Creative	90.0%	9
Session 9	Categorising Objects	92.9%	13
Session 13	Word Games	91.7%	11

Table 3. 11: Sessions Most Frequently Reported as Difficult

Session	Theme	Difficult (%)	n
Session 3	Childhood	33.3%	4
Session 4	Food	30.8%	4
Session 7	Word Association	28.6%	4

Participant feedback indicated high acceptability of the CST programme, with enjoyment emerging as the most positively endorsed domain. Six sessions were universally enjoyed (100% of participants), particularly those involving games and practical themes. Most sessions were perceived as easy, reflecting appropriate adaptation of content for individuals with intellectual disabilities. While a small number

of sessions were rated as more challenging, overall engagement and satisfaction levels remained consistently high across the programme.

3.5.3 Willingness to Repeat CST Sessions

Participants generally expressed a high willingness to repeat the CST sessions, indicating strong engagement and perceived value. Eight sessions were rated as repeatable by 100% of participants, reflecting particularly strong enthusiasm.

Table 3. 12: Willingness to Repeat by Session

Session	Theme	% Willing to Repeat	n (Would Not Repeat)
Session 2	Sound	100%	0
Session 3	Childhood	100%	0
Session 6	Faces and Scenes	100%	0
Session 8	Being Creative	100%	0
Session 9	Categorising Objects	100%	0
Session 11	Using Money	100%	0
Session 12	Number Games	100%	0
Session 13	Word Games	100%	0
Session 5	Current Affairs	76.9%	3
Other Sessions	Various	High (1–2 not repeat)	1–2

These findings suggest that participants found the majority of CST sessions highly engaging and worthwhile, with a strong willingness to repeat most activities. Sessions involving creative, game-based, or practical content appeared to resonate most strongly, while more abstract topics such as current affairs were slightly less preferred by a small number of participants.

3.6 Activity Completion

Table 3. 13: Activity Completed Independently or with Support by the Participants

Activity completion				
Session	**Fully independently**	**With support**	**Did not complete**	**Missing**
Session 1 Physical Games	92.9% (n=13)	7.1% (n=1)	0.0%	0.0%
Session 2 Sound	100% (n=16)	0.0%	0.0%	0.0%
Session 3 Childhood	83.3% (n=10)	16.7% (n=2)	0.0%	0.0%
Session 4 Food	76.9% (n=10)	23.1% (n=3)	0.0%	0.0%
Session 5 Current Affairs	64.3% (n=9)	28.6% (n=4)	0.0%	7.1% (n=1)
Session 6 Faces and Scenes	58.8% (n=10)	35.3% (n=6)	5.9% (n=1)	0.0%
Session 7 Word Association	92.3% (n=13)	7.1% (n=1)	0.0%	0.0%
Session 8 Being Creative	10.0% (n=1)	90.0% (n=1)	0.0%	0.0%
Session 9 Categorising Objects	92.9% (n=13)	7.1% (n=1)	0.0%	0.0%
Session 10 orientation	66.7% (n=10)	33.3% (n=5)	0.0%	0.0%

Session 11 Using Money	56.3% (n=9)	43.8% (n=7)	0.0%	0.0%
Session 12 Number Games	100% (n=17)	0.0%	0.0%	0.0%
Session 13 Word Games	58.3% (n=7)	33.3% (n=4)	8.3% (n=1)	0.0%
Session 14 Team Quiz	61.5% (n=8)	38.5% (n=5)	0.0%	0.0%
Overall	**74.1% (n=146)**	**24.4% (n=48)**	**1.0% (n=2)**	**0.5% (n=1)**

As outlined in Table 3.13, participants completed the session activities independently in a majority of cases across all sessions. Full independent completion was observed in 100% of participants during Session 2: Sound and Session 12: Number Games. In all other sessions, at least 50% of participants completed the activity without assistance.

The session requiring the most participant support was Session 8: Being Creative, in which 90% (n = 9) of participants required assistance to complete the activity. This was followed by Session 11: Using Money, where 43.8% (n = 7) of participants needed support.

3.7 Appropriateness

3.7.1 Level of Activity – Facilitator Observations

Across 238 facilitator observations (14 sessions × 17 participants), the perceived level of activity was most often rated as *easy*, with a smaller proportion rated as *adequate or complex*.

Table 3. 14: Observed Level of Activity

Activity Level	Frequency (n)	Percentage (%)
Easy	134	56.3%
Adequate	62	25.9%
Complex	27	11.2%

These observations suggest that while the majority of activities were considered easy, over one-third (37.1%) were rated as either adequately challenging or complex, indicating a generally appropriate range of difficulty for the participant group.

On average, participants were observed to experience:

- sessions as easy (SD = 3.81),
- sessions as adequate (SD = 2.62),
- and 1.29 sessions as complex (SD = 1.21).

3.7.2 Perceived Complexity by Facilitators vs. Participant Self-Report

Facilitator observations revealed that:

- **Session 2: Sound** was the only session unanimously rated as *easy* for all participants.
- **8 of 14 sessions** were rated as *easy or adequate* for the majority of participants.
- **6 sessions** had higher levels of observed complexity for some individuals.

The two sessions most frequently rated as complex by facilitators were:

- **Session 9: Categorising Objects** – 50% (n = 7) rated complex.
- **Session 11: Using Money** – 43.8% (n = 7) rated complex.

However, participant **self-reports revealed a notable discrepancy see Table 3.15:**

- **For Session 9,** 85.7% (n = 6) of those flagged as experiencing complexity reported the session as *easy.*
- **For Session 11**, 85.7% (n = 6) similarly reported it as *easy* despite facilitator concerns.

Table 3. 15: Facilitator vs. Participant Perceptions of Complexity

Session	% Rated Complex (Facilitators)	n	% of These Reporting 'Easy' (Participants)	n
Session 9	50.0%	7	85.7%	6
Session 11	43.8%	7	85.7%	6

Table 3. 16: Level of Activity Graded by Group Facilitator

Level of activity				
Session	**Complex**	**Adequate**	**Easy**	**Missing**
Session 1 Physical Games	0.0%	42.9% (n=6)	21.4% (n=3)	35.7% (n=5)
Session 2 Sound	0.0%	0.0%	100% (n=16)	0.0%
Session 3 Childhood	16.7% (n=2)	8.3% (n=1)	75% (n=9)	0.0%
Session 4 Food	0.0%	46.2% (n=6)	53.8% (n=7)	0.0%
Session 5 Current Affairs	0.0%	7.1% (n=1)	50% (n=7)	42.9% (n=6)
Session 6 Faces and Scenes	0.0%	17.6% (n=3)	76.5% (n=13)	5.9% (n=1)
Session 7 Word Association	7.1% (n=1)	28.6% (n=4)	64.3% (n=9)	0.0%
Session 8 Being Creative	0.0%	40.0%	60.0% (n=6)	0.0%
Session 9 Categorising Objects	50.0% (n=7)	7.1% (n=1)	42.9% (n=6)	0.0%
Session 10 orientation	13.3% (n=2)	13.2% (n=2)	73.3% (n=11)	0.0%
Session 11 Using Money	43.8% (n=7)	37.5% (n=6)	18.8% (n=3)	0.0%

Session 12 Number Games	0.0%	35.3% (n=6)	64.7% (n=11)	0.0%
Session 13 Word Games	0.0%	50.0% (n=6)	41.7% (n=5)	8.3% (n=1)
Session 14 Team Quiz	23.1% (n=3)	38.5% (n=5)	38.5% (n=5)	0.0%
Overall	**11.2% (n=22)**	**25.9% (n=51)**	**56.3% (n=111)**	**6.6% (n=13)**

3.8 Engagement with Group Facilitator

Facilitator observations indicated full engagement with the group facilitator in 100% of participants during the following sessions:

- Session 4 – Food,
- Session 7 – Word Association,
- Session 12 – Number Games.

Non-engagement was observed in only three sessions:

- Session 1 – Physical Games (n = 2),
- Session 2 – Sound (n = 1),
- Session 6 – Faces and Scenes (n = 1).

Across all other sessions, participants were observed to be either fully or partially engaged with the facilitator

A cross-tabulation of engagement levels and perceived activity difficulty revealed that among the two participants who were not engaged:

- One was participating in a session rated as having adequate level of activity.
- For the other participant, activity difficulty data were missing.

Table 3. 17: Level of Engagement with the Group Facilitator by the Participants

Engagement with group facilitator				
Session	**Fully**	**Partially**	**Did not engage**	**Missing**
Session 1 Physical Games	85.7% (n=12)	0.0%	14.3% (n=2)	0.0%
Session 2 Sound	68.8% (n=11)	25.0% (n=4)	6.3% (n=1)	0.0%
Session 3 Childhood	91.7% (n=11)	8.3% (n=1)	0.0%	0.0%
Session 4 Food	100% (n=13)	0.0%	0.0%	0.0%
Session 5 Current Affairs	92.9% (n=13)	7.1% (n=1)	0.0%	0.0%
Session 6 Faces and Scenes	88.2% (n=15)	5.9% (n=1)	5.9% (n=1)	0.0%
Session 7 Word Association	100% (n=14)	0.0%	0.0%	0.0%
Session 8 Being Creative	80.0% (n=8)	20.0% (n=2)	0.0%	0.0%
Session 9 Categorising Objects	85.7% (n=12)	14.3% (n=2)	0.0%	0.0%
Session 10 orientation	86.7% (n=13)	13.3% (n=2)	0.0%	0.0%
Session 11 Using Money	93.8% (n=15)	6.3% (n=1)	0.0%	0.0%

Session 12 Number Games	100% (n=17)	0.0%	0.0%	0.0%
Session 13 Word Games	91.7% (n=11)	0.0%	0.0%	8.3% (n=1)
Session 14 Team Quiz	100% (n=13)		0.0%	0.0%
Overall engagement	**90.4% (n=178)**	**7.1% (n=14)**	**2.0% (n=4)**	**0.5% (n=1)**

3.9 Engagement with the Group

Full engagement with peers was observed in 100% of participants during the following sessions:

- Session 4 – Food,
- Session 5 – Current Affairs,
- Session 12 – Number Games.

Those who were not fully engaged were still at least partially engaged, indicating overall strong group participation throughout the intervention

Across all sessions, more than 80% of participants demonstrated full engagement with their peers. Those who were not fully engaged were still at least partially engaged, indicating overall strong group participation throughout the intervention.

Non-engagement was limited to only four sessions, with the number of non-engaged participants ranging from 1 to 5 per session, representing a minimal proportion of the total.

A cross-tabulation with facilitators' observations of activity difficulty indicated the following:

- In Session 2 – Sound (n = 2) and Session 12 – Number Games (n = 1), the activity was rated as easy by facilitators.
- In Session 14 – Team Quiz, the activity level was rated as adequate for the one non-engaged participant.
- For Session 6 – Faces and Scenes, activity difficulty data were not recorded for the single participant who did not engage.

Table 3. 18: Level of Engagement with Peers in the Group by the Participants

Engagement with group				
Session	**Fully**	**Partially**	**Did not engage**	**Missing**
Session 1 Physical Games	92.9% (n=13)	7.1% (n=1)	0.0%	0.0%
Session 2 Sound	81.3% (n=13)	6.3% (n=1)	12.5% (n=2)	0.0%
Session 3 Childhood	91.7% (n=11)	8.3% (n=1)	0.0%	0.0%
Session 4 Food	100% (n=13)	0.0%	0.0%	0.0%
Session 5 Current Affairs	100% (n=14)	0.0%	0.0%	0.0%
Session 6 Faces and Scenes	88.2% (n=15)	5.9% (n=1)	5.9% (n=1)	0.0%
Session 7 Word Association	92.9% (n=13)	7.1% (n=1)	0.0%	0.0%
Session 8 Being Creative	80.0% (n=8)	20.0% (n=2)	0.0%	0.0%
Session 9 Categorising Objects	85.7% (n=12)	14.3% (n=2)	0.0%	0.0%
Session 10 orientation	86.7% (n=13)	13.3% (n=2)	0.0%	0.0%
Session 11 Using Money	93.8% (n=15)	6.3% (n=1)	0.0%	0.0%

Session 12 Number Games	94.1% (n=16)	0.0%	5.9% (n=1)	0.0%
Session 13 Word Games	100% (n=12)	0.0%	0.0%	0.0%
Session 14 Team Quiz	92.3% (n=12)	0.0%	7.7% (n=1)	0.0%
Overall engagement	**91.4% (n=180)**	**6.1% (n=12)**	**2.5% (n=5)**	**0.0%**

3.10 Engagement with Activity

3.10.1 Participant Engagement with Activity

Facilitator observations indicated consistently high levels of participant engagement across most CST sessions. Full engagement (100%) was observed in **Session 1 (Physical Games)** and **Session 12 (Number Games)**, suggesting these sessions were particularly well-received. Several other sessions, including **Food, Word Association, and Sound**, also demonstrated strong engagement rates exceeding 85%.

While overall engagement was robust, **Session 5 (Current Affairs)** had the lowest observed engagement, with only **64.3%** of participants fully involved. This variation highlights the importance of aligning session content with participant interests and cognitive preferences to maintain optimal engagement throughout the programme. See Table 3.19.

3.10.2 Facilitator Rated Activity Level Vs Engagement

To explore possible reasons for non-engagement, facilitator-rated activity levels were analysed for those participants who did not fully engage:

- In Sessions 2 (Sound) and 12 (Number Games), the activity level was rated as easy for all non-engaged participants (n = 2 and n = 1, respectively).
- In Session 3 (Childhood) and Session 11 (Using Money), the non-engaged participants (n = 1 each) had their activity rated as complex.
- In Sessions 7 (Word Association) and 8 (Being Creative), activity levels were rated as adequate for the non-engaged participants (n = 1 each); in Session 7, one case was rated easy and one adequate.

- In Session 14 (Team Quiz), the non-engaged participant's activity level was also rated as adequate.
- Activity level data were missing for non-engaged participants in Sessions 5 (Current Affairs) and 6 (Faces and Scenes).

Table 3. 19: : Level of Engagement with the Activity in the Group by the Participants

Engagement with activity				
Session	**Fully**	**Partially**	**Did not engage**	**Missing**
Session 1 Physical Games	100% (n=14)	0.0%	0.0%	0.0%
Session 2 Sound	87.5% (n=14)	6.3% (n=1)	6.3% (n=1)	0.0%
Session 3 Childhood	75.0% (n=9)	16.7% (n=2)	8.3% (n=1)	0.0%
Session 4 Food	92.3% (n=12)	7.7% (n=1)	0.0%	0.0%
Session 5 Current Affairs	64.3% (n=9)	28.6% (n=4)	7.1% (n=1)	0.0%
Session 6 Faces and Scenes	76.5% (n=13)	17.6% (n=3)	5.9% (n=1)	0.0%
Session 7 Word Association	78.6% (n=11)	7.1% (n=1)	14.3% (n=2)	0.0%
Session 8 Being Creative	80.0% (n=8)	0.0%	10.0% (n=1)	10.0% (n=1)
Session 9 Categorising Objects	85.7% (n=12)	14.3% (n=2)	0.0%	0.0%

Session 10 orientation	80.0% (n=12)	20.0% (n=3)	0.0%	0.0%
Session 11 Using Money	81.3% (n=13)	12.5% (n=2)	6.3% (n=1)	0.0%
Session 12 Number Games	100% (n=17)	0.0%	0.0%	0.0%
Session 13 Word Games	91.7% (n=11)	8.3% (n=1)	0.0%	0.0%
Session 14 Team Quiz	76.9% (n=10)	15.4% (n=2)	7.7% (n=1)	0.0%
Overall engagement	**83.8% (n=165)**	**11.2% (n=22)**	**4.6% (n=9)**	**0.5% (n=1)**

3.11 Ability to Complete the Activity

Instances of incomplete activity were observed in two sessions:

- Session 6 – Faces and Scenes (n = 1),
- Session 7 – Word Association (n = 1).

To explore potential contributing factors, cross-tabulation was conducted between activity completion and both facilitator-rated activity difficulty and participants' self-reported ease:

- In one case, the activity was rated by facilitators as adequate and in the other as easy.
- Despite being unable to complete the tasks, both participants self-reported the activities as easy (n = 2).

A chi-square test was conducted to examine the association between activity completion and:

- Facilitator-rated activity difficulty.
- Participant-reported ease of activity.

The results revealed no statistically significant association between the ability to complete the activity and either measure of perceived difficulty ($p > 0.05$).

3.12 Feasibility of the Assessments

This section evaluates the feasibility of the outcome measures implemented in the study, with a focus on their completion rates and acceptability among participants. Secondary outcome measures included assessments of cognition (CAMCOG-DS), health-related quality of life (HRQoL), and global functioning (OARS), administered at baseline (T1) and end-of-intervention (T2) for both intervention and control groups.

All baseline (T1) assessments were conducted **within 10 to 15 days before** the start of the intervention. Likewise, follow-up assessments (T2) were carried out within **10 to 15 days after** the final CST session.

3.12.1 T1 – Baseline Assessments

- All 30 participants were scheduled for assessment.
- A total of 96.67% (n = 29) completed the baseline assessments.
- Assessment was discontinued for one participant due to signs of acquiescence.

Among those assessed:

- 100% (n = 29) completed the CAMCOG-DS.
- 90.0% (n = 27) completed the HRQoL and OARS assessments.
- The remaining 10.0% (n = 3) were unable to complete HRQoL and OARS due to difficulty attempting the measures, as reported by facilitators.

3.12.2 T2 – End-of-Intervention Assessments

- A total of 96.67% (n = 29) participants were assessed.
- One participant (3.33%) could not be assessed due to illness within the evaluation timeframe.

Among those assessed:

- All participants (n = 29) attempted the CAMCOG-DS.
- One case had missing data in the Praxis subsection, resulting in a missing total score.
- 93.34% (n = 28) completed the OARS, with 3.5% (n = 1) unable to attempt the full assessment.

- 90.0% (n = 27) completed the HRQoL, although 3.7% (n = 1) refused to complete the measure.

3.13 Secondary Objectives

The secondary objectives aimed to examine the impact of group CST on cognition, quality of life and global function.

Intervention Group mean CAMCOG scores:

T1 – Baseline Assessments 65.5.

T2 – End-of-Intervention Assessments 68.6.

Control group mean CAMCOG scores:

T1 – Baseline Assessments 65.9.

T2 – End-of-Intervention Assessments 71.4.

A repeated-measures ANOVA was conducted to examine changes in CAMCOG scores over time (T1 to T2) and whether these changes differed between the intervention and control groups.

There was a significant main effect of time, $F(1,26)=8.998$, $p=.006 < 0.05$, indicating that CAMCOG scores changed significantly from T1 to T2.

The main effect of group was not significant, $F(1,26)=0.100$, $p=.754 > 0.05$, indicating no overall difference in CAMCOG scores between the intervention and the control group.

Finally, the time and group interaction were not significant, $F(1,26)=0.950$, $p=.339 > 0.05$, suggesting no differential change between the intervention and the control groups over time.

Similarly, HRQoL scores were also examined using repeated-measures ANOVA. The mean score for the intervention group at T1 was 62.5 and 63.75 at T2. For the control group, the mean scores at T1 and T2 were 64.4 and 63.7, respectively.

The main effect of time was not significant $F(1,20)=0$, $p=0.993 > 0.05$, indicating that HRQoL scores did not change significantly from T1 to T2.

The main effect of group was also not significant $F(1,20)=0.057$, $p=0.814 > 0.05$, indicating no difference between the intervention group and the control group in terms of HRQoL scores.

The time and group interaction were also not significant $F(1,20)=0.432$, $p=.518 > 0.05$, indicating no differential change between the intervention and the control group over time.

OARS was analysed using the Mann-Whitney U test. The Mann–Whitney U test indicated no significant difference in functional ability scores between the intervention and control groups at baseline, $U=72.5$, $p=0.724 > 0.05$, or post-intervention, $U= 90.0$, $p=0.695 > 0.05$.

3.14 Qualitative Data

The reflexive thematic analysis conducted for this study, as described in the 2.5.2 section, generated four overarching themes and subthemes, validating and enriching our quantitative data and addressing the research questions on the acceptability of the programme among adults with intellectual disability, the feasibility of implementing CST, the acceptability of the CST activities, the feasibility of recruitment, and the feasibility of the proposed assessments. Although the qualitative data provides less insight into recruitment processes and the use of the outcome measures, the absence of reported barriers suggests that these elements were feasible within the study context and as described in the concurrent quantitative findings.

Subthemes generating overarching themes

Figure 3. 1: Subthemes Generating Overarching Themes

Overarching themes

Figure 3. 2: Overarching Themes

3.14.1 CST an Empowering and Meaningful Experience

> *"Interactive group, sense of belonging, positive for participants, positive for facilitators" (Group facilitator- GF3)*

Subthemes: Positive emotions, Perceived value of group CST, Expressions of enjoyment, visible engagement and anticipation.

Facilitators consistently highlighted participants' meaningful experiences of group CST. Positive feelings were voiced by participants during the sessions and recorded by group facilitators in observation logs. ***"Brilliant- It's great to exercise our brains" (participant feedback recorded by GF2-PFRGF2).*** Active participation *"I liked the game and our song" (PFRGF1)* and emotional wellbeing was widely evident from the observations, ***"It makes me happy"(PFRGF1),*** "They said it was their favourite session so far" described one of the facilitators (GF5). ***"I would tell others to go to the group" (PFRGF1).***

Group facilitators also documented participants genuinely expressing enjoyment and looking forward to attending sessions:

"The participants reported they looked forward each week to the session, I did too" (GF6).

The sense of fun and enjoyment in the group sessions appeared over 32 times in notes and statements given by facilitators.

"Have a laugh, have fun, talk to your friends" (PFRGF1).

This theme strongly supports the acceptability of the CST programme and adapted activities highlighting the connection, involvement and enthusiasm as affective and motivational dimensions of CST. It focuses on the positive emotional responses, enjoyment, perceived value of CST, and clear signs of acceptability observed by facilitators.

3.14.2 Promoting Confidence and Engagement Through Active Participation

> ***"Sessions promoted self-esteem and confidence levels among individuals". (GF4)***

Subthemes: Participants active agents in the group, Increased spontaneous communication, Social connection through shared memories.

"It's very good, it gave me confidence." (PFRGF1).

Group facilitators described evident growth in participants' confidence as the CST sessions progressed.

One facilitator wrote: *"Normally when greeting this participant when arrived for session, I would initiate conversation. Today this person did it first spontaneously and asked me a few questions" (GF 5).*

This enhanced active participation was seen by facilitators as a sign of feeling comfortable within the group and improved sense of belonging, confirming the group CST's potential to facilitate and promote confidence building (Spector et al., 2003).

"All participants enjoyed putting forward suggestions for group name and theme song. Individuals all know each other; they appeared comfortable interacting together" (GF5).

Facilitators observed active participation and group members feeling confident to voice their opinions. Perceptions of engagement with other members of the group and their facilitators were noted across the sessions.

"Participants were engaged, they were active participants, great communication and turn taking, respectful of groups members opinions" (GF4).

"Some participants not only knew each other but were part of the same group in day services", they were also in a familiar environment and with familiar staff which facilitated active communication and connection as emerged from the facilitator's notes (GF2).

"Real sense of fun in the room today. Lots of laughter and engagement" (GF1).

"Very interactive session both with peer group and facilitators. Feedback was like they want to repeat the session" (GF2).

Activities stimulating reminiscence were also an important factor contributing to cognitive and emotional engagement.

"One participant shared with group that she remembers doing this activity in school" and group made associations with their own memories" (GF5). The memories triggered by the activities helped connecting members of the group as they found common interests and previous experiences which encouraged spontaneous conversation and topics for deeper connections.

"One individual saw a scene picture of Dublin and told the group he was born there. Another participant said she went to school in Dublin when she was younger. Group were more engaged and interactive with each other as the session went on" (GF 5).

This theme explores how the group CST fostered confidence among participants by creating opportunities for active participation, spontaneous communication and meaningful interactions. These interactions not only reflect increased confidence but also show key markers of acceptability and importance for participants with intellectual disabilities.

3.14.3 Person-Centred Approach in A Supportive Environment

> ***"There was a sense of being valued as a member of the group and be made comfortable to express themselves. Each member was made feel as a valued member of the group, a real person-centred approach" (GF3).***

Subthemes: Facilitating personal reflection and reminiscence, balancing structure and flexibility, sense of safety and belonging.

The group facilitators' notes revealed the importance of their role in supporting the group dynamics, enabling a safe space for participants to express themselves and feel valued.

"The activity was more complex, and more encouragement was required to participants to engage today" (GF2).

Their experience working with people with intellectual disabilities clearly facilitated participants' engagement and ensured person-centred approaches, adapting the activity to their needs.

"Two participants opted to do planting seeds; one individual wanted to colour. All appeared to enjoy this session" (GF 5).

"…support was provided…and they appeared to really enjoy the activity" (GF 5).

The facilitators' flexibility and adaptability in delivering the group and understanding of each person's needs were evident in their daily observations.

"Some individuals enjoyed some actives more than others on any given day. It was good to have different activities to allow them to choose from" (GF7).

"Group made simple associations first and then more detailed associations were facilitated" (GF5).

The balance between structure and flexibility offered by the supplementary manual and CST programme, enhanced by facilitators' person-centred core values fostered a vital sense of belonging and safe space for participants' expressions.

"Each member was made feel as a valued member of the group. Person-centred" (GF4).

"The group enabled participants to form friendships around common interests, they were all excited to be part of the group and really proud to be involved in the research" (GF7).

This theme shows fundamental person-centred values and attitudes in delivering the CST programme. Facilitators effectively balanced a structured 14-session programme with the flexibility to incorporate choice, spontaneity and personal preferences. This balance clearly demonstrates the feasibility of implementing group CST for individuals with intellectual disabilities in day services.

3.14.4 Shifting Staff Perceptions

> ***"As a facilitator, I found CST meaningful and very effective, thoroughly enjoyable and I feel that the group benefited from the experience immensely. The deliverance was dignified, empowering and respectful and that was reflected in the group response, reaction and participation" (GF1).***

Subthemes: Enhanced awareness of participant potential, Improving staff confidence, Impact beyond the sessions.

Group facilitators expressed how the CST programme contributed to changing their own perceptions around participants' potential. The group CST worked as an opportunity for staff to spend more time with supported individuals, getting to know them in a different context and building rapport over the 7 weeks.

"Rapport built with the participants over the 7 weeks. I felt I really got to know them. The participants reported they looked forward each week to the session, I did too" (GF5).

"Seeing some individuals who normally won't engage in a bigger group discussion speaking up was my favourite part" (GF2).

"Seeing their level of understanding and knowledge was my favourite thing… so enjoyable to see participants concentrate on different sounds to establish what they were" (GF3).

Several facilitators also expressed changes in their own perception and confidence around the CST programme and a rewarding sense in their work delivering CST.

"Rewarding to see participants flourish and gain confidence over the 7 weeks. Heartwarming to see participants look forward to each session" (GF7).

"Word association enabled the group to work as a team and it was lovely to witness this and to see their abilities" (GF4).

Facilitators expressed apprehension and uncertainty when reflecting on their initial experience delivering the CST programme. Their statements revealed a major shift in confidence and understanding as the sessions progressed, and they witnessed participants' enjoyment and achievement.

"Have undergone each session, we now have a better idea about how each session can be adapted for individual needs" (GF6).

This shift in perception extended beyond the sessions as staff reported recognising participants' potential in communication and engagement to participate beyond the CST groups and the need for this programme to continue on a broader scale.

"Having a specific time set, having a template to follow and support from memory clinic staff was very positive. Individuals really enjoyed this programme, they all enjoyed participating, Individuals engaged in the programme" (GF6).

"We can improve in the future by having more staff trained and more experience delivering more sessions" (GF6).

This theme shares the transformative effect that delivering the group CST had on staff perceptions and the potential to impact professional growth and service provision at a broader level. This theme also delves into the potential of growing staff capacity, supporting the feasibility of implementing the CST programme.

4. Key Findings

- **Feasibility of recruitment**

  Recruitment rate, which can be defined as the percentage of participants screened and eligible for the study from the expressions of interest, was 53.5%. Retention rate was 100% and drop-out rate was 0%.

- **Feasibility of Implementation of CST**

  There was strong adherence, as most participants attended more than 70% of the sessions. On average, participants attended 11 out of 14 sessions. All intervention groups had a minimum of two group facilitators for each session. They also had a designated space in the day centre to run this intervention. Each intervention group had at least three members of the group attending the session each time, adhering to the integrity of a group intervention.

- **Acceptability of Group CST from the participants' point of view**

  Most participants (>90%) enjoyed 12 out of 14 sessions. There were only two sessions: Session 4: Food and Session 14: Team Quiz, in which some participants did not enjoy (<90%). Most participants wanted to repeat all 14 sessions.

- **Appropriateness of the activity**

  Group facilitators rated most sessions as either easy or adequate for most participants. Group facilitators rated Session 9: Categorising Objects and Session 11: Using Money as the two most complex sessions.

- **Feasibility of the assessments**

  The response rate for all the outcome assessments was high.

- **Participant Engagement**

  There was high engagement with all the engagement variables (with group facilitators, with peers in the group, and with the activity).

- **Overarching themes**

  CST is an empowering and meaningful experience for participants with intellectual disabilities, with the potential to promote confidence and engagement through active participation. It warrants a person-centred approach and supportive environment and has the crucial power to shift staff perceptions.

5. Discussion

This study aimed to evaluate the feasibility, acceptability, and appropriateness of delivering a structured Cognitive Stimulation Therapy (CST) intervention to adults with intellectual disabilities attending day services, using the supplementary CST manual developed for adults with intellectual disability (Ali et al., 2023) as well as the feasibility of associated assessment procedures. Findings provide encouraging evidence supporting the practical implementation and potential benefits of CST in this population.

5.1 Recruitment and Retention

The recruitment process yielded a moderate response rate, with 56 expressions of interest received from 250 individuals (22.4%), which is consistent with expectations for similar populations. Of those screened, 53.5% (n = 30) met eligibility criteria and consented to participate. Importantly, the study achieved a 100% retention rate, with no dropouts over the seven-week intervention period. This high retention suggests there was high acceptability and relevance of the intervention to participants and reflects positively on the suitability of the intervention structure and delivery model.

5.2 Feasibility of Delivery and Logistics

The intervention was implemented across three day-service locations with appropriate logistical supports in place, including dedicated rooms and trained facilitators. Adequate staffing was crucial to the intervention's success, consistent with findings from previous research highlighting the importance of staff resources in CST implementation (Khan et al., 2014). Session timing (morning vs. afternoon) did not significantly affect attendance, and modifications to session duration (extending from 45 to 53 minutes on average) were both necessary and manageable. On average, sessions lasted approximately 53 minutes, with durations ranging from 40 to 75 minutes depending on the group and session. These figures align with findings from an umbrella review of CST interventions, which reported session lengths ranging from 30 to 90 minutes (Cao et al., 2023). These adaptations underscore the importance of flexibility when delivering interventions to individuals with intellectual disability, allowing for pacing, processing time, and reasonable accommodations.

5.3 Adherence and Attendance

Adherence was high, with participants attending an average of 11 out of 14 sessions (78.5%), a rate comparable to attendance figures reported in the general population (Spector et al., 2003). Notably, 94.1% attended over 70% of the sessions, which is slightly higher than attendance rates reported in the existing literature on individual

CST (iCST) for adults with intellectual disabilities (Ali et al., 2022). Session-wise attendance varied slightly, with the lowest observed during Session 8 (58.8%). Reasons for absenteeism were mostly related to appointments or illness (7.1%) and unreported causes (10.1%). Random patterns of absence and no trends across session order suggest external rather than intervention-related factors were responsible for missed attendance. Activity completion and full session presence were also very high at 99% and 95.4%, respectively, indicating strong engagement.

5.4 Group Size and Engagement

Cluster randomisation resulted in three groups with five or six participants. Attendance-related fluctuations led to session group sizes ranging from three to six. Engagement patterns varied with group size: six-person groups promoted more peer and facilitator interaction, while three-person groups saw stronger engagement with the activity itself. However, smaller groups also showed slightly higher non-completion rates and greater need for breaks. These findings highlight the importance of both group dynamics and facilitator skill in optimizing participant engagement which are drivers of changes in outcome (Borek et al., 2019).

Group size may influence the dynamics of engagement and delivery, and a moderate group size (four to five) may be optimal for balancing interaction and task completion.

These suggests that while smaller groups may facilitate deeper activity engagement for some, mid-sized groups (n = 4–5) may offer the most balanced environment for activity completion and sustained participation, with larger groups promoting fuller social engagement without increasing the need for breaks.

5.5 Acceptability of the Intervention

Participants rated enjoyment, ease, and willingness to repeat activities positively. Enjoyment was universally endorsed for several sessions, with only minor variation across others. MacHale et al. (2024) similarly reported that participants with intellectual disabilities found CST sessions enjoyable and expressed enthusiasm for future participation. Most sessions were rated as easy, with occasional reports of difficulty in activities such as Word Association, Childhood, and Food. Despite these reports, willingness to repeat sessions remained high, with eight sessions endorsed for repetition by 100% of participants.

These findings suggest that while most sessions were well-matched to participants' abilities, certain activities—particularly those involving personal memory recall, sensory stimulation in the Food session and abstract associations—may pose greater challenges and should be reviewed for further adaptation or additional support strategies.

While still broadly positive, the relatively lower enjoyment ratings for these sessions may indicate specific content areas or delivery methods that warrant further review or adaptation to maximise engagement.

Overall, the consistently high enjoyment ratings across the majority of sessions reinforce the acceptability of the CST intervention among adults with intellectual disabilities.

5.6 Appropriateness of the Intervention Content

Facilitator ratings indicated that most sessions were perceived as easy or adequate in terms of complexity. Sessions such as Categorising Objects, Using Money and Team quiz, previously identified as challenging by participants in the study by MacHale et al. (2004)) were rated as complex for some participants; however, a divergence was observed between facilitator ratings and participants' self-reports, the latter often indicating perceived ease even for tasks facilitators rated as complex. This suggests potential differences in perceived cognitive demands and highlights the importance of including self-report data in assessing appropriateness. Sessions were well-matched to participants' abilities overall, with low instances of inability to complete activities, and no significant association between perceived difficulty and completion.

This divergence suggests a possible disconnect between professional assessments and participants' subjective experiences, underscoring the importance of including self-report measures when evaluating the appropriateness of intervention content for individuals with intellectual disabilities.

These findings suggest that task completion may be influenced by factors beyond perceived or observed difficulty, such as individual engagement, sustained attention, support received, or contextual variables (e.g. fatigue or emotional state). The limited number of incomplete activities across all sessions further supports the overall feasibility and appropriateness of the intervention content for the participant population.

5.7 Multifaceted Engagement

Participants consistently demonstrated high levels of engagement across three domains: with facilitators, with peers, and with the activity itself. Full engagement with facilitators and peers was observed in several sessions, and non-engagement was rare. Cross-tabulations suggest that lack of engagement was not primarily linked to activity difficulty, reinforcing the notion that social, emotional, or contextual factors may influence momentary engagement. Some participants showed low engagement in activities considered easy, while others remained fully engaged in activities rated as complex. This highlights the importance of individualised factors, such as personal interest, cognitive style, or environmental supports, which may play a more significant role than task complexity alone in influencing participant engagement.

Although the number of low levels of engagement was small, these results may indicate that low engagement was not solely attributable to task complexity. This suggests that other contextual or individual factors, such as hearing, mood, environmental distractions, or participant fatigue, may have influenced engagement with facilitators during sessions.

These findings underscore that while the majority of sessions were well-received, content that may be less engaging or more cognitively demanding—such as current events—may require adaptation or increased support to enhance participant interest and accessibility.

The strongest overall engagement occurred in sessions involving physical activity or games, aligning with the natural preferences and learning styles of many individuals with intellectual disability.

These results suggest that low levels of engagement with peers were not strongly associated with the perceived complexity of the session activities. This implies that other factors, such as individual preferences, comorbidities, interpersonal dynamics, or environmental influences, may have affected peer engagement during group CST sessions.

5.8 Feasibility of Assessments

Outcome assessments were mostly feasible. At baseline (T1), 96.67% completed assessments, with minimal missingness attributed to task avoidance or acquiescence. The CAMCOG-DS showed the highest completion rate, reinforcing its suitability for use in this population. While HRQoL and OARS were also largely completed, some participants were unable or unwilling to complete these tools, suggesting a need for refinements or supports in their administration. Post-intervention assessment (T2) showed similarly high completion rates, with only one participant unable to attend due to illness. Statistical analysis confirmed no significant relationship between the ability to complete assessments and perceived difficulty, further supporting the robustness of the assessment battery.

5.9 Secondary Outcomes

Statistical analyses of secondary outcomes revealed the following:

Cognition (CAMCOG): Scores significantly improved over time across both groups ($p = .006$), suggesting possible time-related effects or general engagement benefits. However, no significant differences were found between groups or in group-by-time interactions, indicating the intervention did not outperform usual activities.

Quality of Life (HRQoL): No significant changes were observed over time or between groups ($p > .05$).

Global Function (OARS): No significant differences were detected between groups at either baseline or follow-up ($p > .05$).

These findings which diverge from prior research, which has reported positive effects of CST on quality of life in individuals with intellectual disabilities (Ali et al., 2022). suggest that while the CST intervention was engaging, acceptable, and feasible, it did not yield differential improvements in cognitive or functional outcomes compared to control group over the study period. The differences between the intervention group and the control group at baseline, the sample size and the choice of instruments may have influenced these results and should be considered in future studies. Also, given the short intervention duration, these results should be interpreted cautiously and viewed as preliminary.

6. Conclusion and Next Steps

This feasibility study set out to evaluate the implementation of Cognitive Stimulation Therapy (CST) an evidence-based, non-pharmacological intervention for adults with intellectual disabilities. Avista's leadership in this project reflects its strong commitment to best practices, a person-centred support, and meaningful interventions for people with intellectual disabilities - a population, at heightened risk of developing dementia. The findings from both quantitative and qualitative data confirm that CST is not only feasible but highly acceptable in a day service context. A 100% adherence rate, alongside high engagement and enjoyment, suggests strong participant buy-in. The intervention aligned well with person-centred frameworks, as illustrated by the positive feedback and reflections from participants and facilitators.

The study marks an important first step: demonstrating that CST can be successfully delivered to individuals with mild to moderate intellectual disabilities in day service settings. The next phase should focus on larger scale trials, particularly with individuals who have a formal diagnosis of dementia, to assess clinical effectiveness. Additionally, future research should investigate the long-term effects of CST on cognition, quality of life, and functional outcomes.

Avista is committed to expanding access to CST across the organisation, and TCAID will continue to lead evaluation efforts. Participant and facilitator feedback demonstrate a strong desire for the continuation of CST, valuing both the emotional connections and cognitive stimulation it provides.

To enhance sustainability and integration, further staff training and cultural change are needed within day services. Embedding CST as a core component of person-centred planning, will require flexibility, active communication, and sensitivity to individual preferences. Reviewing and refining the CST Supplementary Manual for adults with intellectual disability will also support consistent, tailored delivery.

In summary, this feasibility study provides robust evidence that CST is both appropriate and impactful for adults with intellectual disabilities. High retention, engagement, and satisfaction rates, alongside feasible outcome measures, support its scalability. The study lays a strong foundation for future trials, further implementation, and the integration of CST into standard care pathways contributing meaningfully to inclusive and responsive support for people ageing with an intellectual disability. Continued investment will ensure that CST becomes a sustainable, impactful intervention that promotes healthy ageing, inclusion, and dignity for individuals with intellectual disabilities.

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Avista

Trinity Centre for Ageing and Intellectual Disability

Aonad Pleanála & Forbartha Altranais & Cnáimhseachais, Átha Cliath &Thoir Theas

Nursing & Midwifery Planning & Development Unit, Dublin & South East

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