Constant Therapy: An adaptation in Kannada

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CERTIFICATE

This is to certify that this dissertation entitled **"*Constant Therapy: An adaptation in kannada*"** is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 14SLP017. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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May, 2016

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This is to certify that this dissertation entitled *"Constant Therapy: An adaptation in Kannada"* has been prepared under my supervision and guidance. It is also been certified that this dissertation has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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DECLARATION

This is to certify that this dissertation entitled *"Constant Therapy: An adaptation in Kannada"* is the result of my own study under the guidance of Dr. S. P. Goswami, Professor of Speech Pathology and Head, Department of Speech-Language Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore,   *Registration No. 14SLP017*
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Dedicated to Amma

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Vimmi, Rashika, Suppi, out of synch friendship... though our wavelengths and frequencies never matched, we had an amazing time together. Thank you for all the fun and love.

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Chapter I

Introduction

Persons with aphasia require speech and language treatment programs which are intensive and long lasting. A considerable number of rehabilitation specialists believe that such persons' outcomes improve with reduced duration of hospital stay and services provided at home environments (Reinkensmeyer, Pang, Nessler, & Painter, 2002). However, a large proportion of persons with aphasia do not receive speech and language services owing to reasons like high costs, lack of availability of such services and geographical barriers (Agostini, Garzon, Benavides, De Pellegrin, Bencini, Rossi et al.,2014)

Impairment of language functions represents the second most disabling sequel following motor impairment and the most common deficit caused by cerebral lesion (Agostini et al., 2014). The Aphasia and Stroke Association of India (Aphasia and Stroke Association of India, 2013) estimated that about 800, 000 to 1, 000,000 people are affected by aphasia annually. Aphasia is a chronic condition hence, language and communicative deficits require continuous, long term and intensive treatment(Theodoros, Hill, Russell,Ward, & Wootton, 2008).The access to avail speech and language services in Indian context is limited in terms of available number of service providers, geographical barriers, high cost and physical condition of the person with aphasia.

Technological innovations in the field of tele-communication have paved way for the advent of tele-rehabilitation. It aids in assessment, intervention, consultation and education services which have proved to be effective (Telepractice, 1997-2015). Hence, several researches have focused to develop computerized rehabilitation services to help

the persons with aphasia to continue to avail speech and language rehabilitation services (Brennan, Tindall, Theodoros, Brown, Campbell, Christiana et al.,2011).

Of late, tele-rehabilitation has gained popularity in various countries as a mode for making speech and language services available to the clinical population. The position statement of the American Speech Language and Hearing Association is that "tele-practice is an appropriate model of service delivery for the professions of Audiology and Speech-Language pathology," because it "may be used to overcome barriers of access to services caused by distance, unavailability of specialists and/or sub-specialists, and impaired mobility" and offers "the potential to extend clinical services to remote, rural, and underserved populations"(Speech-Language Pathologists Providing Clinical Services via Telepractice: Position Statement, 2005)

Agostini et al., 2014 examined the efficacy of tele-rehabilitation as compared to a conventional face-to-face treatment of naming, in persons with post-stroke anomia. Treatment outcomes showed a significant improvement on treated items in both, tele-rehabilitation and face-to-face conditions. These findings hinted at the feasibility of tele-treatment in post-stroke patients, as suggested by previous authors. The study suggested that neither the lack of physical interaction between persons with aphasia and therapist nor the technical complexities of the system hampered the effectiveness of the tele-treatment.

Though in its foundational stage, tele-rehabilitation in India has commenced in recent times and is being established as an effective tool. Goswami, Bhutada, &Jayachandran, 2012, reported a single case study of a person with Broca's aphasia who was assessed and

treated using a web camera based system via Skype. The study revealed positive outcomes of 25 sessions of therapy in terms of improved performance on target linguistic domains and improved participation in the treatment program.

Computerized Version of Manual for Adult Aphasia Therapy – Kannada (CV-MAAT-K) was developed and field tested by Goswami and Renuka (2013). It has five domains namely Functional Communication, Repetition, Comprehension and Expression, Naming and Reading and Writing. The CV-MAAT- K provides various sub-sections and activities under each domain relevant to remediating the communicative deficits of persons with aphasia. Systematic assembly of activities, stimulus, and scoring pattern facilitated documentation of the participants' responses. CV-MAAT K has been reported as an effective tool in improving the communication skills of persons with aphasia.

Use of software programs that are aimed specifically for improving language and cognitive skills in persons with aphasia is interwoven with tele-rehabilitation process. Further, the use of software program allows interaction between people remote from each other in an asynchronous manner. Research on these lines has been stated by various authors.

CogMed (Pearson Company, Scandinavia, Sweden,2011), a software developed for use with individuals with brain injury aims to improve working memory abilities (Lundqvist, Grundstro¨m, Samuelsson & Ro¨nnberg 2010). The effectiveness of CogMed software in 18 stroke participants divided into a control group and a treatment group was studied. After 5 weeks, treatment participants showed more improvement on untrained measures of working memory and attention than control participants. Participants also self-reported

fewer cognitive problems after the treatment (Westerberg, Jacobaeus, Hirvikoski et al., 2007)

Another online-based tool for rehabilitation is Lumosity (Lumos Lab, San Francisco, CA, 2007), also available on the internet, which targets attention, processing speed, visual memory in older individuals with mild cognitive impairments. Finn and McDonald studied 16 participants with mild cognitive impairments who completed 30 sessions of training with Lumosity. Participants improved on the trained tasks and showed some evidence of generalization to a measure of visual sustained attention (Finn & McDonald, 2011)

Other software based programs targeting aphasia therapy are Sentence Shaper,Lingraphica and Sentactics. Tele-rehabilitation or software based solutions are restricted in their functionality and variety of available therapy tasks but prove to be an effective alternative to the conventional therapy.

An impairment-based, individualized treatment plan for persons with aphasia, who have suffered a traumatic brain injury (TBI), stroke or dementia, or children who need special education and care due to learning disabilities or other disorders, that can be delivered through an iPad (Apple Inc., Cupertino, CA) software platform called Constant Therapy was developed by Kiran, Des Roches, Balachandran & Ascenso (2014). Also, taking shape from thorough research, a series of tasks were designed to remediate linguistic and cognitive skills to make the rehabilitation process more systematic, individualized and highly personalized. This program can replace the conventional therapy that makes use of delivering therapy tasks manually and enables the participant to use dynamically updated tasks. These tasks were implemented into a software platform (Constant Therapy) to

provide individualized therapy for participants enrolled in the study. This program assesses the accuracy and latency of the responses on each of the designed tasks. The software enables clinicians to remotely monitor the participant's performance on each therapy task. The program also allows for analysis and graphical visualization of the accuracy and latency of scores for every session of usage. Constant Therapy allows therapists, academicians and researchers to use the program independently or with multiple clients, set up homework and monitor patients' progress to make better clinical decisions

The effectiveness of this tablet based software program, constant therapy have been studied and significant and positive changes both in cognitive and language domains in persons with aphasia have been reported. These results provide evidence for the usefulness of a tablet-based platform to deliver tailored language and cognitive therapy to individuals with aphasia (Des Roches, Balachandran, Ascenso, Tripodis & Kiran , 2014).

Need for the study:

Persons with aphasia, in India, face a lot of difficulty in gaining access to speech and language services because of numerous reasons including the lack of manpower, unavailability of adequate rehabilitation services, high costs, geographical barriers and physical limitations. From the studies quoted above it is established that computer rehabilitation programs are effective in improving language in persons with aphasia. Constant Therapy is one of the software programs that have been effective in giving impairment based aphasic intervention. Developing software based rehabilitation programs in Indian context for the persons with aphasia is still at an elementary stage.

Thus, an adaptation of Constant Therapy to Indian languages can be useful in enabling rehabilitation of persons with aphasia through distance mode and enable them to receive continued services. Hence need for the current study was felt with the aim of adapting constant therapy in Kannada.

Chapter II

Review of Literature

Persons with aphasia post stroke have to stay in long term rehabilitation for remediation of lost language functions. It has been reported that Persons with all types of aphasia undergo significant improvement following stroke when treated with conventional speech and language therapy as a part of comprehensive rehabilitation program within six months of onset.(Bakheit, Shaw, Carrington, & Griffiths, 2007). Thus the rehabilitation service for aphasic individuals has to be immediate and intensive.

Godecke, Lalor, Rai and Phillips (2012) studied the outcome of intensive therapy on 59 persons with aphasia who were randomized to receive either daily aphasia therapy or usual care (≤1 session/ week). PWA who received daily aphasia therapy attended therapy for five days in a week to a maximum of 20 sessions with the duration of 30-80 minute. The outcome of this study was documented using AQ scores of WAB and the functional communication profile. Results revealed that participants who were treated on a daily basis showed significantly greater scores on AQ of WAB and FCP when compared with the control group which proves that intensive therapy would fetch greater improvement and rapid progress in persons with aphasia.

Although intensive and immediate speech and language services have demonstrated good outcomes in post stroke aphasia individuals, they may fail to receive one because of lack of availability of services, physical limitations, lack of accessibility, and due to remoteness. Consequently due to these huge sensible problems, it is difficult to provide

the continued communication rehabilitation services they require. Thus other options of delivering services to persons with aphasia have to be considered. One such option is through Tele rehabilitation services which are provided at a distance.

Tele rehabilitation services saw an expansion initially from videoconferencing to delivering intervention and to monitor function in persons with stroke patients, to a straight forward computer based programs to provide cues and range of exercises which enhanced the quality of remote intervention. As an evidence for the above statement, Enderby and Petheram (1992) highlighted the use of computer assisted technology at home to rehabilitate persons with aphasia for whom long term inpatient services are not often possible due to many potential problems. This lacuna in providing long term rehabilitation led to the increase in commercially available special rehabilitation softwares (Stachowiack, 1993). Later many clinicians started promoting the cognitive retraining softwares specially developed for one or the other platform.

It was Deloche and team towards the end of 1970s in Paris, and Enderby and team at the beginning of 1980s in Brisol, England, who first attempted to use computers in providing therapy for aphasic individuals. Seron, Deloche, Moulard and Rouselle (1980) were the first to study the effect of computer based aphasia therapy. Initially computers were used only to improve writing abilities as it was seen only as an instrument meant for text processing and calculation purpose. In their study, they took five PWA who had severe writing disorders and they were trained to type the words dictated by the clinician on a keyboard. After several sessions of training, they found out that PWA with writing problems later improved to type the words accurately on a keyboard with fewer errors per

words and those errors made by them were closer to the target words. They could also find the generalization effect on reading as well.

Later on, similar computer based programs to rehabilitate writing difficulties for persons with aphasia started emerging, taking the influence from Deloche's study. Enderby and Petheram (1992) experimented with 10 PWA who were trained to use self adapting written language exercises and reported positive knowledge of average working time per task being decreased with usage.It was scrutinized that PWA showed higher level of motivation in using the program and it was documented by more time duration they spent in working with the program.This way the computer programs gradually motivated the stakeholders to utilize the program to self rehabilitate, frequently and extremely by its ease of usage and interesting activities. And subsequent to this several linguistic based programs came into view which focused on impairment based intervention.

One such comprehensive language based system for the treatment of all linguistic domains in aphasics was developed in the United States, with a specially equipped speech synthesizer. This system was Lingware/STACH System developed in Bonn from 1983 to 1989. It consists of 150 exercises and domains like naming, dictation, word formation, categorization and syntax with 50 tasks in each. Later using this STACH system, a study was conducted by Grießl and Stachowiak, in 1994 on 156 persons with aphasia(PWA) . Out of 156 PWA,Out of 156 PWA, conventional speech therapy was given to 77 individuals, whereas an additional supplementary computer training (STACH system) along with conventional speech therapy was given to 79 PWA. Language training was specified for a period of 6 weeks with the Aachen Aphasia Test Battery (AAT).They

reported overall general positive effect of speech therapy and effect of supplementary computer training using STACH system on domains of naming and written language.

Mortley, Wade, Davies, and Enderby (2003) observed the possibility of delivering and monitoring computer based therapy using tele-rehabilitation. In their study, they included seven persons with aphasia who were 12 months post stroke who received 6 months of language therapy using computer based program. Therapy was conducted using patient's own PC at their home. They carried out a monthly remote session for transferring therapy exercises completed by the patient to the therapist computer for evaluation and a telephone conference for discussion of the progress and for any change or modification in the current therapy program prescribed for the client. A second appointment was put to download new exercises from the therapies to the clients. They used INTACT software as the source for therapy exercises. The authors evaluated number of exercises, attempts, total time spent, number of successful and failed remote sessions and reasons for failure etc. They reported 20-67 as total number of hours spent using computer based program to practice exercises and per person the median number of hours per month was seven. A median of 39 exercises were assigned per person and number of attempts per exercise ranged from 5 – 40. Six remote updates per person were planned. One individual received all updates successfully – in all other cases there was at least one technological failure.

This initial effort of delivering services with the help of simple computer based program witnessed numerous boundaries by cumbersome technological issues, predominantly that of length and complexity of data transfer. This early failures desired for software incorporating improved interfaces and automated data transfer procedures that needs a secured internet site. These software programs can be tailored to each patient by selecting

a range of exercises from the software library suited to individual levels of impairment that can be carried out by the persons with aphasia independently at home. This, lead to new developments in the software technology, founding of internet and development of new gadgets, new, customizable, aphasia-specific application software – apps – which are becoming available in the iPad App Store regularly many from reputable companies who are not newcomers to aphasia therapy-Lingraphica: Princeton, NJ; Sentence-Shaper (Psycholinguistic Technologies, Jenkintown, PA), Oral Reading for Language in Aphasia (ORLA, Cole &Cherney, 2004)and Touchspeak (TouchspeakTM,London,England); Tactus Therapy Solutions Ltd: Vancouver, BC. , Multicue. Internet-based software treatments have been increasingly available for individuals with brain damage like CogMed(Pearson Company, Scandinavia, Sweden).

Another computer based program Lingraphica was used by Aftonomos et al., (1997) to study the effectiveness of the software on 23 chronic aphasia individuals who previously had received traditional therapy for a period ranging from six months to 15 years post onset. All PWA received one hour of therapy session by the therapist for a period of 16.2 weeks using Lingraphica system. This system involved PWA to use the sequence of selected pictures to build the messages which was later transformed digitally into speech. Results indicated the improvement of about 10 percentile points in three PWA after receiving 40 hours of therapy on the PICA. From pre to post treatment, remaining 20 PWA showed improvement on Boston Naming Test and similar improvements were seen on the subtests of the Western Aphasia Battery and the Boston Diagnostic Aphasia Examination

Doesborgh, van de SandtKoenderman, Dippel, van Harskamp, Koudstaal &Visch Brink (2004) Netherlands 6 (RCT) conducted a study using a multicue computer software program which basically used to provide a cue for the treatment of word finding difficulties. They included 18 persons with aphasia post stroke and who had previously received impairment based intervention were randomly assigned to form either experimental or control group. The control group acted as a placebo received no treatment. Experimental group received 10-11 hours of therapy with the intensity of 2-3 times per week for about 20 months. Each session lasted for 30-45 minutes. Participants in control group continued to be in the study upto 6-8 weeks. Persons who were assigned to receive therapy using multicue program did not receive any other intervention apart from assigned language therapy and psychological therapy. Results revealed no difference between the groups in mean improvement on Boston Naming Test (BNT) and the Amsterdam-Nijmegan Everyday Language Test (ANELT-A). However, the experimental group who received multicue therapy showed improved scores on Boston naming test significantly (p=0.02), while Scores did not differ in control group on Boston naming test. Improvement on the BNT did not generalize to improvement in everyday verbal communication as assessed by the ANELT-A.

Van de Sandt-Koendermana, Wiegersb, Wielaertb, Duivenvoordenc&Ribbersd in 2007 assessed the usefulness of the computerized software Touchspeak in training 30 PWA. They were trained to use Touchspeak in two self-chosen communicative situations. These PWA showed varied level of proficiency in using the software. Out of 30 PWA, some of the aphasic individuals learned to use the software independently in many situations which included untrained ones also, where some of them used Touchspeak(TS)

independently in trained situations only and others were totally dependent on their partners in accessing the system. It was reported that seven participants were extensive users of Touchspeak (TS), five were independents users, and five were dependent on their partners.

Cherney (2010) conducted a study, where 25 persons with chronic, non-fluent aphasia were randomized to receive either Oral Reading for Language in Aphasia (ORLA) therapy delivered by a computer, or the same therapy delivered by a speech language pathologist following a no treatment period of 7-12 weeks. Each participant received 24, one hour sessions of ORLA. Participants were assessed using the Western Aphasia Battery (WAB) at baseline, after a no treatment period of 7-12 weeks, prior to the start of intervention, and post intervention. Outcomes of this study concluded that all 25 participants received all 24 sessions of therapy over an average of 12.62 weeks. Computer delivered ORLA therapy resulted in improvements on the WAB-AQ from pre- to post treatment (mean change in test score = 3.29. SD=6.16). Change from pre-treatment to post-treatment between the computer delivered ORLA and speech language pathologist delivered ORLA groups showed no significant difference for any of the assessed outcomes.

Due to its increasead skillfulness in delivering impairmnet based services, several ipad based softwares became popular and had been used extensively by PWA .One such software being constant therapy developed by Kiran (2009) became used widespread and was developed with the aim of providing impaiment based intervention not only to aphasic individuals but also to other disorders and is the main focus of the study.

Des Roches et al., (2014) studied the effectiveness of ipad based software platform, constant therapy. He included a group of 51 persons with aphasai , for a duration of month to about 359 months, post stroke or traumatic brain injury. The participants were randomized to control and experimental group, where the control group received 1 hour therapy per week using constant therapy along with the clinician at clinic. Whereas, the experimental group were assigned to take usual one hour therapy at clinic and also to use the software at their home.The outcomes of their project were discussed in terms of four PWA with varying cognitive-linguistic profiles. For detailed profiling of the cognitive-linguistic skills before and after intervention, tools like Revised- Western Aphasia Battery (WAB-R), Cognitive- Linguistic Quick Test (CLQT), Boston Naming Test (BNT) and Pyramids and Palm Trees Test (PPTT) were used. The preference of allotting the therapy tasks came from a set of 30 + tasks which were divided into language and cognitive therapy. Language therapy tasks were divided into (1) naming therapy (2) reading therapy(3) writing therapy (4) sentence planning. The cognitive therapy tasks were divided into (1)visuo-spatial processing (2) memory (3) attention (4) problem solving (5)executive function. After selecting the potential tasks, a baseline was assigned. The aphasic person were advocated to work on certain therapy tasks, only if their scores on that particular task is below than 80% and once their score reach the level of above 80%, next level of difficulty in a particular task will be undertaken. Every week, as a therapy schedule PWA were assigned with five to six tasks with up to 10 items in each task. This treatment program was carried out for about 10 weeks. Through the therapy course, the tasks assigned to PWA were modified or updated based on their changing cognitive linguistic profiles. The control group was asked to login into the software using

usernames and passwords to work on the assigned tasks, everyday for one hour for a total of six days a week. They were also advocated to weekly visit the clinic for monitoring their progress. Their results were documented by the software itself on each task they performed and it also registers therapy practice time. Post therapy outcome measures were analyzed using WAB-R, CLQT and PPTT for four PWA with Low Language Profile –Low Cognitive Profile, High Language Profile-Low Cognitive Profile, Low Language Profile- High Cognitive Profile and High Language Profile- High Cognitive Profile respectively. The results showed that the PWA improved on their tasks using ipad based software program in terms of accuracy and latency. For the group who were assigned to practice therapy tasks at home, they noticed the higher motivation levels which were inferred through number of log in sessions per week for each person on software. Positive outcomes of this software based intervention were also reflected in the total scores on standardized test materials like WAB-R, CLQT and PPTT irrespective of the duration from which the person had aphasia or the cognitive-linguistic profile.

Overall, the results of studies examining computer-based intervention are positive which bridges the gap between immediate, intensive treatment and sensible problems which avoid them, as it gives an opportunity to augment therapy intensity through additional practice opportunities. Also other concurrent activity which interests the person and impairment based interactive system that has proved to be an effective alternative to face to face aphasia therapy and is equally efficient as conventional speech and language therapy delivered by speech language pathologist. Thus such computer based programs can effectively be used for improving oral communication in PWA and thereby improve their quality of life.

Chapter III

Method

The present study aimed to adapt constant therapy software in Kannada language which was basically an impairment based interactive program in English language developed in 2014 by Kiran et al. to restore the lost language functions in persons with aphasia and other language disordered individuals. The method involved adaptation of the software in two phases. All the materials and task sheets of the main software were obtained from the developers with their consent and steps towards necessary modifications and translations were taken to the original stimuli to adapt that in Kannada language. The developers and creators of the software have been duly acknowledged throughout the study.

Procedure:

The study was carried out in two phases.

Phase I: Preparation of stimulus for Constant Therapy in Kannada

Phase II: Validation of stimulus prepared for Constant Therapy in Kannada

Phase I: Preparation of stimulus for Constant Therapy in Kannada:

The phase I concerned the appraisal, modification and translation of the stimuli used in the original constant therapy software aptly by considering the cultural and linguistic aspects for its adaptation in Kannada. The original stimuli of the software contained both language and cognitive domains which also had subsections. The same domains and their subsections were adapted in Kannada with preferred subsections being modified and translated. The domains and subsections of Constant Therapy Kannada are listed below:

I. Language Auditory

    1. Spoken Word Comprehension

    2. Spoken Sound Comprehension

    3. Spoken Syllable Comprehension

    4. Spoken Rhyming Comprehension

    5. Auditory Commands

B. Naming

    1. Feature Matching

C. Reading

    1. Letter to Sound Matching

    2. Sound to Letter Matching

    3. Written Word Comprehension

    4. Reading Comprehension

D. Sentence Planning

    1. Active Sentence Completion

    2. Passive Sentence Completion

II. Cognition

A. Visual Processing

    1. Map Reading Task

    2. Calendar Task

B. Quantitative Reasoning

    1. Word Problems

    2. Currency Task

Core Vocabulary for Constant Therapy- Kannada:

The core vocabulary forms the basis, from which the stimuli were taken for some of the tasks. This contains 29 lexical categories with words and related pictures which were translated and adapted appropriately keeping in mind the cultural and linguistic aspects of the language and also were chosen according to the semanticity, familiarity and frequency of usage for PWA. There are total of 635 words and its pictures chosen from 29 categories.

Adaptation of few tasks in Kannada:

i. **Spoken Word Comprehension Task:**

This task made use of the developed core vocabulary which contained 635 words and its related pictures under 29 lexical categories.

ii. **Spoken Sound Comprehension:**

Words from the core vocabulary were taken and were segregated as the words which begin and/or end with each phoneme in Kannada. That is, these words were segregated as phoneme initial and phoneme final sets which were entered in the Microsoft excel sheet provided by the developers of the Constant Therapy software.

iii. **Spoken Syllable Comprehension:**

All the same words taken from core vocabulary were counted for number of syllables in each and ordered with increasing syllables and was entered in the Microsoft excel sheet along with distracters.

iv. **Spoken Rhyming Comprehension:**

A set of rhyming pairs were taken from text books, rhymes, etc. considering the familiarity and frequency of usage of the words and were inserted in the Microsoft excel document as per the protocol provided by the developers. The stimulus of this task consisted of both for yes responses and no responses.

v. **Auditory Command Task:**

Auditory commands were given in Kannada language which uses the core vocabulary to carry out a given command.

vi. **Feature Matching Task**

Keeping all the lexical items taken from core vocabulary as the base, semantic features specific to each category were identified. Semantic features chosen had common lexical entries as responses and distracters. These were then entered in the Microsoft excel document as 0 and 1 where 1 indicates the specific feature is present in that particular item and 0 indicates that feature is absent in it.

vii. **Reading Comprehension**

For this task, the reading passages were taken from Manual for Adult Aphasia Therapy – Kannada(MAAT-K, Goswami, Shanbal, Chaithra, Ranjini, 2011) and questions related to each reading passage were prepared and all the reading passages, its related questions and distracters were entered in the task sheet as suggested by the developers of the constant therapy software.

viii. **Sentence Planning**

The stimuli for this task also were chosen from MAAT-K which consisted of active and passive sentences. These sentences were segmented into its subject,

object and verb and then were inserted in the Microsoft excel document with each of their distracters.

ix. Map Reading Tasks

The maps were created using Google maps which contained 1-6 destination points. Specific questions were formed based on the designated places, its routes, distance, places before and after the destined points along with answers and two distracters each and all these were incorporated into the excel sheet.

x. Calendar Task

For this task, calendar for each month of the year 2016 were created with important events and dates marked and highlighted on each of the calendar. Questions were later formulated which was based on those important events, days and dates with an appropriate answer and two distracters for each question. Those questions with answers and distracters were entered in the excel sheet as suggested.

xi. Word Problems

For the word problem task, several arithmetic statement problems were formed and were presented along with the appropriate operations to be chosen for each of the statement question that was written in Kannada like addition, subtraction, multiplication and division. This data was entered in the Microsoft document as prescribed. This task was also made with increasing levels of difficulty.

xii.   **Currency Task**

First the picture stimuli for the currency task were created using coins and notes of Indian currency. Later, those were used accordingly to increase the complexity of the task in four levels. Level 1 stimuli consisted of 1-2 coins and/or currency notes; Level consisted of 3-4 coins and/or currency notes; Level 3 consisted of 5-6 coins and/or currency notes and Level 4 consisted of 8-10 coins and/or currency notes.

Phase II: Validation of stimulus prepared for Constant Therapy in Kannada

In this phase, 10 SLPs were given all stimuli and tasks and a feedback questionnaire (Goswami, Shanbal, Samasthitha, & Navitha, 2012) which contained 20 parameters like simplicity, familiarity, relevance and generalization etc., was used to rate the stimuli of constant therapy in Kannada. These parameters were rated based on a 5 point rating scale of 'very poor', 'poor', 'fair', 'good' or 'excellent' given in the feedback questionnaire. All 10 SLPs were native speakers of Kannada and they rated all stimuli and tasks which were developed, modified and translated in Kannada language. Ratings were obtained from all 10 judges, compiled and frequency distributions of the ratings were taken using SPSS software and the scores were represented in tables for each of the category and task.

Chapter IV

Results

The study aimed at adaptation of Constant Therapy in Kannada which included two phases of development of the stimuli and validation of the stimuli from 10 SLPs. Overall 16 tasks were developed and the stimulus under each consisted of words, questions, statements, passages and related pictures in Kannada language.(Table 4.1).

Table 4.1 *Summary of stimulus prepared*

Sl. No.	Therapy Task	No. of Stimulus Items Prepared			
		Orthographic Stimuli			Picture Stimuli
		Questions/ Words/ Word Pairs	Answers	Distracters	
1.	Auditory Command Task	4 General questions for 4 levels prepared*	-	-	635
2.	Calendar Task	120	120	240	12
3.	Categories	635	-	-	635
4.	Currency Task	196	-	-	196
5.	Feature Task	101	1022	61278	*
6.	Letter to Phoneme Task	44	44	44	-
7.	Map Task	50	50	100	5
8.	Math Task	114	-	-	-
9.	Phoneme to Letter Task	44	44	44	-
10	Phoneme to Word Task	635	-	-	-
11	Reading Task**	30	30	60	-
12	Rhyming Task	282	282	100	-
13	Semantic Minimal Pair Task	138	138	138	-
14	Semantic Odd One Out Task	100	500	200	-
15	Sentence Completion Task**	50	50	-	-
16	Syllable Task	635	635	-	-

Note: * Indicates: Program written for Kannada version; will utilize the 635 core vocabulary made
   ** Indicates: Stimuli adapted from field tested manuals

Table 4.1 summarizes the number of stimulus developed under each task and Table 4.2 presents with the number of stimulus items prepared under each set of 29 lexical categories.

Table 4.2 *Stimulus Summary of Lexical Categories*

Sl No.	Lexical Category	No. of Items	No. of Pictures
1.	Animals	62	62
2.	Arts and crafts	18	18
3.	Bird	32	32
4.	Body parts	29	29
5.	Clothing	39	39
6.	Container	15	15
7.	Entertainment	09	09
8.	Fixture	06	06
9.	Food	40	40
10.	Fruits	31	31
11.	Furniture	33	33
12.	Gadget	09	09
13.	Geography	04	04
14.	Herbs	07	07
15.	House hold item	20	20
16.	Kitchen	21	21
17.	Magical creature	02	02
18.	Musical instruments	13	13
19.	Nature	26	26
20.	People	24	24
21.	Personal item	32	32
22.	Residence	06	06
23.	Structure	23	23
24.	Symbolic	05	05
25.	Tool/tool aid	35	35
26.	Toy	18	18
27.	Transport	34	34
28.	Vegetables	36	36
29.	Weapon	06	06

It is seen that in auditory command task, four general instructions were prepared across five levels with increasing order of difficulty in terms of its syntactic structure. The pictures and words were chosen from the core vocabulary of 29 categories for this task so that by using all that, numerous set of instructions can be generated by the software. Under calendar task, 120 questions were made based on the important events marked in 12 months calendar picture stimuli used for the same, provided along with 240 distracters .Overall 635 items (words and its related pictures) comprised core vocabulary of 29 lexical categories. There were 196 stimuli along with pictures of Indian currency notes and coins in currency task developed across four levels of difficulty.101 semantic features were written for few items of core vocabulary and 1022 answers were provided for the same along with 61278 distracters. In both letter to phoneme and phoneme to letter tasks, there were a total of 44 items. For map task, maps were created which had destination points and routes using Google maps. A total of 50 questions were prepared based on the maps created and was provided along with its 50 distracters. 114 statement questions were framed for math task which needed a right solution in the form of mode of operation to be chosen by PWA. Under phoneme to word task, 635 words were taken, where the core vocabulary formed the source of the stimulus and the task was segregated as phoneme initial and phoneme final stimulus items. For rhyming task, 282 word pairs which rhyme and 100 word pairs which do not rhyme each other were developed. 138 minimal word pairs along with 138 distracters were made for semantic minimal pair task. For semantic odd one out task, a total of 100 items which had five semantically related words chosen from core vocabulary along with two unrelated words were developed. Syllable task had 635 items of core vocabulary, where the words were counted for

number of syllables in each. The Sentence Completion Task consisted of 25 sentences each in active and passive voice with one answer and six distracters for each sentence.

The stimuli and tasks were rated by 10 SLPs using a feedback questionnaire taken from MANAT (Goswami, Shanbal, Chaitra & Ranjini, 2011) tool which consisted of 20 parameters. All the stimuli and tasks were rated on a five point rating scale as 'very poor', 'poor', 'fair', 'good', and 'excellent' for each of the 20 parameters as mentioned in MAAT tool. The 20 parameters include simplicity, familiarity, size of the picture, color and appearance, arrangement, presentation, volume, relevance, complexity, iconicity, accessibility, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern, publications, outcomes and developers and coverage of parameters. All the ratings from 10 SLPs were collected, compiled and frequency distributions of rating for each parameter were obtained using SPSS 21.0 software. The results are discussed for each of 29 categories from core vocabulary separately and other tasks which consisted of statements, questions and phrases based on the obtained ratings from 10 judges for all twenty parameters.

Ratings obtained for Core vocabulary of 30 lexical categories:

Animals

There are a total of 62 items in animal category and their related pictures. Table 4.3 shows the rating of the items obtained from 10 judges on a feedback questionnaire. As shown in the table, out of 10 SLPs, on the parameters of simplicity, iconicity, stimulability, feasibility, scope of practice, scoring pattern and coverage of parameters, six judges rated the stimuli of words and related pictures as good, where as four has

judged to be excellent. Eight judges gave a rating of good and two of them rated as excellent for the parameters of familiarity and presentation. On the parameter of size of the picture, two judges rated the stimuli as fair, five of them as good and three judges rated it to be excellent.

Table 4.3 *Stimulus rating for lexical category of Animals*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	6	4
Familiarity	-	-	-	8	2
Size of the Picture	-	-	2	5	3
Colour and Appearance	-	-	1	6	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	8	2
Volume	-	-	-	7	3
Relevance	-	-	1	5	4
Complexity	-	-	1	5	4
Iconicity	-	-	-	6	4
Accessibility	-	-	-	7	3
Flexibility	-	-	1	6	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	6	4
Feasibility	-	-	-	6	4
Generalization	-	-	1	5	4
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	5	5
Coverage of Parameters	-	-	-	6	4

One of the judges gave the rating of fair, six SLPs rated the words and pictures as good and four of them have rated as excellent on the parameters of color and appearance and flexibility. On the parameters of arrangement, accessibility and trainability, seven of the SLPs rated to be good and three judges rated the stimuli as excellent. A rating of fair,

good and excellent was given by one, five and four judges respectively for the parameters of relevance, complexity and generalization. On the parameter of publication, five judges gave the rating as good and five judges rated it to be excellent. Few of the items in this category were modified based on the suggestion given by the raters. Some items were discarded as these were rated as least familiar by the judges and few pictures were changed as size color and appearance were not appropriate.

Arts and crafts

A total of 18 items and the relevant picture stimuli were identified and arranged as 'easy', 'medium' and 'difficult'. Table 4.4 depicts the stimulus rating for the lexical category of arts and crafts. On the parameters of familiarity, presentation, iconicity, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern and publications and outcome, eight judges rated the stimuli as good, whereas two of them gave a rating of excellent. Seven judges rated as good and three judges rated the stimuli to be excellent for the parameters of simplicity, volume, relevance, accessibility and flexibility. For the parameters, size of the picture and color and appearance, a rating of fair was given by one judge, stimuli was rated as good by six judges and as excellent by three judges. One of the judges gave the rating of fair, seven judges rated the stimuli to be good and two to be excellent on the parameters of arrangement, complexity and coverage of parameters.

Table 4.4 *Stimulus rating for lexical category of Arts and crafts*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	8	2
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	1	6	3
Arrangement	-	-	-	7	2
Presentation	-	-	1	7	3
Volume	-	-	-	7	3
Relevance	-	-	-	7	3
Complexity	-	-	1	7	2
Iconicity	-	-	-	8	2
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	8	2
Stimulability	-	-	-	8	2
Feasibility	-	-	-	8	2
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	8	2
Scoring Pattern	-	-	-	8	2
Publications	-	-	-	8	2
Coverage of Parameters	-	-	1	7	2

Birds

In birds category, totally there were 32 items and has been categorized as the most commonly found in India and also as the most familiar. As shown in Table 4.5, on the parameters of simplicity and feasibility, two judges perceived it to be fair and six of them rated it as good. Two judges gave the rating for the familiarity of the stimuli as poor, two judges rated it as fair and six of them gave the rating as good. On relevance of the stimuli, a rating of fair and good was given by four and six judges respectively. These ratings explain the fact that some of the stimuli in this category cannot be easily identified. They

are least familiar and may not hold good relevance in Indian context. Also on the

parameters of trainability and stimulability ratings are obtained as fair by two judges,

good by seven and as excellent by one judge.

Table 4.5 *Stimulus Rating for Lexical category of Birds*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	2	6	2
Familiarity	-	-	4	6	-
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	1	6	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	8	2
Volume	-	-	1	7	2
Relevance	-	-	-	5	5
Complexity	-	-	3	5	2
Iconicity	-	-	-	8	2
Accessibility	-	-	1	7	2
Flexibility	-	-	3	6	1
Trainability	-	-	2	7	1
Stimulability	-	-	2	7	1
Feasibility	-	-	2	6	2
Generalization	-	-	1	8	1
Scope of Practice	-	-	2	7	1
Scoring Pattern	-	-	1	7	2
Publications	-	-	1	8	1
Coverage of Parameters	-	-	2	7	1

Out of 10 judges, one of them rated as fair, six judges gave the rating of good and three

judges as excellent for the aspects of size of the picture and color and appearance. On

arrangement, seven and three judges gave the rating of good and excellent respectively.

For the parameters of presentation and iconicity, ratings of good and excellent were given

by eight and two judges. A rating of fair, good and excellent were given for the

parameters of volume, accessibility, and scoring pattern by 1, 7 and 2 judges respectively. For the aspect of complexity, three judges rated the stimuli as fair, five judges gave the rating of good and a rating of excellent by two judges. Three judges rated the stimuli for flexibility as fair, whereas it was given a rating of good by six of them and the rest gave the rating to be excellent. Generalization and publications, outcomes and developers obtained the ratings of fair, good, and excellent by one, eight and one judge respectively. On the parameters of scope of practice and coverage, two judges rated it as fair, seven of them as good and one of the judges gave the rating as excellent.

Body Parts

There are total of 29 items in body parts category and Table 4.6 shows the stimulus ratings from 10 judges for the same. On the parameters of simplicity, arrangement, volume, relevance, accessibility, flexibility, trainability, stimulability, feasibility, generalization, scope of practice and scoring pattern six judges rated the items as good and the rest rated them as excellent. One of the judges, five judges and four of them rated familiarity, color and appearance, presentation, complexity, publications and coverage of parameters as fair, good, and excellent respectively. For size of the picture and iconicity aspects, two judges rated the stimulus to be fair, four judges each gave the rating as good and excellent.

Table 4.6 *Stimulus Rating for Lexical Category of Body Parts*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	6	4
Familiarity	-	-	1	5	4
Size of the Picture	-	-	2	4	4
Colour and Appearance	-	-	1	5	4
Arrangement	-	-	-	6	4
Presentation	-	-	1	5	4
Volume	-	-	-	6	4
Relevance	-	-	-	6	4
Complexity	-	-	1	5	4
Iconicity	-	-	2	4	4
Accessibility	-	-	-	6	4
Flexibility	-	-	-	6	4
Trainability	-	-	-	6	4
Stimulability	-	-	-	6	4
Feasibility	-	-	-	6	4
Generalization	-	-	-	6	4
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	1	5	4
Coverage of Parameters	-	-	1	5	4

Clothing

39 items and their pictures under this lexical category were translated and adapted and rated on the feedback questionnaire. The ratings for this category are mentioned in Table 4.7.On Simplicity, volume, trainability, generalization aspects, eight judges rated the stimuli as good and two of them as excellent.

Table 4.7 *Stimulus Rating for Lexical Category of Clothing*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	8	2
Familiarity	-	-	-	9	1
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	1	6	3
Presentation	-	-	-	7	3
Volume	-	-	-	8	2
Relevance	-	-	1	7	2
Complexity	-	-	1	6	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	8	2
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

Out of 10 judges, one of them rated the stimulus as fair, six judges gave the rating of good and rest of them rated the stimuli to be excellent on the aspects of size of the picture, arrangement and complexity. For the parameters color and appearance, presentation, accessibility, flexibility, stimulability, feasibility, scope of practice, scoring pattern, publications, outcomes and developers, and coverage of parameters, seven of them rated as good while three of the judges rated it as excellent. Familiarity of the stimuli was rated as good by nine judges and to be excellent by one judge. This stimulus

was rated for its relevance by one judge as fair, by seven judges as good and by two of them as excellent.

Container

A total of 15 items were translated in Kannada in this category. Table 4.8 shows the stimulus rating for this category.

Table 4.8 *Stimulus Rating for the Lexical Category of Container*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	8	2
Presentation	-	-	-	8	2
Volume	-	-	-	7	3
Relevance	-	-	-	7	3
Complexity	-	-	-	7	3
Iconicity	-	-	-	8	2
Accessibility	-	-	-	8	2
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	8	2
Scoring Pattern	-	-	-	8	2
Publications	-	-	-	8	2
Coverage of Parameters	-	-	-	8	2

The stimulus rating of good and fair was given by seven judges and three judges on the parameters of simplicity, familiarity, size of the picture, color and appearance, volume,

relevance, complexity flexibility, trainability, stimulability and feasibility. For arrangement, presentation, iconicity, accessibility, generalization, scope of practice, scoring pattern, publications, outcomes and developers and coverage parameters, out of 10 judges, eight of the judges gave the rating of good and two of them rated it as excellent.

Entertainment

A set of 9 items relevant to Indian context were comprised in this category. The obtained ratings for the same are summarized in Table 4.9. In this category, the ranking of good and excellent was given by seven and three judges respectively on most of the parameters like arrangement, volume, accessibility, flexibility, trainability, stimulability, feasibility, and generalization, scope of practice, scoring pattern, publications and coverage of parameters. Complexity of the stimulus was being ranked as fair by two, good by six and excellent by two judges. For the aspect iconicity, a stimulus rating was given by two judges as fair, five judges as good and three judges as excellent. Five judges each rated simplicity and familiarity as good and excellent. For size of picture and presentation, a rating of fair, good, excellent were obtained by one, six, three judges respectively.

Table 4.9 *Stimulus Rating for Lexical Category of Entertainment*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	5	5
Familiarity	-	-	-	5	5
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	-	8	2
Arrangement	-	-	-	7	3
Presentation	-	-	1	6	3
Volume	-	-	-	7	3
Relevance	-	-	-	8	2
Complexity	-	-	2	6	2
Iconicity	-	-	2	5	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

Fixture

Table 4.10 gives the summary of ratings given for 6 items of the category fixture. A uniform rating was observed by most of the raters for the parameters of stimulus rating on a feedback questionnaire.

Table 4.10 *Stimulus Rating for the Lexical Category of Fixture*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	8	2
Relevance	-	-	-	8	2
Complexity	-	-	-	8	2
Iconicity	-	-	-	8	2
Accessibility	-	-	-	8	2
Flexibility	-	-	-	8	2
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	8	2
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	8	2
Scoring Pattern	-	-	-	8	2
Publications	-	-	-	8	2
Coverage of Parameters	-	-	-	8	2

Many parameters were rated as being good and excellent by eight and two judges respectively. (volume, relevance, complexity, iconicity, accessibility, flexibility, feasibility, generalization, scope of practice, scoring pattern professional background and coverage of parameters). On the parameters of simplicity, familiarity, size of the picture, color and appearance, arrangement, presentation, trainability and stimulability seven judges gave the rating of good and three gave it as excellent.

Food items

 Table 4.11 depicts the ratings of the stimulus in food items. 40 items were collected and were chosen based on relevance and familiarity and was given for the rating to 10 judges. As shown in the below Table, four judges gave the rating of good, six ranked it as excellent on the parameters of simplicity, familiarity, volume, iconicity, accessibility, flexibility, trainability and stimulability. Other aspects like size of the picture, color and appearance, arrangement, presentation, relevance and complexity received a similar rating by equal number of judges (one judge-fair, three judges-good, six judges-excellent).

Table 4.11 *Stimulus Rating for Lexical Category of Food items*

	Very Poor	**Poor**	**Fair**	**Good**	**Excellent**
Simplicity	-	-	-	4	6
Familiarity	-	-	-	4	6
Size of the Picture	-	-	1	3	6
Colour and Appearance	-	-	1	3	6
Arrangement	-	-	1	3	6
Presentation	-	-	1	3	6
Volume	-	-	-	4	6
Relevance	-	-	1	3	6
Complexity	-	-	1	3	6
Iconicity	-	-	-	4	6
Accessibility	-	-	-	4	6
Flexibility	-	-	-	4	6
Trainability	-	-	-	4	6
Stimulability	-	-	-	4	6
Feasibility	-	-	-	5	5
Generalization	-	-	-	5	5
Scope of Practice	-	-	-	5	5
Scoring Pattern	-	-	-	5	5
Publications	-	-	-	5	5
Coverage of Parameters	-	-	-	5	5

The stimulus rating on feasibility, generalization, scope of practice, scoring pattern, professional background and coverage parameters all received good and excellent by five judges each.

Fruits

The category fruits had 30 items and related pictures which was translated and modified wherever necessary. For the stimuli of 31 items ranking was obtained by all 10 SLPs and the summary of the same is presented in Table 4.12.

Table 4.12 *Stimulus Rating for Lexical Category of Fruits*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	1	4	5
Familiarity	-	-	3	2	5
Size of the Picture	-	-	1	4	5
Colour and Appearance	-	-	-	5	5
Arrangement	-	-	-	5	5
Presentation	-	-	-	5	5
Volume	-	-	-	5	5
Relevance	-	-	2	3	5
Complexity	-	-	1	4	5
Iconicity	-	-	-	6	4
Accessibility	-	-	1	5	4
Flexibility	-	-	-	5	5
Trainability	-	-	-	5	5
Stimulability	-	-	-	5	5
Feasibility	-	-	-	5	5
Generalization	-	-	1	4	5
Scope of Practice	-	-	1	5	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	5	5

This shows that ratings of fair by one of the judges, good by four judges, excellent by five judges that were obtained for the parameters of simplicity, size of the picture, complexity and generalization. Most of the ratings were good and excellent by five judges each on several aspects like color and appearance, arrangement, presentation, volume, flexibility, trainability, stimulability, feasibility and coverage of parameters. One judge rated the stimulus as fair and five of them gave the rating of good and the rest rated it as excellent on the aspects of accessibility and scope of practice. Familiarity was ranked as fair by three, good by two and excellent by five judges. None of the modifications were suggested by the raters in this category.

Furniture

Table 4.13 *Stimulus Rating for the Lexical Category of Furniture*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	1	6	3
Complexity	-	-	-	7	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

33 items were compiled and it was give for validation in this category. Table 4.13 shows the stimulus rating of furniture. Almost all the parameters except size of the picture and relevance received a rating of good by seven judges and as excellent by three judges. The rest two parameters were rated as being fair by one of them, as good by seven and as excellent by three judges respectively.

Gadgets

Presented in the Table 4.14 is the stimulus rating obtained for nine items of the category gadgets.

Table 4.14 *Stimulus Rating for the Lexical Category of Gadgets*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	8	2
Familiarity	-	-	-	8	2
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	1	6	3
Complexity	-	-	-	7	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	8	2
Flexibility	-	-	-	8	2
Trainability	-	-	-	8	2
Stimulability	-	-	-	8	2
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

It is seen that seven of the judges and three of them rated most of the parameters such as size of the picture, color and appearance, arrangement, presentation, volume, complexity, iconicity, feasibility, generalization, scope of practice, scoring pattern, professional background and coverage of parameters as good and excellent. And except relevance which was given the rating of fair by one of the judges, good by six judges and excellent by three judges rest of the aspects received the ratings of good and excellent by eight and two judges respectively.

Geography

Geography had four items in its category. Ranking for the same is shown in Table 4.15. It is summarized in the table that on the parameters of color and appearance, complexity, accessibility, flexibility, trainability and stimulability, the ratings of fair, good and excellent were assigned to the stimuli by one, seven and two judges respectively. Also several other parameters (arrangement, presentation, volume, feasibility, generalization, scope of practice, scoring pattern, professional background and coverage of parameters) were assigned the rankings of fair by one of the judges, good by six judges and excellent by three judges. While size of the picture obtained a rating of good by eight judges and excellent by two judges, iconicity was rated as fair, good and excellent by two, six and two judges respectively.

Table 4.15 *Stimulus Rating for the Lexical Category of Geography*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	2	7	1
Familiarity	-	-	2	7	1
Size of the Picture	-	-	-	8	2
Colour and Appearance	-	-	1	7	2
Arrangement	-	-	1	6	3
Presentation	-	-	1	6	3
Volume	-	-	1	6	3
Relevance	-	-	2	5	3
Complexity	-	-	1	7	2
Iconicity	-	-	2	6	2
Accessibility	-	-	1	7	2
Flexibility	-	-	1	7	2
Trainability	-	-	1	7	2
Stimulability	-	-	1	7	2
Feasibility	-	-	1	6	3
Generalization	-	-	1	6	3
Scope of Practice	-	-	1	6	3
Scoring Pattern	-	-	1	6	3
Publications	-	-	1	6	3
Coverage of Parameters	-	-	2	5	3

Herbs

For the category of herbs, a set of seven commonly found items were compiled along with their pictures. Stimulus rating for the same is represented in Table 4.16. Simplicity , familiarity, relevance and coverage of parameters were judged to be fair by two raters, good by seven of them and excellent by one of the raters. Size of the picture was ranked to be fair by two judges and good by 8 judges. Feasibility, generalization, scope of practice, scoring pattern and professional background all received the ratings by 1, 8, 1 judge respectively as to be fair, good and excellent. Color and appearance was rated as

excellent by all 10 judges. Remaining parameters were ranked as good by nine and excellent by one judge.

Table 4.16 *Stimulus Rating for the Lexical Category of Herbs*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	2	7	1
Familiarity	-	-	2	7	1
Size of the Picture	-	-	2	8	-
Colour and Appearance	-	-	-	-	10
Arrangement	-	-	-	9	1
Presentation	-	-	-	9	1
Volume	-	-	-	9	1
Relevance	-	-	2	7	1
Complexity	-	-	-	9	1
Iconicity	-	-	-	9	1
Accessibility	-	-	-	9	1
Flexibility	-	-	-	9	1
Trainability	-	-	-	9	1
Stimulability	-	-	-	9	1
Feasibility	-	-	1	8	1
Generalization	-	-	1	8	1
Scope of Practice	-	-	1	8	1
Scoring Pattern	-	-	1	8	1
Publications	-	-	1	8	1
Coverage of Parameters	-	-	2	7	1

Household items

There are total of 20 items in this category and Table 4.17 presents the summary of the ratings. As it is shown in the table, in this category all raters have given uniform ratings. On the parameter of simplicity, a rating of good by nine of the judges and one of them has given it as excellent.

Table 4.17 *Stimulus Rating for the Lexical Category of Household items*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	9	1
Familiarity	-	-	-	8	2
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	-	7	3
Complexity	-	-	-	7	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	1	6	3

For familiarity, eight judges gave the rating of good and rest judged it to be excellent. Judges had given the rating of fair(1), good(6) and excellent(3) for size of the picture. Likewise the same rating was obtained for coverage of parameters. Other than this, remaining all parameters obtained the ranking of good by seven judges and excellent by three judges. It should be observed that the uniform rating of good and excellent was obtained by majority of the raters.

Kitchen

A feedback questionnaire was used for rating the stimuli on 20 parameters for the stimulus of 21 items which were developed in this category.

Table 4.18 *Stimulus Rating for the Lexical Category of Kitchen*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	6	4
Familiarity	-	-	-	5	5
Size of the Picture	-	-	-	6	4
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	-	6	4
Complexity	-	-	-	7	3
Iconicity	-	-	-	6	4
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

Judge's ratings for kitchen category are tabulated in the Table 4.18.As depicted, simplicity, size of the picture, relevance and iconicity was ranked as good by six judges and excellent by four judges. On the aspect of familiarity, five judges rated it as good and five judges assigned the ranking of excellent .A rating of good and excellent was assigned by seven and three judges respectively for color and appearance, arrangement,

presentation and volume.. Also other parameters like complexity, accessibility, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern, professional background and coverage of parameters also have received a rating of good by seven judges and excellent by three judges.

Magical creatures

A total of two items were developed and modified in the category with their relevant pictures. Ratings for these stimuli are presented in Table 4.19. It is observed that two judges gave the rating as fair, seven as good and one as excellent for the aspects of simplicity, relevance, generalization and scope of practice. The parameters like familiarity, size of the picture, scoring pattern, professional background and coverage of parameters obtained the ratings from one of the judges as fair, from eight judges as good and as excellent by one judge. A rating of fair was given by one judge, good was given by seven judges and excellent by rest of them for the parameters iconicity, accessibility, flexibility, trainability and stimulability. A ranking of good and excellent was given for the aspects of color and appearance, arrangement, presentation and volume by eight judges and one of the judges respectively. Complexity was ranked by eight judges to be good and rest of them rated it as excellent. For feasibility, two of them gave fair, six of them gave good and remaining judges rated it as excellent.

Table 4.19 *Stimulus Rating for the Lexical Category of Magical creatures*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	2	7	1
Familiarity	-	-	1	8	1
Size of the Picture	-	-	1	8	1
Colour and Appearance	-	-	-	9	1
Arrangement	-	-	-	9	1
Presentation	-	-	-	9	1
Volume	-	-	-	9	1
Relevance	-	-	2	7	1
Complexity	-	-	-	8	2
Iconicity	-	-	1	7	2
Accessibility	-	-	1	7	2
Flexibility	-	-	1	7	2
Trainability	-	-	1	7	2
Stimulability	-	-	1	7	2
Feasibility	-	-	2	6	2
Generalization	-	-	2	7	1
Scope of Practice	-	-	2	7	1
Scoring Pattern	-	-	1	8	1
Publications	-	-	1	8	1
Coverage of Parameters	-	-	1	8	1

Musical instruments

In this category, total number of items collected was 13 and stimuli rating for these stimuli are represented in Table 4.20. All the stimuli that were most familiar in Indian context were collected and those which hold less relevance were discarded. Seven judges rated the stimuli as good and three judges gave the rating as excellent on all parameters except relevance.

Table 4.20 *Stimulus Rating for the Lexical Category of Musical instruments*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	1	6	3
Complexity	-	-	-	7	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

Nature

In this category, total number of stimuli collected was 26 and Table 4.21 shows the ratings of the stimuli given by 10 judges. The rating of good and excellent was given by six and four judges for the parameters of simplicity, familiarity, presentation, complexity, accessability, stimulability, feasibility, generalization, scope of practice, scoring pattern, professional background and coverage of parameters. Seven judges assigned the rating of

good and three judges gave the rating as excellent on the aspects of size of the picture, color and appearance, volume and trainability.

Table 4.21 *Stimulus Rating for the Lexical Category of Nature*

	Very Poor	**Poor**	**Fair**	**Good**	**Excellent**
Simplicity	-	-	-	6	4
Familiarity	-	-	-	6	4
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	5	5
Presentation	-	-	-	6	4
Volume	-	-	-	7	3
Relevance	-	-	1	5	4
Complexity	-	-	-	6	4
Iconicity	-	-	1	6	3
Accessibility	-	-	-	6	4
Flexibility	-	-	-	6	4
Trainability	-	-	-	6	4
Stimulability	-	-	-	6	4
Feasibility	-	-	-	6	4
Generalization	-	-	-	6	4
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	6	4

Arrangement was given a ranking of good by five and excellent by five of them. Relevance was rated by one of them, five and four judges respectively as fair, good and excellent. Iconicity was judged to be fair by one of the judges, good by six judges and excellent by three.

People

24 items were included in people category and the ratings for the same can be seen in Table 4.22.It was observed that six judges rated the stimulus as good and four judges gave the ranking as excellent on the aspects of simplicity, familiarity, size of the picture, color and appearance, arrangement, presentation and volume.

Table 4.22 *Stimulus Rating for the Lexical Category of People*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	6	4
Familiarity	-	-	-	6	4
Size of the Picture	-	-	-	6	4
Colour and Appearance	-	-	-	6	4
Arrangement	-	-	-	6	4
Presentation	-	-	-	6	4
Volume	-	-	-	6	4
Relevance	-	-	1	6	3
Complexity	-	-	-	7	3
Iconicity	-	-	1	6	3
Accessibility	-	-	-	7	3
Flexibility	-	-	1	6	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	1	6	3
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	6	4

While other parameters received the ranking of fair by one of the judges , good by six judges and excellent by three judges for relevance, iconicity, flexibility and feasibility. For the parameters of accessibility, trainability and stimulability, judges gave the rating

as good (7) and excellent (3). Generalization obtained good and excellent by eight and two raters respectively. Six judges rated as good and four judges rated as excellent for scope of practice, scoring pattern, professional background and coverage of parameters.

Personal items

In this category, there were total of 32 items and obtained ratings are presented in Table 4.23.

Table 4.23 *Stimulus Rating for the Lexical Category of Personal Items*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture	-	-	1	5	4
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	-	8	2
Complexity	-	-	-	7	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	-	7	3

On the parameters of simplicity, familiarity, color and appearance, arrangement, presentation, volume, complexity, iconicity, accessibility, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern, professional background and coverage of parameters, judges gave the uniform rating of good by seven and excellent by three. Size of the picture was given fair by one, good by five and excellent by rest of the judges. Eight judges gave the rating for the parameter of relevance as good and rest of them ranked it as excellent.

Residence

In this category, a total of 6 items were modified and translated in Kannada language. Table 4.24 gives the stimulus rating obtained from judges for the items compiled in residence category. One of the judges assigned the rating of fair, six judges gave it as good while rest of them rated it to be excellent on the aspects of accessibility, stimulability, feasibility, scope of practice, scoring pattern, professional background and coverage of parameters. It was shown that on the parameters of color and appearance, complexity, presentation and generalization, one of the judgse ranked it as fair, seven of them as good and two of the judges gave excellent. The parameters like arrangement, flexibility and trainability obtained the ratings of fair, good and excellent by one, eight and one rater respectively. Four judges gave the rating of fair, four judges assigned good and two rated it as excellent for simplicity. For familiarity and volume, eight judges made it as good, while remaining of them made excellent. Relevance obtained fair, good and

excellent by two, six and two judges respectively. On the aspect of iconicity, three, four and three judges assigned the rankings of fair, good and excellent.

Table 4.24 *Stimulus Rating for the Lexical Category of Residence*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	4	4	2
Familiarity	-	-	-	8	2
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	1	7	2
Arrangement	-	-	1	8	1
Presentation	-	-	1	7	2
Volume	-	-	-	8	2
Relevance	-	-	2	6	2
Complexity	-	-	1	7	2
Iconicity	-	-	3	4	3
Accessibility	-	-	1	6	3
Flexibility	-	-	1	8	1
Trainability	-	-	1	8	1
Stimulability	-	-	1	6	3
Feasibility	-	-	1	6	3
Generalization	-	-	1	7	2
Scope of Practice	-	-	1	6	3
Scoring Pattern	-	-	1	6	3
Publications	-	-	1	6	3
Coverage of Parameters	-	-	1	6	3

Structure

This had 23 stimuli in total and given ratings for the same is depicted in Table 4.25. Size of the picture, iconicity, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern and professional background obtained a ranking of fair by one of the judges, as good by six of them and excellent by rest of the judges. One of the judges rated the stimuli as fair, seven gave the rating as good and two of them gave

excellent for the aspects of presentation, volume and complexity. Simplicity and familiarity received fair, good and excellent by the judges two, six and two. Color and appearance and relevance parameters obtained the rating of good by eight and excellent by rest of them. On the parameter of arrangement, two judges gave the ranking of fair, seven gave good and one of the judges gave it as excellent. Seven and three judges assigned good and excellent for accessibility and coverage of parameters.

Table 4.25 *Stimulus Rating for the Lexical Category of Structure*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	2	6	2
Familiarity	-	-	2	6	2
Size of the Picture	-	-	1	6	3
Colour and Appearance	-	-	-	8	2
Arrangement	-	-	2	7	1
Presentation	-	-	1	7	2
Volume	-	-	1	7	2
Relevance	-	-	-	8	2
Complexity	-	-	1	7	2
Iconicity	-	-	1	6	3
Accessibility	-	-	-	7	3
Flexibility	-	-	1	6	3
Trainability	-	-	1	6	3
Stimulability	-	-	1	6	3
Feasibility	-	-	1	6	3
Generalization	-	-	1	6	3
Scope of Practice	-	-	1	6	3
Scoring Pattern	-	-	1	6	3
Publications	-	-	1	6	3
Coverage of Parameters	-	-	-	7	3

Symbolic

This category consisted of 5items and the following Table 4.26 present the summary of the assigned rankings for the same. As shown in the table, familiarity, size of the picture, color and appearance, arrangement, presentation, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, and scoring pattern had been given a rank of good by eight judges and a rank of excellent by two of them.

Table 4.26 *Stimulus Rating for the Lexical Category of Symbolic*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	9	1
Familiarity	-	-	-	8	2
Size of the Picture	-	-	-	8	2
Colour and Appearance	-	-	-	8	2
Arrangement	-	-	-	8	2
Presentation	-	-	-	8	2
Volume	-	-	-	7	3
Relevance	-	-	-	7	3
Complexity	-	-	-	7	3
Iconicity	-	-	-	6	4
Accessibility	-	-	-	7	3
Flexibility	-	-	-	8	2
Trainability	-	-	-	8	2
Stimulability	-	-	-	8	2
Feasibility	-	-	-	8	2
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	8	2
Scoring Pattern	-	-	-	8	2
Publications	-	-	1	7	2
Coverage of Parameters	-	-	1	7	2

Seven of them gave good and remaining judges assigned it to be excellent on the aspects of volume, relevance, complexity and accessibility. Simplicity obtained good and

excellent ratings by nine and one of the judges respectively. For iconicity, six judges gave

the ranking of good and four of them rated it to be excellent. Other parameters received

fair by one of them, good by seven and excellent by two judges.

Tools

There are 35 items and their related pictures under this section and the ratings obtained

are provided in Table 4.27. Seven judges rated the stimulus as good and three judges

rated it as excellent for color and appearance, arrangement, presentation, volume,

complexity, iconicity, accessibility, scope of practice, scoring pattern and professional

background.

Table 4.27 *Stimulus Rating for the Lexical Category of Tools*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	2	6	2
Familiarity	-	-	3	5	2
Size of the Picture	-	-	-	8	2
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	2	6	2
Complexity	-	-	-	7	3
Iconicity	-	-	-	7	3
Accessibility	-	-	-	7	3
Flexibility	-	-	1	6	3
Trainability	-	-	1	6	3
Stimulability	-	-	1	6	3
Feasibility	-	-	1	6	3
Generalization	-	-	2	5	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	1	6	3

It was noticed that on flexibility, trainability, stimulability, feasibility and coverage of parameters, only one judge gave the rating of fair, whereas six of them judged it as good and remaining rated it to be excellent. For simplicity and relevance, obtained ratings followed fair by two, good by six and excellent by two. Three judges gave the rating of fair, good was given by five and two raters rated it as excellent for familiarity. On the aspect of size of the picture, eight judges gave good where rest of them rated it as excellent. Generalization was ranked as fair by two judges, as good by five judges and as excellent by three judges.

Toys

Table 4.28 *Stimulus Rating for the Lexical Category of Toys*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	8	2
Familiarity	-	-	-	8	2
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	1	6	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	1	6	3
Complexity	-	-	1	6	3
Iconicity	-	-	1	6	3
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	7	3
Generalization	-	-	-	7	3
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	7	3
Publications	-	-	-	7	3
Coverage of Parameters	-	-	1	6	3

In this category, total compiled words and their related pictures are 18. 10 judges have given their ratings for the same and are arranged in Table 4.28. On the aspects of size of the picture, color and appearance, presentation, volume, accessibility, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern and professional background, seven judges gave good and remaining rated as excellent. One of them gave the rating of fair, six assigned good and three of them ranked it as excellent or arrangement, relevance, complexity, iconicity and coverage of parameters. Simplicity and familiarity were ranked as good and excellent by eight and two judges respectively.

Transportation

Table 4.29 *Stimulus Rating for the Lexical Category of Transportation*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	1	4	5
Familiarity	-	-	1	4	5
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	7	3
Arrangement	-	-	-	6	4
Presentation	-	-	-	6	4
Volume	-	-	-	6	4
Relevance	-	-	-	6	4
Complexity	-	-	-	6	4
Iconicity	-	-	-	6	4
Accessibility	-	-	-	7	3
Flexibility	-	-	-	6	4
Trainability	-	-	-	6	4
Stimulability	-	-	-	7	3
Feasibility	-	-	-	6	4
Generalization	-	-	-	6	4
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	6	4

Total number of stimuli in this category is 34 and the stimulus rating for this is represented in Table 4.29. Simplicity and familiarity was given a ranking of fair by one, good by four and excellent by five judges. Six judges gave the rating of good and rest of them ranked it as excellent for relevance, complexity, arrangement, presentation, volume, iconicity, flexibility, trainability, feasibility, generalization, scope of practice, scoring pattern, coverage of parameters and professional background. On the aspects of size of the picture, color and appearance, accessibility and stimulability seven judges assigned the ranking to be good and three of them rated it as excellent.

Vegetables

Table 4.30 *Stimulus Rating for the Lexical Category of Vegetables*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	3	7
Familiarity	-	-	-	3	7
Size of the Picture	-	-	-	4	6
Colour and Appearance	-	-	-	3	7
Arrangement	-	-	-	4	6
Presentation	-	-	-	4	6
Volume	-	-	-	4	6
Relevance	-	-	-	3	7
Complexity	-	-	-	3	7
Iconicity	-	-	-	3	7
Accessibility	-	-	-	4	6
Flexibility	-	-	-	3	7
Trainability	-	-	-	3	7
Stimulability	-	-	-	4	6
Feasibility	-	-	-	4	6
Generalization	-	-	-	3	7
Scope of Practice	-	-	-	4	6
Scoring Pattern	-	-	-	3	7
Publications	-	-	-	3	7
Coverage of Parameters	-	-	-	3	7

For simplicity and familiarity, a rating of fair, good and excellent was given by one, four and five judges respectively. Five judges each ranked for relevance and complexity as good and excellent. Vegetables section had a total number of 36 items and its related pictures. Table 4.30 presents with the summary of the ratings obtained for the same. On the parameters of familiarity, color and appearance, relevance, complexity, iconicity, flexibility, trainability, generalization, scoring pattern, professional background and coverage of parameters, three judges gave good, whereas seven judges rated the stimulus as excellent. Four judges gave the ranking of good and remaining of them assigned excellent for size of the picture, arrangement, presentation, volume, accessibility, stimulability, feasibility and scope of practice. This category also obtained a rating of good and excellent as it included all familiar and highly frequent items and held good validity**.**

Weapons

Six items are included in this category and judges ratings for the stimulus validation are as followed in Table 31. It is seen that for color and appearance, arrangement, presentation, volume, relevance, complexity, iconicity, accessibility, flexibility, trainability, stimulability, feasibility and generalization six judges gave the rating of good and rest of them gave excellent. One of the judges rated it as fair, four judges rated the stimulus as good and remaining of them ranked it as excellent on the aspects of scope of practice, scoring pattern, publication, outcomes and developers and coverage of

parameters. On simplicity, familiarity and size of the picture a rating of good and excellent was given by seven and three raters respectively.

Table 4.31 *Stimulus Rating for the Lexical Category of Weapons*

	Very Poor	**Poor**	**Fair**	**Good**	**Excellent**
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture	-	-	-	7	3
Colour and Appearance	-	-	-	6	4
Arrangement	-	-	-	6	4
Presentation	-	-	-	6	4
Volume	-	-	-	6	4
Relevance	-	-	-	6	4
Complexity	-	-	-	6	4
Iconicity	-	-	-	6	4
Accessibility	-	-	-	6	4
Flexibility	-	-	-	6	4
Trainability	-	-	-	6	4
Stimulability	-	-	-	6	4
Feasibility	-	-	-	6	4
Generalization	-	-	1	5	4
Scope of Practice	-	-	1	5	4
Scoring Pattern	-	-	1	5	4
Publications	-	-	1	5	4
Coverage of Parameters	-	-	1	5	4

Auditory command task

Ratings for this task are shown in Table 4.32. In this task, since the pictures were chosen from the core vocabulary of 30 categories, parameters like size of the picture, color and appearance and iconicity were not rated and were marked as not applicable. Simplicity was given a rating of fair by one, good by eight and excellent by one judge respectively. For coverage of parameters, one of the judges gave fair, seven judges rated good and rest

of them as excellent. A rating of good and excellent was given by eight and two judges on the parameters of accessibility, flexibility, trainability, stimulability, feasibility, generalization, scope of practice, scoring pattern and professional background. Rest all parameters received a ranking of good by nine and excellent by one of the judges.

Table 4.32 *Stimulus Rating for Auditory command task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	1	8	1
Familiarity	-	-	-	9	1
Size of the Picture(NA)	-	-	-	-	-
Colour and Appearance(NA)	-	-	-	-	-
Arrangement	-	-	-	9	1
Presentation	-	-	-	9	1
Volume	-	-	-	9	1
Relevance	-	-	-	9	1
Complexity	-	-	-	9	1
Iconicity(NA)	-	-	-	-	-
Accessibility	-	-	-	8	2
Flexibility	-	-	-	8	2
Trainability	-	-	-	8	2
Stimulability	-	-	-	8	2
Feasibility	-	-	-	8	2
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	8	2
Scoring Pattern	-	-	-	8	2
Publications	-	-	-	8	2
Coverage of Parameters	-	-	1	7	2

*(NA: Not Applicable): Indicates that particular parameter is not applicable to this task

Calendar task

Calendar task consisted of set of questions based on important events and dates marked in picture stimuli used for the same. A total of 120 questions, their distracters and 12 related pictures formed calendar task. The ratings for the set of questions and their related

pictures are depicted in Table 4.33. Here in this task, the judges were asked to rate the questions mainly for its appropriateness, familiarity of the words used in those sentences and overall simplicity of the task.

Table 4.33 *Stimulus Rating for Calendar task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	6	4
Size of the Picture	-	-	5	4	1
Colour and Appearance	-	-	5	4	1
Arrangement	-	-	-	6	4
Presentation	-	-	-	6	4
Volume	-	-	-	5	5
Relevance	-	-	-	5	5
Complexity	-	-	1	4	5
Iconicity	-	-	5	4	1
Accessibility	-	-	-	6	4
Flexibility	-	-	-	5	5
Trainability	-	-	-	6	4
Stimulability	-	-	-	6	4
Feasibility	-	-	-	6	4
Generalization	-	-	1	4	5
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	6	4

Ratings obtained as per the given instructions showed that on the parameters of familiarity, presentation, accessibility, trainability, stimulability, arrangement, scope of practice, scoring pattern, professional background and coverage of parameters the task obtained a rating of good by six judges and excellent by rest of them. Five judges gave

the ranking of fair, four rated it as good and one judged it to be excellent for size of the picture, color and appearance and iconicity. A rating of good and excellent had been given by each of the five judges on the aspects of volume, relevance and flexibility. One of the judges gave the rating of fair, four of them assigned good and remaining ranked it to be excellent for complexity and generalization. On simplicity, seven and three judges rated good and excellent.

Currency task

Table 4.34 *Stimulus Rating for Currency task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-		6	4
Familiarity	-	-	-	4	6
Size of the Picture	-	-	-	6	4
Colour and Appearance	-	-	1	4	5
Arrangement	-	-	-	4	6
Presentation	-	-	-	5	5
Volume	-	-	-	5	5
Relevance	-	-	1	4	5
Complexity	-	-	-	5	5
Iconicity	-	-	-	5	5
Accessibility	-	-	-	5	5
Flexibility	-	-	-	5	5
Trainability	-	-	-	5	5
Stimulability	-	-	-	5	5
Feasibility	-	-	1	4	5
Generalization	-	-	1	4	5
Scope of Practice	-	-	-	5	5
Scoring Pattern	-	-	-	5	5
Publications	-	-	-	5	5
Coverage of Parameters	-	-	-	5	5

Currency task has 196 questions and its related pictures. Table 4.34 gives the overview of the ratings obtained for the same. Five judges provided the rating of good and excellent on volume, complexity, iconicity, accessibility, flexibility, trainability, stimulability, scope of practice, scoring pattern, professional background and coverage of parameters. On the aspects of color and appearance, relevance, feasibility and generalization, one of them gave the rating of fair, a rating of good was obtained by four judges and five of them ranked it to be excellent. On simplicity and size of the picture, obtained rankings are good (six judges) and excellent (four judges). Four judges provided a rating of good, whereas rest of them assigned excellent for familiarity and arrangement parameters.

Math task

Table 4.35 *Stimulus Rating for Math task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	1	9	
Familiarity	-	-	-	10	-
Size of the Picture(NA)	-	-	-	-	-
Colour & Appearance(NA)*	-	-	-	-	-
Arrangement	-	-	-	6	4
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	-	6	4
Complexity	-	-	-	6	4
Iconicity(NA)*	-	-	-	-	-
Accessibility	-	-	-	6	4
Flexibility	-	-	1	5	4
Trainability	-	-	1	5	4
Stimulability	-	-	-	6	4
Feasibility	-	-	-	6	4
Generalization	-	-	2	4	4
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	6	4

*(NA: Not Applicable): Indicates that particular parameter is not applicable to this task

This task included a 114 statement questions which needs an answer of what kind of operation needs to be chosen as a solution. Here rating is done considering how the statement questions are framed and its aptness for the solutions provided. The ratings are provided by judges are shown in Table 4.35.Arrangement, relevance, complexity, accessibility, stimulability, feasibility, scope of practice, scoring pattern, professional background and coverage of parameters, all these are rated as being good by six judges and being excellent by four of them. All 10 judges ranked the stimuli as good on a parameter of familiarity. For simplicity, one of them provided fair whereas remaining judges rated it as good. Seven judges and three judges ranked as good and excellent for the parameters of presentation and volume. Flexibility and trainability received a ranking of fair, good and excellent by one, five and four judges respectively. On generalization, two judges rated the stimuli as fair, four of them gave it as good whereas rest of them assigned a ranking of excellent.

Rhyming task

In this, 282 rhyming word pairs and 100 non rhyming pairs were developed, was mainly rated for whether the two words rhyme appropriately or not and for familiarity of the words used. Table 4.36 depicts the ratings of the same. It is seen that, for familiarity, arrangement, presentation, volume, complexity, accessibility, flexibility, trainability, stimulability and scope of practice, seven judges provided the ranking of good and remaining of them gave excellent. Feasibility, generalization, scoring pattern, professional background and coverage of parameters all these received a rating of good and excellent by eight and two judges respectively. Simplicity and relevance obtained good and excellent by six and four of them.

Table 4.36 *Stimulus rating for Rhyming task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	6	4
Familiarity	-	-	-	7	3
Size of the Picture(NA)	-	-	-	-	-
Colour and Appearance(NA)	-	-	-	-	-
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	7	3
Relevance	-	-	-	6	4
Complexity	-	-	-	7	3
Iconicity(NA)*	-	-	-	-	-
Accessibility	-	-	-	7	3
Flexibility	-	-	-	7	3
Trainability	-	-	-	7	3
Stimulability	-	-	-	7	3
Feasibility	-	-	-	8	2
Generalization	-	-	-	8	2
Scope of Practice	-	-	-	7	3
Scoring Pattern	-	-	-	8	2
Publications	-	-	-	8	2
Coverage of Parameters	-	-	-	8	2

*(NA: Not Applicable): Indicates that particular parameter is not applicable to this task

Semantic minimal pair task

This has a total of 138 minimal pairs and judge's ratings for the same are summarized in Table 4.37. It was observed that for the parameters of arrangement, presentation, volume, relevance, complexity, scope of practice, scoring pattern, professional background and coverage of parameters obtained good by six and excellent by four judges. One of the judges gave the ranking of fair, five of them assigned good and remaining rated excellent for flexibility, trainability, stimulability, feasibility and generalization. For the aspects of

simplicity and familiarity judges gave the rating as good(seven judges) and excellent(three judges). Accessibility received a rating of good and excellent by five judges each.

Table 4.37 *Stimulus rating for Semantic minimal pair*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	7	3
Familiarity	-	-	-	7	3
Size of the Picture(NA)	-	-	-	-	-
Colour and Appearance(NA)	-	-	-	-	-
Arrangement	-	-	-	6	4
Presentation	-	-	-	6	4
Volume	-	-	-	6	4
Relevance	-	-	-	6	4
Complexity	-	-	-	6	4
Iconicity(NA)	-	-	-	-	-
Accessibility	-	-	-	5	5
Flexibility	-	-	1	5	4
Trainability	-	-	1	5	4
Stimulability	-	-	1	5	4
Feasibility	-	-	1	5	4
Generalization	-	-	1	5	4
Scope of Practice	-	-	-	6	4
Scoring Pattern	-	-	-	6	4
Publications	-	-	-	6	4
Coverage of Parameters	-	-	-	6	4

*(NA: Not Applicable): Indicates that particular parameter is not applicable to this task.

Semantic odd one out task

This task included 100 set of related words and its distracters. Table 4.38 shows the stimulus rating for the same. It is seen that on the parameters of simplicity and familiarity, eight judges assigned the ranking as good and rest of them gave excellent. Seven of them gave the rating as good and three judges rated the stimulus to be excellent

for the aspects of arrangement, presentation and scoring pattern. For other parameters of complexity, accessibility, flexibility, generalization, scope of practice and coverage of parameters, five judges gave the rating as good and remaining five judges rated it to be excellent. Volume and relevance obtained ratings of good and excellent by six and four judges respectively. One of the judges rated it as fair, six judges assigned the ranking of good and three of them gave excellent for the parameters of trainability, stimulability and feasibility. On the aspect of professional background, five of them gave fair and other five judges rated good.

Table 4.38 *Stimulus rating for Semantic odd one out task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	8	2
Familiarity	-	-	-	8	2
Size of the Picture(NA)	-	-	-	-	-
Colour and Appearance(NA)	-	-	-	-	-
Arrangement	-	-	-	7	3
Presentation	-	-	-	7	3
Volume	-	-	-	6	4
Relevance	-	-	-	6	4
Complexity	-	-	-	5	5
Iconicity(NA)	-	-	-	-	-
Accessibility	-	-	-	5	5
Flexibility	-	-	-	5	5
Trainability	-	-	1	6	3
Stimulability	-	-	1	6	3
Feasibility	-	-	1	6	3
Generalization	-	-	-	5	5
Scope of Practice	-	-	-	5	5
Scoring Pattern	-	-	-	7	3
Publications	-	-	5	5	-
Coverage of Parameters	-	-	-	5	5

*(NA: Not Applicable): Indicates that particular parameter is not applicable to this task

Feature task

For this task, 101 features were written along with its related answers and distracters.

Stimulus rating was obtained from 10 judges and is presented in Table 4.39.

Table 4.39 *Stimulus rating for Feature task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	-	5	5
Familiarity	-	-	-	6	4
Size of the Picture(NA)	-	-	-	-	-
Colour and Appearance(NA)	-	-	-	-	-
Arrangement	-	-	1	5	4
Presentation	-	-	1	5	4
Volume	-	-	1	5	4
Relevance	-	-	-	5	5
Complexity	-	-	2	6	2
Iconicity(NA)	-	-	-	-	-
Accessibility	-	-	-	6	4
Flexibility	-	-	-	5	5
Trainability	-	-	1	5	4
Stimulability	-	-	-	6	4
Feasibility	-	-	-	5	5
Generalization	-	-	1	5	4
Scope of Practice	-	-	-	4	6
Scoring Pattern	-	-	-	4	6
Publications	-	-	-	5	5
Coverage of Parameters	-	-	-	5	5

*(NA: Not Applicable): Indicates that particular parameter is not applicable to this task

For feature task, on the parameters of simplicity, relevance, flexibility, feasibility, professional background and coverage of parameters, five judges gave the rating of good, whereas remaining five judges rated the stimulus to be excellent. For familiarity, accessibility and stimulability aspects, six raters judged the stimuli to be good and four of them gave the rating as excellent. One of the judges assigned it as fair, five of them rated

as good and rest of the judges gave the ranking as excellent. On the aspect of complexity, fair was given two judges, good by six of them and as excellent by rest of the judges. For scope of practice and scoring pattern, four judges gave good and remaining judges assigned the ranking of excellent.

Map task

Table 4.40 *Stimulus rating for Map task*

	Very Poor	Poor	Fair	Good	Excellent
Simplicity	-	-	3	5	2
Familiarity	-	-	3	5	2
Size of the Picture	-	-	2	6	2
Colour and Appearance	-	-	2	6	2
Arrangement	-	-	1	5	4
Presentation	-	-	1	5	4
Volume	-	-	1	5	4
Relevance	-	-	4	5	1
Complexity	-	-	4	6	-
Iconicity	-	-	1	5	4
Accessibility	-	-	-	5	5
Flexibility	-	-	-	5	5
Trainability	-	-	3	5	2
Stimulability	-	-	2	7	1
Feasibility	-	-	-	6	4
Generalization	-	-	1	5	4
Scope of Practice	-	-	1	5	4
Scoring Pattern	-	-	-	7	3
Publications	-	-	5	5	-
Coverage of Parameters	-	-	-	7	3

In this task, maps were created using Google maps and 50 questions based on the maps were made along with its distracters. Table 4.40 presents the ratings obtained for this task for 20 parameters. For the aspects of simplicity, familiarity and trainability, three judges

rated it as fair, five of them gave the ranking of good and rest of them assigned excellent ratings. One of the judges gave the rating as fair, five judges assigned a ranking of good and four judges rated it to be excellent for the parameters of arrangement, presentation, volume, iconicity, generalization and scope of practice. Size of the picture and color and appearance obtained a ranking of fair by two judges, a rating of good by six judges and excellent by two of them. Five judges assigned good and other five judges gave the rating of excellent for the aspects of accessibility and flexibility. On the parameters of scoring pattern and coverage of parameters, good and excellent ratings were obtained by seven and three judges respectively. Relevance received a ranking of fair by four judges, good by five of them and excellent by one of the judges. Four judges gave the rating of fair and rest of them assigned good for complexity. For stimulability, ratings of fair, good and excellent were obtained by two, seven and one of the judges respectively. Feasibility obtained good rating by six judges and a rating of excellent by four judges. A rating of fair and good was obtained by five judges each for professional background parameter.

To summarize, all lexical categories and tasks of Constant Therapy software Kannada has obtained good and excellent ratings by no less than 70% of judges on almost all parameters.

Chapter V

Discussion

The study aimed to adapt constant therapy software in Kannada language. The software contained two broad sections of language and cognition and other sub domains under each of them. All the stimuli and tasks were translated and modified according to the Indian context. These stimuli after making necessary adaptations were given to 10 SLPs to be validated using a feedback questionnaire, for 20 parameters on a five point rating scale. In this section, based on the obtained ratings from 10 SLPs for all 36 tasks it was discussed why these ratings obtained for few of the stimuli were low and why few were judged to have high validity.

Core vocabulary of 30 lexical categories:

Under this, items under categories like animals, art and crafts, vegetables, fruits, container, clothing, household items, body parts, food items, kitchen, personal items, fixture, toys, transportation, nature, people, gadgets and furniture were developed .Even though a few categories received a rating of fair by one or two judges for few parameters, a majority of the judges assigned good and excellent ratings which were no less than 70%. None of the parameters of the stimulus received a rating of poor or very poor which indicated that the stimulus has good validity, this was because the items used in these categories were those used in day to day situations and were all familiar thus the value of functionality was high. Thus, it can be used for intervention process where the prime aim would be improving functional communication. However, few suggestions were given by

judges to improvise the stimuli. In the category of animals, as per the suggestions of judges, /bête naayi/ was changed and they also suggested that the inclusion of /gullenari/, /thola/ and /nari/ all three would be too ambiguous and would be difficult to differentiate among them for PWA.In body parts category, it was suggested to change the pictures used to represent /bennu/ and /bhuja/ as they both looked similar and these changes were incorporated. Also picture for /baala/ was replaced by a more appropriate picture. In gadgets, as per the suggestion, mobile phone was also included in the stimulus. In toys category it was suggested to use the pictures of a real slide, see-saw and a swing and those changes were included.In nature category, based on the suggestion, 'pollen' was removed and itwas replaced by 'sun' and 'moon'. In clothing category, stimulus 'lehenga' was removed as it holds less relevance in Karnataka. Under personal items, Indian pictures for badge and /padaka/ were collected and incorporated. Thus, all the stimuli in all these categories obtained good validity and were considered for its use in tasks along with few modifications of constant therapy software in Kannada.

In few other categories like birds, entertainment, herbs, geography, magical creatures, musical instruments, structure, symbolic, tools and residence, two or more than two judges rated the stimuli as fair for most of the parameters. Mainly simplicity, familiarity, relevance and generalization parameters received lower ratings and these were the parameters which added more weight age to the quality of the stimuli prepared. In entertainment category, there were fewer stimulus items and pictures which may be ambiguous (like the pictures of /nataka/, /circus/). Also, some stimuli like 'tape recorder', and 'video game' may not serve as the means of entertainment and they may be irrelevant for the rural population. Thus, considering the ratings obtained by the raters, some more

simple, familiar and relevant stimuli which were applicable to both geographical distributions were added and were modified. Herbs category received lower ratings because of the familiarity aspect. And number of stimulus items was few. Also, frequently used items were less and hence all these factors affected its ratings for the parameters of simplicity, familiarity and relevance. As a result, appropriate modifications were done to this category. In geography, it should be noted that the ratings obtained for this category were scattered and almost all parameters received a rating of fair by one or more than one judge due to the variations in geographical distribution, literacy skills and vocation in India. Thus, the necessary adaptations were carried out. In magical creatures and symbolic category, again lower and scattered ratings explain the fact that the stimuli comprised sensible issues of caste and religion (as in /kamadhenu/, /garuda/, /om/) and therefore it demanded appropriate adaptations for these categories. In categories of structure and tools, fair ratings were given because these items again question the frequency of its usage in daily situation. The stimulus was modified and categorized based on such distinctions of religion, literacy, geographical distribution etc. and were retained with no reduction in the number of stimulus items

Other tasks of constant therapy in Kannada:

Almost all tasks received ratings of good and excellent for most of the parameters. Because all tasks were focused on giving impairment based intervention and also were more towards the functional approach of intervention for PWA(considering the tasks like, math task, currency task, calendar task). Auditory command, rhyming and semantic minimal pair tasks centered the impairment based intervention and all these tasks were to improve the auditory comprehension of PWA which ranged from a simple task of

following commands to reaching its complexity in steps towards the finer aspects like that of minimal pair. All these were modified and translated appropriately to the Indian scenario. Other tasks like semantic odd task and feature task also obtained good and excellent ratings since these tasks were thought to be more useful in strengthening the semantic network in PWA and also due to the fact that it would facilitate naming and helps in fast retrieval of words in different types and severities of aphasia. A map task had its lower ratings by most of the judges in almost all parameters due to the reason of again variations in geographical distribution, literacy skills, vocation, its relevance and utility in India. However this task was included as this can be used immensively to improve the visuo-spatial skills of PWA and its value of functionality is also high(ex: PWA travelling everyday by bus, should be aware of routes).

Reading task and sentence completion were the tasks that were adapted from field tested manual MAAT-K , hence they were not given for validation. Also, other tasks like phoneme to letter, letter to phoneme, phoneme to word and syllable task reading task and sentence completion task were not given for rating. The tasks like phoneme to letter and letter to phoneme were not rated since it had one to one correlation in Kannada language. Phoneme to word and syllable task were not given for rating because the stimulus taken for these tasks was from the core vocabulary that was already validated by the judges.

Even though, discussion of the results provided could not be extended much as the stimulus developed was not field tested, it can be used for its implementation into the software as most of the stimuli obtained good and excellent ratings mainly on the parameters of simplicity, familiarity, relevance and trainability.

Chapter VI

Summary and conclusion

The constant therapy software originally developed in English, which is an ipad based interactive system for aphasic individuals, was translated, modified and adapted into Kannada language in the present study. A stimulus rating was obtained by 10 SLPs on a 20 parameter feedback questionnaire for core vocabulary developed under 29 categories and 15 therapy tasks. All the ratings obtained for the tasks varied between ratings of good and excellent by not less than 70 % of the judges. The wide range of tasks developed tackle language retraining of PWA by improving auditory comprehension, naming, visuo spatial abilities, reading and cognitive reasoning. The extensive number of stimuli and wide range of tasks covering most of the language components to be worked on for PWA enables the clinician to make language rehabilitation tailor made and need based. The stimuli used in the study were segregated according to increasing difficulty level, familiarity and literacy. Thus it can be used for a wide range of patients across various literacy levels and socio economic background. This kind of hierarchy in the stimulus set along the aspect of complexity makes it flexible for use with PWA who have either low cognitive-linguistic profile or a high cognitive-linguistic profile thereby helping the PWA overcome stagnant performance on a given task and/or skill. Therefore, it holds good validity and relevance and can be considered for its implementation in to the constant therapy software in Kannada focusing on impairment based intervention.

Implications:

- This software which has developed in Kannada language can stand as an effective computer based program which helps in language and cognitive retraining in PWA that can be used widely across Karnataka, since it takes into consideration its cultural and regional variations.

- Since this software have a wide range of tasks and stimuli, it can effectively be used to tackle many difficulties faced by PWA and different domains help to improve various aspects of language and cognition in individuals with aphasia. Also this test material can be generalized to other adult language disorders due to the same reason and across various settings.

- The tasks and stimuli, have been categorized as most familiar, least familiar, most commonly found in India, those known to elite population, those known to rural population, sensitive to cultural aspects and geographical distributions such that the clinician can aptly choose the tasks applicable to the given PWA.

Limitations:

- The categories like herbs, magical creatures, geography, symbolic and fixture had very few stimuli.

- The stimulus was not field tested due to time constraints as the stimulus preparation phase was extensive owing to the large number of stimulus items.

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APPENDIX I

Feedback Questionnaire

	Very Poor	Poor	Fair	Good	Excellent
Simplicity					
Familiarity					
Size of the Picture					
Colour and Appearance					
Arrangement					
Presentation					
Volume					
Relevance					
Complexity					
Iconicity					
Accessibility					
Flexibility					
Trainability					
Stimulability					
Feasibility					
Generalization					
Scope of Practice					
Scoring Pattern					
Publications					
Coverage of Parameters					

Please put a (√) in the appropriate box

Suggestions:

Definitions of parameters

Simplicity: are the stimuli comprehendible?

Familiarity: Is the test material familiar to the user?

Size of the Picture: Whether the picture stimuli are of the appropriate size.

Color and Appearance: Are the picture stimuli appropriate in terms of color and dimension?

Arrangement: Whether the picture stimuli are within the visual field of an individual?

Presentation: Are the number of stimuli in each section placed appropriately?

Volume: Is the overall stimuli appropriate in size?

Relevance: Whether the test material is culturally and ethically acceptable?

Complexity: Is the material arranged in the increased order of difficulty ?

Iconicity: Does the picture stimuli appear to be recognizable and representational ?

Accessibility: Is the test material user-friendly?

Flexibility: Can the stimulus be easily modified?

Trainability: Can the stimuli be used for intervention purpose in different milieu?

Stimulability: Does stimulus material elicit responses from the individual?

Feasibility: Whether the test material is viable?

Generalization: Can the test material be generalized to any other adult languages and disorders and various settings?

Scope of Practice: Is the test material within the profession's scope of practice or within the personal scope of practice?

Scoring Pattern: Whether the scoring pattern followed in the resource material applicable?

Publications, Outcomes and Developers (Professional Background): Is there any other resources material similar to this test material which you are aware of ?

Coverage of Parameters: Does the resources material contain the essential language components to be treated.

APPENDIX II

A CD containing the stimulus prepared enclosed.