



THE ROYAL NEW SOUTH WALES INSTITUTE FOR DEAF AND BLIND CHILDREN

Number 4 of Monograph Series, Readers' Position

**SUPPORTING THE RECEPTIVE
COMMUNICATION OF INDIVIDUALS WITH
SIGNIFICANT MULTIPLE DISABILITIES:
ELECTIVE USE OF TOUCH TO ENHANCE
COMPREHENSION**

BY LOUISE GOOLD & JILL HUMMELL

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This monograph is the outcome of research undertaken through the Ratcliffe Readership at the Royal New South Wales Institute for Deaf and Blind Children.

The Ratcliffe Readership is largely funded through income derived from the Ann Ratcliffe Trust which was established under the terms of the late Miss Ratcliffe's Will to fund "medical and educational research to improve the sight and hearing and the heightening of intelligence of the children in the care of the Institute".

The Institute wishes to record its appreciation of the generous forethought of the late Miss Ann Gertrude Ratcliffe and her sister, the late Miss Margaret Beatrice Ratcliffe, former Members of the Manly Lantern Club.

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We would finally like to thank the Royal NSW Institute for Deaf and Blind Children for providing us with the opportunity to prepare this monograph, and the Ann Ratcliffe Trust from which funding was provided to release us from our regular duties to produce *Supporting the Receptive Communication of Individuals with Significant Multiple Disabilities: Selective Use of Touch to Enhance Comprehension*.

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FOREWORD

Touch offers individuals with significant multiple disabilities access to communication. Since it may be the least impaired sensory channel, selective use of touch can be seen as a way of working to the individual's strengths. Of all the modalities that may be used in communication, touch is perhaps the most intimate and thereby has the potential for being the most intrusive. In using touch, interaction partners cross into an individual's personal space. In light of the fact that individuals with significant multiple disabilities are unlikely to be able to regulate the amount of closeness that occurs in interactions, the onus is on the communication partner to be sensitive to the appropriate uses of touch in communication and the potential for its misuse. The authors of the monograph "Supporting the Receptive Communication of Individuals with Significant Multiple Disabilities: Selective use of Touch to Enhance Comprehension" alert the reader to the need to accord the individual with "respect and dignity", and continue to reiterate this need throughout the monograph.

The authors demonstrate their own sensitivity and respect for individuals with significant multiple disabilities by providing strategies for the use of selective touch to enhance comprehension which have been based on the accumulation of clinical experience. It is evident that each strategy maintains the primary focus of ensuring that the interventionist acts according to heightened awareness of the individual's responses to touch. The strategies have evolved through the authors' trial and error experiences coupled with consistent monitoring of the individual's reactions. The strategies and programs also reflect the authors' thorough knowledge of previous published work in this area, which has provided theoretical and research grounding for the procedures. The careful delineation of each strategy and the examples provided ensure that readers will find them easy to understand and apply. However, effective implementation of strategies obtained from a text can only occur when an interventionist has a sound understanding of the underlying principles.

This background information is contained in three chapters of the monograph devoted to reviewing the literature on various aspects of touch. First, the medium is explored in terms of how it can be used for various types of interactions. This is followed by a literature review that integrates the use of touch with current best practices in communication intervention. Finally, an overview of the somatosensory system in terms of its structure and function is provided. This chapter provides the reader with an understanding of how touch can impact on the human system.

The literature review, structural and functional overview, and detailed strategies and programs are a powerful combination. This monograph has, in effect, formalised and contributed to a movement that has been occurring in communication intervention with individuals with severe disabilities. The authors have built on the

principles of looking to existing behaviours and expanding on these by accessing an individual's abilities. The monograph reflects academic thoughtfulness and clinical expertise. I congratulate the authors Louise Goold and Jill Hummell in making a significant contribution to the field. This contribution will be readily appreciated by all who seek to engage in meaningful communication with individuals with significant disabilities.

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PREFACE

The monograph explores the use of touch to enhance the receptive communication of individuals with significant multiple disabilities who have little or no understanding of spoken language. It introduces and describes the Touch-Speech Cue. It is proposed as a valuable strategy communication partners can utilize to promote attention to, recognition, and comprehension of key spoken words.

A Touch-Speech Cue is defined as:

a **simultaneous touch-speech production** in which the communication partner pairs a target word for comprehension with a specific touch signal on the individual's body or limb/s.

By accompanying a target word for comprehension with a specific touch signal, the communication partner provides a strong multi-sensory cue to the individual with significant multiple disabilities.

Touch-Speech Cues require a sensitive interactive style by a communication partner who meticulously observes, and responds to indications of communicative intent by an individual with significant multiple disability (Goold, Borbilas, Clarke, Kane, Yates & Mendelson, 1993). They require a responsible communication partner who creates an environment which encourages such communication and facilitates it when it occurs, utilizing meaningful language, touch and activities. Touch-Speech Cues further require a flexible, innovative communication partner who is sensitive to the emotional, social and physical needs of the individual with significant multiple disabilities and who can implement and evaluate a Touch-Speech Cue programme when it is determined by the team as an appropriate receptive communication strategy.

The content of the monograph reflects our personal philosophies towards professional relationships with individuals with significant multiple disabilities. We believe that social interactions with these individuals must accord them respect and dignity. Intervention strategies must consider the unique personality, skills, abilities and difficulties of the individual, and the family and community of which (s)he is a member. Interventions need to be individual-specific, enjoyable and meaningful to the individual and provide him or her with choices.

Team members must constantly strive to provide optimal programmes for each individual with significant multiple disabilities, both in their area of expertise and as part of a team. The individual with significant multiple disabilities and his or her family are integral members of that team. No one person has the knowledge and skills to provide the optimal programme for each individual with significant multiple disabilities. At present, optimal programmes can be developed, implemented and evaluated by highly skilled and integrated teams which utilize both the ecological approach (Helmstetter, 1989; Sigafos & York, 1991) and its indi-

vidual educational plan process (Nietupski & Hamre-Nietupski. 1987).

Touch-Speech Cues as detailed in this monograph provide one option available for communication partners to use when promoting the receptive communication of individuals with significant multiple disabilities. They have been developed in consultation with relevant literature and clinical experience. The authors have successfully developed, implemented and evaluated Touch Speech Cue programmes in collaboration with other team members. It is anticipated that future research and clinical experience will refine and extend information presented in the monograph.

Louise Goold and Jill Hummell
April, 1993

INTRODUCTION

The individual with significant multiple disabilities differs from the individual without multiple disabilities in his/her capacity to detect, interpret, and interact with the people and items in his/her environment. The authors use the term significant multiple disabilities to refer to multiple disabilities that take the form of intellectual, and/or sensory, and/or physical impairments. The nature and severity of these impairments restricts the individual's exploration and understanding of his/her world. The social interactions that (s)he enjoys with the people around him/her may contrast greatly to the social exchanges enjoyed by his/her peers without significant multiple disabilities.

Research investigating the social interactions of individuals with significant multiple disabilities and their communication partners demonstrates the following:

1. **The *communication partner* of the individual with significant multiple disabilities is more imperative when speaking to that individual, i.e. uses more directives and commands (Cardoso-Martins & Mervis. 1985; Deck, 1981; Eheart, 1982).**
2. **Initiation and maintenance of a social interaction is *dominated by the communication partner* (Romer & Schoenberg, 1991).**
3. **Communicative attempts of the individual with significant multiple disabilities are *inconsistently reinforced by communication partners* (Owens, McNerney, Bigler-Burke, & Lepre-Clerk, 1987).**
4. **The individual with significant multiple disabilities is *less responsive* in comparison to chronological and mental age peers without disabilities (Eheart, 1982; Hanzlik & Stevenson, 1986; Levy-Shiff, 1986).**

The individual with significant multiple disabilities has very early or ***simple*** communication abilities. His/Her comprehension of spoken language may be minimal. (S)He may attend to his/her name, or perhaps demonstrate differentiated responses to changing intonation patterns. (S)He may seem to understand some key words that are used in familiar, recurring daily situations. The communication status of individuals with significant multiple disabilities may be described as nonsymbolic or pre-linguistic (Sugarman, 1984). These labels refer to the individual's inability to ***both*** comprehend and use symbolic communication such as spoken language, sign language, photos, pictures and so forth.

The literature details more and more frequently the fact that the individual with significant multiple disabilities **can communicate!** (S)He is able to use nonsymbolic, natural means of communication including vocalisation; eye-gaze; facial expression; body movements; to convey his/her likes, dislikes and needs to his/her communication partners (Siegel-Causey & Guess, 1989).

The following example illustrates the expressive communication style of the individual with significant impairments.

Sarah is being wheeled around the shopping centre by her brother and mother. Christmas carols come onto the loud-speaker. Sarah stiffens and turns. Her brother notices Sarah's responses and comments: "Hey Sarah, they're playing "Jingle Bells". He sings along noisily, Sarah smiles. He interprets this as a request for more saying: "More Jingle Bells Sarah?". He launches into another rendition.

This example illustrates two points for discussion:

1. The individual with significant multiple disabilities can communicate using nonsymbolic or non-linguistic behaviours.
2. The individual with significant multiple disabilities is reliant on his/her communication partner to **detect, interpret, and respond** to his/her communicative behaviours.

Acknowledgement of communicative acts or potentially communicative behaviours enhances expressive communication development. The importance of these partner responses is reflected by the wealth of literature offering programmes and strategies that communication partners can utilize to facilitate the expressive communication of individuals with significant multiple disabilities (Baumgart, Johnson, & Helmstetter, 1990; Donnellan, Mirenda, Mesaros, & Fassbender, 1984; McNaughton & Light, 1989).

Whilst the literature addresses in great detail the programmes and strategies that can be employed to facilitate **expressive** communication, it fails to address partner responsibilities in supporting the learner's **receptive communication** (Keough & Reichle, 1985; Musselwhite & St. Louis, 1988; Reichle, York, & Sigafos, 1991).

Communication partners of individuals with significant disabilities need to be vigilant not only in recognising, acknowledging and responding to expressions of communication, but also simultaneously in supporting comprehension of what is taking place. The nonsymbolic communicator may fail to detect, recognise and assign meaning to the speech around him/her. His/Her inability to use symbols to express him/herself, is similarly reflected in an inability to understand the sound symbols that are spoken words. (S)He may recognise a person's voice, or be sensitive to intonation patterns, (for example, smiling to a warm, joking voice, frowning and crying to a scolding voice), but fail to identify and comprehend discrete units of speech.

This inability to extract meaning from the speech of the people interacting with him/her places the nonsymbolic individual at risk

of being a passive, unprotesting "participant" in activities with others, or a confused, distressed and frightened recipient of actions for which (s)he is unprepared. (S)He may communicate non comprehension by engaging in aberrant behaviour (Donnellan, Mirenda, Mesaros, & Fassbender, 1984).

This monograph addresses communication partner responsibility for the receptive communication development of the individual with significant multiple disabilities. It aims to provide communication partners with a review of specific strategies that can be incorporated into interactions to facilitate the individual's attention to the speaker; his/her anticipation of impending activities, and to develop where possible his/her comprehension of frequently occurring key words and phrases.

Specifically the monograph considers the role that touch used by communication partners may play in hindering or enhancing the attention and comprehension of the individual with significant multiple disabilities.

It proposes and explores a contemporary receptive communication strategy, the Touch-Speech Cue in which informative touch is paired with selected speech. The communication partner accompanies a target word for comprehension with a touch signal, thus providing a strong multi-sensory cue to the individual with significant multiple disabilities. Touch-Speech Cues aim to promote the individual's attention to, recognition and comprehension of the target or 'key' spoken word. Touch-Speech Cues are an adaptation of Touch Cues as presented by Rowland and Stremel-Campbell (1987). Touch Cues were suggested by these authors as a receptive communication strategy for individuals with dual sensory impairments.

Touch-Speech Cues are defined as:-

a simultaneous touch-speech production in which the communication partner pairs a target word for comprehension with a specific touch signal or the individual's body on limb/s.

The monograph describes a framework for assessing, designing, implementing and evaluating Touch-Speech Cue programmes. It is **not** a prescriptive manual, but a guide to engaging in these processes.

Chapter Two reviews the literature on Touch as an interactive medium, highlighting the role of touch in the social exchanges of individuals with and without disabilities.

Chapter Three proposes Touch-Speech Cues and places them in the context of other receptive communication strategies employed by communication partners.

Chapter Four outlines the neurobiology of the somatosensory system of which touch is a modality. It focuses on those aspects of the somatosensory system which are relevant to Touch-Speech Cue selection and implementation, and it describes important characteristics of touch signals.

Chapter Five proposes an assessment framework to assist team members to determine Touch-Speech Cue candidacy. This framework suggests to the team whether Touch-Speech Cues are the most appropriate receptive communication for the individual with significant multiple disabilities with limited comprehension of spoken language.

Chapter Six addresses Touch-Speech Cue design, implementation and evaluation.

Chapter Seven concludes the discussion on Touch-Speech Cues and suggests avenues for future directions and research.

A REVIEW OF TOUCH AS AN INTERACTIVE MEDIUM

Touch is a primary sense modality.

We use it to explore, make sense of, and appreciate our surroundings. Touch is also a powerful act of communication. It is an intrinsic social component of our interactions with others. It can be used to convey comfort and security (McGee & Menolascino, 1991), empathy (Posthuma, 1985), intimacy (Fromme, Janyes, Taylor, Hanold, Daniell, Rontree & Fromme, 1989), reprimand and (Van Houten, Nan, Mackenzie-Keating, Sameoto, & Colavecchia, 1982), malice (Creyke & Weeks, 1985), in addition to specific information (Rowland & Stremel-Campbell, 1987).

The touch we use in our social exchanges with others is highly variable.

Our willingness to give and receive touch in social interactions is influenced by age (Sigelman & Adams, 1990), gender (Derlega, Lewis, Harrison, Winstead, & Costanza, 1989), culture (Strano, Mohan, & McGregor, 1989), and personality (Deethardt & Hines, 1983). The touch we employ when relating to others will also be influenced by our relationship to them and the communicative intent of the touch.

Touch is viewed as a desirable component of the health-worker's interaction with his/her patient.

Its presence is purported to be an inherent factor in establishing rapport and trust between carer and patient (Belcore, 1981; Gartland, 1984). Therapeutic Touch is being reported more frequently in the health literature as an intervention for assisting healing and pain suppression (Meehan, 1990; Smith, 1990).

Touch can have a marked effect upon the actions of others.

Studies by Kleinke (1977), Smith, Gier & Willis (1982), and Willis & Hamm (1980) indicated that people were more likely to respond favourably to verbal requests if the person asking the question paired their request with touch on the respondent's arm. Goldman & Fordyce (1983) demonstrated that participants in an interview were significantly more likely to rush to the interviewer's aid when he dropped his notes, if during the course of the interview, he had made brief physical contact with the interviewee.

Wheldall, Bevan & Shortall (1986) investigated the classroom behaviour of five and six year olds without disabilities. They found increases in child on-task behaviour and fewer child disruptive behaviours when classroom teachers were encouraged to use touch selectively, pairing it with verbal approval of good behaviour.

Touch is a fundamental component of a mother's communicative messages to her infant .

Its presence in early mother-child exchanges serves to alert and notify the child of his/her mother's presence. It is suggested that maternal pairing of non-verbal behaviours, for example touch, eye-gaze, and facial expression with speech, may assist the young child in making sense of, or "decoding" verbal messages (Fernald, 1984).

It is therefore apparent that mothers' communication to their young children is multimodal (Appell, 1989). By employing verbal and non-verbal behaviours, the mother attracts and maintains his/her infant's attention, thus providing the social exchanges so crucial to the child's language development (Schaffer, Hepburn, & Collis, 1983). Schaffer et al (1983) suggested that extralinguistic and paralinguistic features of maternal communication including touch, gesture, tone, and animation serve to make adult linguistic input more "attention-worthy" for the infant.

Studies of families of children without disabilities indicate that parental touch decreases as the child becomes older (Hanzlik, 1990) and more independent in his/her actions (Burgess & McMurphy, 1982). The advent of siblings also results in decreased touch for the older child (Sigelman & Adams, 1990). These findings suggest that as the child develops from a prelinguistic to linguistic status, (s)he is less reliant on parents to "interpret" his/her communication; (s)he now uses more easily recognised forms with the onset of words. Similarly, advances in linguistic comprehension enable him/her to process the speech of others with decreasing dependence on contextual, "here and now" cues. For example (s)he no longer needs to see the cup, when mother asks if (s)he'd like a drink, to understand what is said. (Stremel-Campbell & Matthews, 1987).

Studies of the communication development of individuals with a disability reveal significant differences in the nature of their interactions with others.

Rowland (1984) and Urwin (1984) reported that the mothers of blind infants used significantly more touch in their interactions with their children than did the mothers of sighted infants. Hanzlik (1990) found similar results in her investigation of the social interactions between children with cerebral palsy and their mothers. Increases in maternal touch and physical contact may have been elicited by displays of more dependent infant behaviours that in turn may have been a consequence of impaired capacity to act on, and explore their surroundings.

As stated in the introduction, the individual with significant multiple disabilities is less responsive in comparison with chronological and mental age peers without multiple disabilities. (Eheart, 1982; Hanzlik & Stevenson, 1986; Levy-Shiff, 1986). Brooks-Gun & Lewis (1984), and Mahoney (1988) found that mothers of children with intellectual disability were more responsive to the child with greater language abilities.

Rowland (1990) found that teachers of individuals with dual sensory impairments were more responsive to their students, and provided more cues, such as visual, auditory, and tactual to communicate when the student had a symbolic means of communication. Romer & Schoenberg (1991) observed the interactions between staff and clients of a residential facility for adults with mild to profound disabilities. Initiation and maintenance of communication was dominated by staff. Interestingly, the client's level of communication (i.e. symbolic or nonsymbolic) had no effect on staff behaviour. "Communication tended to be directive and to be aimed at obtaining behavioural compliance" (Romer & Schoenberg 1991, p. 85).

Crapps and Witkowski (1990) studied the playground peer interactions of kindergarten students with and without "mild to moderate" intellectual disability. Both the non-disabled students, and the students with intellectual disability used specific types of touch when interacting with peers. Both groups of children used touch

- a) *"incidentally", for example, accidental bumping,*
- b) *"interactively", for example, to hug, gain a peer's attention, and protest,*
- c) *to "manage", for example "hold another down while taking toy".*

The authors found that children with intellectual disability engaged in higher proportions of "managing" touch when playing with their peers. The investigations suggested that these children may have resorted to using a domineering style of touch in comparison with their non-disabled peers, as a result of their impaired ability to use language to direct another's actions.

The preceding studies highlight our responsibilities as communication partners in communicative exchanges with persons with significant impairments. The literature suggests that the individual with limited or no symbolisation may fail to receive optimal opportunities for realising his/her communication potential.

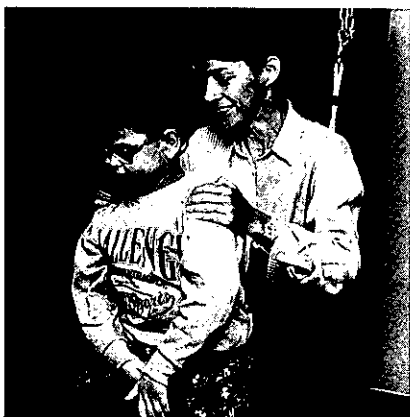
The literature fails to address the role of touch in the social interactions of individuals with significant impairments and their communication partners. Whilst researchers cite touch as a desirable, informative and assistive component of communication partners' interactions (Downing, 1990; McGee & Menolascino, 1991; Rowland, 1990; van Dijk, 1966), touch can all too easily become an autocratic, controlling force that may promote passivity, override initiated behaviour, and prohibit active participation.

Table 2.1 identifies the varied and dynamic role of touch in interactions between people. Twelve categories of interactive touch are proposed based on clinical observations and synthesis of social psychology, educational and therapeutic literature (Crapps & Witkowski, 1990 : Creyke & Weeks 1985; McGee & Menolascino, 1991).

Table 2.1 Interactive Uses of Touch

Type of Touch	Touch Intent
Autocratic Touch	Where the primary purpose of the touch is to control, e.g. enforcing compliance.
Casual Touch	Where touch occurs accidentally, as a course of daily casual contact, e.g. bumping into someone, brushing against a person.
Extraneous Touch	Where there is no interactive purpose or reason for the touch, e.g. resting hand on other's shoulder as a convenient resting place.
Habilitative Touch	Where the primary purpose of the touch is to achieve a specific therapy goal, e.g. massage to relax shoulders.
Informative Touch	Where the primary purpose of the touch is to convey information, e.g. Touch Speech Cues.
Intimate Touch	Where the primary purpose of the touch is private and expresses intimacy.
Malicious Touch	Where the primary purpose of the touch is to harm or injure e.g. pinching.
Nurturing Touch	Where the primary purpose of the touch is to foster a close emotional bond.
Protective Touch	Where the primary purpose of the touch is to protect other from danger, e.g. physically preventing stepping out in front of traffic.
Recreational Touch	Where the primary purpose of the touch is to amuse, e.g. tickling.
Requisite Touch	Where the primary purpose of the touch is to fulfil caregiving requirements, e.g. bathing, dressing.
Social Touch	Where the primary purpose of the touch is to express a message, e.g. greeting, compliments.

Some Examples of Interactive Uses of Touch



Habilitative Touch



Social Touch



Recreational Touch



Nurturing Touch



Requisite Touch



Informative Touch

The types of touch used when interacting with the individual with significant multiple disabilities may vary according to:

- a) the intent of the touch.
- b) the relationship between the individual and his/her communication partner
- c) the types of responses elicited by the touch.

Communication partners may be influenced by the touch used by other partners in the individual's environment, as well as unconsciously "shaped" by clients into using certain types of touch; for example, the individual who smiles and laughs in response to rough and tumble games may shape his/her partners into using strong, robust types of social and recreational touch.

The passive, and at times unresponsive appearance of the individual with significant impairments may result in him/her being the recipient of high proportions of extraneous and autocratic touch. The individual with significant multiple disabilities who displays challenging or excess behaviours may have an increased likelihood of receiving extreme forms of autocratic touch, such as physical restraint.

The individual with significant impairments was described earlier as being nonsymbolic or prelinguistic. (S)He may fail to understand or *decode* the spoken messages that are telling her about what is happening or about to happen. (S)He is more likely to be drawing information from the speaker's face, intonation, the objects being held out, or by smells and noises. Familiarity of routine may also *cue* him/her in to what is going on. The touch that the individual receives will also provide him/her with some information about what is happening – or what is about to happen.

Touch-Speech Cues

Touch Cues is a term used by Rowland and Stremel-Campbell (1987 p.64) and refers to "signals executed on the learner's body to provide a specific message" (p.64). These authors describe touch cues as one of three primary receptive strategies that can be used by communication partners to assist the comprehension of the individual with dual sensory impairments. The authors of the present monograph extend this selective use of informative touch and propose "Touch-Speech Cues" as a strategy which may be used by communication partners to promote the receptive communication skills of individuals with significant multiple disabilities. A Touch-Speech Cue is:

A simultaneous touch-speech production in which a target word for comprehension is paired with a specific signal on a specific location on the learner's body or limbs.

It is the combination of signal and location, that provide additional information to facilitate the individual's *attention*, *recognition* and *comprehension* of a target word. Target words are the

frequently occurring words in that individual's life that he/she may fail to attend to and/or comprehend. Target words appear in the key word phrases a communication partner uses when speaking to the individual about an impending event or action, for example saying "Let's *go*", "Stand *up*", "We've *finished*".

Touch-Speech Cues provide a consistency to the linguistic input to which the individual is exposed. Touch-Speech Cues highlight those words that are important/desirable for that individual to attend to, and understand. The specific touch signal that accompanies the communication partner's speech provides the nonsymbolic individual with selective, informative touch congruent to the verbal message (s)he is receiving. Touch-Speech Cues are incorporated into the communication partner's mode of interaction with the individual to enhance his/her attention, recognition and comprehension of the target words of partner speech.

Assessment, design and implementation of Touch-Speech Cues as described in Chapter 5 and 6 detail the nonsymbolic individual's participation in social interactions. This process explores the following:

- (a) types of touch used by communication partners,
- (b) types of interactions experienced with communication partners,
- (c) characteristics of communication partners performance within these interactions and
- (d) interactive strategies in use to promote the individual's receptive communication.

Chapter 3 describes Touch-Speech Cues in the context of the range of receptive interactive strategies that communication partners can employ to actively facilitate receptive development of the nonsymbolic individual.

CHAPTER THREE

RECEPTIVE COMMUNICATION STRATEGIES AND TOUCH-SPEECH CUES

Recent research has offered a wealth of therapeutic/interactive procedures to assist communication development. (Baumgart, Johnson, & Helmstetter, 1990; Jones, 1988; Siegel-Causey & Guess, 1989; Writer, 1987). Successful implementation of these interactive strategies relies on the ability of the team to critically evaluate available techniques and select procedures that best meet the individual's unique communication situation.

Current educational and therapeutic literature favour naturalistic approaches (Norris & Hoffman, 1990; Willard & Spackman, 1972) that include assessment and programming in "real" environments; using activities and items that are meaningful and interesting for that particular individual (Brown, 1987; Price & Bochner, 1991). Fundamental to this *ecological model* (Helmstetter, 1989) for intervention is the principle that instruction and learning are embedded in naturally occurring routines.

Intervention strategies such as *milieu teaching* (Hart & Rogers-Warren, 1978) and *incidental teaching* (Hart & Risley, 1968) are based on this principle that communication learning occurs in meaningful, natural contexts. Successful implementation of such programmes requires the communication partner to have a firm grasp of the target communication areas for development. In addition to knowing the areas of communication targeted for development, the communication partner needs to know how to adapt and exploit the natural situation to incorporate communication objectives (Fey, 1986).

By embedding communication programming into natural routines and activities, the communication partner dispenses with the need for artificial prompts and reinforcers. Instead the communication partner can make use of the *natural cues* (Sigafos, Mustone, DePaepe, Reichle, & York, 1991) offered by context, and the intrinsic reward provided by meaningful outcomes for the individual.

The authors subscribe to the practice that communication programming is at all times a learner-oriented approach. Fey (1986, p.194) described the basics of learner-centred approaches in communication intervention:

*"wait for the {individual} to initiate some behaviour....
interpret that behaviour as meaningful and communicative....
respond to the behaviour in some communicative manner that
is assumed to facilitate {communication} development" (p.194).*

One of the most important communication programming premises to make an appearance in the educational literature is that ***education is interactive***; a two-way process that simultaneously requires close attention to the behaviours of the instructor as well as the learner (Rowland & Stremel-Campbell, 1987).

The individual with significant impairments has dynamic needs that change with age, environments, and variations in sensory, cognitive, and physical performance. Degenerative conditions necessitate informed, and flexible instructional/interactive approaches that anticipate the changing needs of that individual.

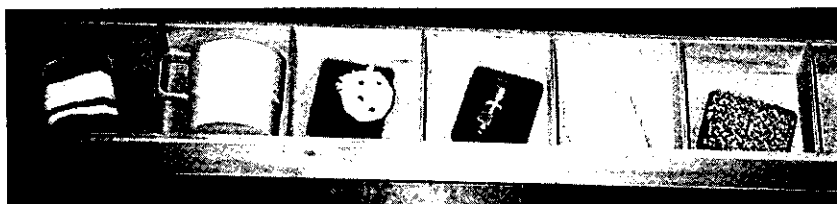
Natural Cues

An effective means of supporting communication expression and reception is the exaggeration of Natural Cues (i.e. cues offered by a meaningful context – daily routine). Natural Cues are used to increase the individual's awareness of what he/she has to do by highlighting or ***referencing*** (Sigafoos et al, 1991) the natural antecedent(s) to his/her actions. Natural Cues can involve any sensory modality or combination thereof. Whilst promoted in the literature as means of eliciting spontaneous communication, natural cues can also be used to assist the ***comprehension*** of the learner with little or no understanding of spoken language.

Table 3.1 presents the diverse range of natural cues available to communication partners. This table suggests to readers a means of adapting both context and interactive style to facilitate the comprehension of individuals with significant multiple disabilities.

Table 3.1 Natural Cues

Auditory Cue	Communication partner activates the auditory association for the activity or event, for example: Partner <i>jangles car keys</i> as asks "Do you want to come for a <i>drive in the car?</i> "
Gestural Cue	Communication partner pairs her speech with natural pantomime, for example; Partner <i>hold out arms and leans forward</i> as asks "Would you like to <i>come up?</i> "
Olfactory Cue	Communication partner ensures the individual has the opportunity to detect odours associated with an activity, for example: Partner gently <i>waves vegemite under nose</i> as says "Mmmm, how about some <i>vegemite toast?</i> "
Routine Cue	Learner had her communication partners move through a "set" timetable of meaningful activities/events that are repeated daily with minimal change to assist memory and anticipation. If the individual has representation or symbolisation the instructor may use object or pictorial timetables to heighten the individual's awareness, anticipation and comprehension of the day's activities.
Tactual Cue	Communication partner gently places the object of direct meaning to the activity onto the learner, for example: Partner <i>places spoon gently on lower lip</i> while saying "Here's some <i>soup</i> ".
Verbal Cue	Communication partner's speech and intonation suggest individual's course of action, for example: Partner suggests "Let's go for a walk" (Cue to stand up).
Visual Cue	Communication partner <i>displays the real object associated with the activity</i> , for example: Partner <i>displays swimming costume</i> as suggests "Want to go <i>swimming?</i> ".



Routine Cue – time table



Tactual Cue – feels swing chain



Visual Cue – “sit down on the mat?”



Auditory Cue – rattles swing chain



Olfactory Cue – lunch!



Gestural Cue – “come up?”

Table 3.2 Natural Cues Script

<i>Environment</i>	<i>Subenvironment</i>	<i>Activity</i>	<i>Participants</i>
School	Playground	"Conversation"	Sarah and Peter
LEARNER		PARTNER	
<i>Sarah is sitting in her wheelchair, near swings, appears to be dozing</i>		Peter approaches Sarah on the path, exaggerating his footfall (<i>Auditory Cue</i>).	
<i>No response from Sarah.</i>		Peter crouches to Sarah's level, settling himself with a lot of rustling and sighing (<i>Auditory Cue</i>).	
<i>Sarah stiffens and blinks, turns to Peter.</i>		Peter crouched opposite, smiling (<i>Visual Cue</i>), and waves (<i>Gestural Cue</i>).	
<i>Sarah's facial expression alert.</i>		Peter says "Well here I am to see my friend Sarah" (<i>Verbal Cue</i>).	
<i>Sarah smiles at Peter's intonation and vocalises</i>		Peter responds "Well, Hello Sarah! That was nice of you to say Hi to me!". Suggests: "I was wondering if you want to come and have a swing" (<i>Verbal Cue</i>). Waits.	
<i>Sarah's face alert, neither smiling or frowning.</i>		Peter gently rocks the swing, swing chain rattles. (<i>Auditory Cue</i>).	
<i>Sarah stiffens, eyes widen</i>		Peter takes Sarah's hand and places it on the tyre seat of the swing (<i>Tactual Cue</i>) saying "have a swing?" (<i>Verbal Cue</i>).	
<i>Sarah's face displays a grimace, she averts her head.</i>		Peter replies "No, you don't want to! O.K. do you want to stay in your wheelchair?" (<i>Verbal Cue</i>)	
<i>Sarah alert, listening to Peter.</i>		Peter suggests "Shall we just stay here and talk, Peter and Sarah?"	
<i>Sarah's body relaxes.</i>		Peter says "O.K. we'll just stay here and have a nice chat".	

The skilful communication partner is quick to recruit the natural cues offered by the situation in which (s)he interacts with the individual with significant multiple disabilities. (S)he carefully manipulates both the environment and his/her own actions to facilitate that individual's receptive and expressive communication.

Table 3.2 provides a sample script that reflects the informed selection and use of natural cues to promote both communication comprehension and expression. The participants featured in the script are Sarah, and Peter, her Speech Pathologist. Sarah is twelve years old. She has intellectual, visual and physical impairments.

Communication partners script their role carefully when interacting with the individual with significant multiple disabilities. They modify and adjust their own actions to facilitate spontaneous responses from the individual. A *successful* script is dependent upon the communication partner's *ability to wait*, and provide the individual *sufficient time* to respond.

Sensitive Interactive Style

Natural cues can be used too, as an adjunct to a Sensitive Interactive Style to promote attention to the speaker, the setting, as well as promote spontaneous communicative responses. A sensitive interactive style includes:

- *genuine interest in the individual*
- *warmth and friendliness of manner*
- *speaking style appropriate to the individual's age*
- *discreet use of intonation and volume*
- *speaker orientation to the individual's physical level (crouches to face them, if on floor); and pausing to allow individual opportunity to initiate and respond.*
- *alertness to changes in the individual's behaviour which may be potentially communicative.*
- *acknowledgement, response to, and willingness to follow individual's display of interest / attention.*

Prompting

Whilst natural cues *suggest* the learner's course of action, prompts *direct a specific* course of action. Prompting is an artificial interactive strategy that is only employed when the sensitive manipulation of the natural cues described previously fail to elicit desirable responses (Sigafos et al, 1991; Snell & Zirpoli, 1987). Prompts can be disruptive to communication development due to their tendency to be used in an intrusive, controlling manner, which undermines the shared, reciprocal nature of social interaction.

Although prompting is suited to the instruction of a particular behaviour, or sequence of behaviours such as those demanded by activities of daily living, e.g. spoon feeding, Snell and Zirpoli (1987, p.124) cautioned that:

"...prompts are more likely to foster excessive dependence on the trainer. Directing the learner's attention towards the cues in the natural setting ultimately promotes self-prompting and self-correction" (p124).

Prompts that direct the learner's behaviour are referred to as response prompts. These include such partner behaviours as modelling, physical guiding, and providing verbal prompts. Prompts that include the instructor's manipulation/alteration of physical items or stimuli associated with learner's desired response are referred to as stimulus prompts. For example, the instructor teaching and individual to brush her teeth may use a sequence of photographs depicting the appropriate steps as a "stimulus prompt" to direct that individual's performance (Sigafoos et al, 1991).

Touch-Speech Cues

Touch cues are *neither* natural cues *nor* instructional prompts. Rowland and Stremel-Campbell (1987:64) define touch cues as "signals executed on the learner's body to provide a specific message". These authors propose touch cues as an *alternate form* of receptive communication for the individual with dual sensory impairments who does not understand "even the simplest speech or manual sign language".

The authors of the present monograph suggest an application of the touch cue for the individual with significant multiple disabilities which take the form of intellectual, visual and/or physical impairments. This application takes the form of "Touch-Speech Cues".

Touch-Speech Cues are a simultaneous touch-speech production. A target word for comprehension is paired with a specific touch signal on a specific location on the learner's body or limbs.

It is the combination of signal and location that provide additional information to support the individual's attention, recognition, and comprehension of the target word.

When sensitive interactive styles, in conjunction with the appropriate combinations of natural cues are insufficient to assist the individual's comprehension of what is taking place; the communication partner can utilise a Touch-Speech Cue to *alert* and *notify* the individual with significant multiple disability of an *impending* action. Just as we adapt our interactive style to the learner's level of attention and comprehension, we can also adapt our touch and speech input.

Touch-Speech Cues are individual-specific. They are selected according to the individual's receptive communication, and somatosensory status, as explained in Chapter 5. Target words are selected from the *key word phrases* of that individual's life. Key word phrases are the frequently occurring phrases used with that individual. They reflect the phrases that are nominated by the individual's communication partners as desirable for the learner to attend to. Target words and their key word phrases reflect what is

useful for that individual to know, now, and in her future. The key word phrase provides the naturally spoken context of the target words.

Target words are paired with a consistent touch signal with the intention of **cueing** the learner's attention to the speaker and action/activity/event as well as strengthening the impression of the target word by providing a **consistent touch association**. The touch signal may involve the application of one or two touch applications, and may include the movement of a body part. This is explained in detail in Chapter Four.

Selective use of touch in the form of Touch-Speech Cues may assist recognition, comprehension, and memory of the target words. Tables 3.3 and 3.4 provide some examples of Touch-Speech Cues and their associations for the individual profiled in table 3.2.

Table 3.3 Example of Touch-Speech Cue "Dancing"



Touch-Speech Cue for "Dancing"			
Target Word	Key Word Phrase		
Dancing	"Let's do some dancing"		
Touch Signal Partner Action			
Cups shoulders from in front, rotates shoulder girdle short distance forward then back using a reciprocal action.			
Location	Duration	Intensity	
Sarah's shoulders	Synchronised as says "dancing"	Gentle	
<hr/>			
Context			
Environment	Subenvironment	Activity	Participants
School	Gym/Therapy	Dancing	Communication
Home	Loungeroom		Partners
Community	Parties		

Table 3.4 Example of Touch-Speech Cue “Wait”

Touch-Speech Cue for "Wait"			
Target Word		Key Word Phrase	
Wait		"Wait a minute Sarah"	
Touch Signal			
Partner Action			
Presses her hands on both Sarah's knees.			
Location	Duration	Intensity	
lower thigh above knee	sustain for "wait"	firm	
.....			
Context			
Environment	Subenvironment	Activity	Participants
All	All	All	All

Touch-Speech Cue Programmes

1. Touch-Speech Cue programmes offer a means of evaluating and standardising the existing use of touch between communication partners and individuals with significant multiple disabilities, to enhance the receptive communication of that individual.
2. Communication partners are often using Touch-Speech Cues unconsciously in their interactions with the individual with severe to profound multiple disabilities. For example a partner may always pair “Hi” with a particular touch signal on the individual’s body; may ruffle her hair when saying “You’re a great girl!”.
3. Touch-Speech Cue planning reviews the existing use of touch in that individual’s life to ascertain whether specific touch signals could be paired with key words or phrases in the individual’s day to alert and notify his/her of impending actions that he/she may fail to recognise or comprehend.

4. Touch-Speech Cues similar to other instructional or interactive strategy may play either a temporary or a permanent role in that individual's receptive communication. They may play a transitional role for the individual, supporting his/her development from a level of nonsymbolic comprehension (attentive to sounds, some voices, but unable to extract meaning from voices) to understanding of "sound symbols", that is, language (knows the meaning of certain words). For another individual they may be a permanent receptive strategy adopted by his/her communication partners to alert and notify him/her of actions/events/activities.
5. Touch-Speech Cues have a specific application. They are not suitable for every individual with significant multiple disabilities.
6. Touch-Speech Cues may be of value to the individual who is unable to detect and appreciate the natural cues in his/her environment, or who is often the recipient of confusing and extraneous touch.
7. Touch-Speech Cues are not a strategy to be used in isolation, but are an adjunct to a sensitive interactive style, according the individual with respect and dignity.
8. Touch-Speech Cues may be used in conjunction with natural cues, or may be discarded in favour of natural cues.

Chapters 5 and 6 suggest individuals for whom Touch-Speech Cues may be useful, outlining both assessment, design and implementation considerations.

Chapter 4 outlines the neurobiology of the somatosensory system with a focus on those aspects which have relevance to Touch-Speech Cues. The important characteristics of touch signals, as proposed by the authors, are described.

CHAPTER FOUR

TOUCH: A MODALITY OF THE SOMATOSENSORY SYSTEM

Touch is a modality of the somatosensory system which matures early in humans (Greenough, 1990). Touch is purported to exert a major influence on the maturation of the Central Nervous System (CNS) (Montagu, 1978) and to have an important organisational effect upon it (Barnard & Brazelton, 1990). Although many aspects of touch and the somatosensory system have been studied over many years and new knowledge is continually being acquired, the facets and functions of touch are not yet well understood (Rose, 1990). Tactile functions are also difficult to test (Ayres, 1980).

Recent research has consistently provided evidence that information from all sensory systems and all areas of the brain continually interact to enable individuals to function competently within society (Kandel, 1991; Moore, 1991). It is important to remember that the somatosensory system does not function in isolation but in concert with other sensory systems and all areas of the brain.

This chapter provides a simplified version of the somatosensory system, the pathways and central nervous system structures involved, focusing on key aspects which have relevance to Touch-Speech Cues. It proposes a number of implications from neural science literature for the selection and implementation of the touch signal when using Touch-Speech Cues to facilitate receptive communication. The neurobiological perspective illustrates the importance of using touch selectively and assists to explain the varied responses which may occur when using touch as an interactive medium and communication partner strategy. Terminology used is from the discipline of neuroanatomy.

Although this chapter outlines the pathways and structures which contribute to the somatosensory system separately, it is crucial to remember that the system functions as a whole. These pathways can be viewed as subsystems within a system. It is also important to be aware that the somatosensory system is a dynamic system. The changing nature of the somatosensory system assists in explaining the day to day variations in an individual's responses to touch.

Individuals differ in their reactions to touch. Some individuals prefer firm touch, for example strong hugs; others prefer light touch, for example, being lightly stroked on the back. Individuality of reactions is also reflected in the perception of pain (Jessell & Kelly, 1991). For example, some people are unable to eat iceblocks because the cold is perceived as pain; for others being tickled is perceived as painful.

An individual's reaction to touch may differ according to the person who is touching them. A back rub given by one person may be enjoyable and that given by another may result in an aversive

reaction. This individuality of responses is illustrated by the following scenario:

Jarrod is an 8 year old boy who has significant visual, intellectual and physical impairments. He enjoys 'rough and tumble' play with his father and being tickled by his older sister, but prefers more gentle touch from other familiar adults and children.

Longitudinal observations of individuals with significant multiple disabilities indicate that many have atypical responses to tactile stimuli. They may be under-or over-responsive to a variety of forms of tactile stimuli found in everyday life, including, pain, physical contact and plastic or wooden toys. This is illustrated by the following scenarios:

Josie is a 6 year old girl who has significant intellectual, visual and physical impairments. She gives no indication of pain when she falls over and grazes herself or even when she sustains a deep cut to her leg.

Keith is an 11 year old boy who has significant visual, hearing, intellectual and physical impairments. His primary response to tactile stimuli is aversion. For example, when his hands are touched by an adult with the aim of facilitating his exploration of familiar items, he withdraws his hands. However, he enjoys strong hugs from his parents.

Some individual with significant multiple disabilities have delayed and/or unusual responses to touch, as illustrated by the following scenario:

Sarah, who has significant intellectual, visual and physical impairments responds to a pin prick with delayed laughter.

An impaired temperature sense may also occur, as the following scenario illustrates:

Sue, who is 15 years old and has significant intellectual and visual impairments, would eat foods or drink liquids hot enough to burn her mouth and tongue if not prevented from doing so.

Research suggests that when sensory input, including tactile input, is embedded within a purposeful activity, it is meaningful to the Central Nervous System (CNS) and can promote learning (Hyden & Egyhazi, 1962; cited in Ayres, 1972 Rosenzweig, 1966 cited in Ayres, 1972). Further, tactile input must be of a type and quantity that is acceptable to the individual learner and congruent with the activity (Ayres, 1972, 1981). Tactile input must be used selectively and within the context of a meaningful activity. Bombardment with sensory stimuli may overload the CNS, particularly immature nervous systems, and have potentially detrimental effects (Gorski, Leonard, Sweet, Martin & Sehring, 1990).

Specific tactile input and physical contact are primary components of many therapeutic techniques; including neurodevelopmental therapy (Bobath & Bobath, 1984; Geniale, 1990), proprioceptive

neuromuscular facilitation (Myers, 1990) and sensory integrative procedures (Ayres, 1981; Clark, Mailloux & Parham, 1988), and instructional procedures, including, physical prompts (Sigafoos, Mustonen, DePaepe, Reichle & York, 1991), tactual cues (Sigafoos et al, 1991) and hand-on-hand instruction.

It is important that team members who employ intervention strategies utilizing touch, including Touch-Speech Cues, have a clear understanding of the neurobiology of the somatosensory system, particularly the tactile system.

Also required is knowledge of research findings on the potential positive and negative effects of tactile input, the preferred manner in which to provide this input, plus an understanding that individuals will vary in their responses to identical somatosensory stimuli.

When designing and implementing a Touch-Speech Cue programme knowledge of the somatosensory system will assist in determining:

1. touch type used,
2. location,
3. duration and
4. intensity of the touch signal.

THE SOMATOSENSORY SYSTEM

The somatosensory system receives and processes information from four modalities (Kandel & Jessell, 1991; Martin & Jessell, 1991; Moore, 1991).

1. touch,
2. proprioception,
3. pain and
4. temperature sense

This chapter will focus on the touch and proprioceptive modalities because of their relevance to Touch-Speech Cues.

Somatosensory Receptors

Within each somatosensory modality, information is initially received and processed by receptors (Martin & Jessell, 1991; Moore, 1991). Each receptor has a receptive field, that is, the area in which the receptor is located and from which it receives and processes information (Martin, 1991). Receptive fields overlap.

These receptors transform the incoming somatosensory information and transmit it via the somatosensory system pathways (or bundles of nerves) to the relevant structures of the CNS (Martin, 1991), which determine the individual's response. At each level of the CNS, information is either facilitated or inhibited (Kandel & Jessell, 1991). Consequently, information may ascend to structures at higher levels of the CNS with or without change (Martin, 1991). In

addition, some processing and interpretation of information from the sensory systems appears to occur at each level of the CNS (Kandel & Jessell, 1991).

Touch/Tactile Receptors

The skin is the sensory organ subserving the tactile system (Montagu, 1978). Tactile receptors are found throughout the skin and underlying tissue and respond primarily to externally applied stimuli including gross touch, light touch/flutter, vibration, and touch-pressure or steady skin indentation (Martin & Jessell, 1991a; Royeen & Lane, 1991).

There are numerous types of tactile receptors, each of which responds optimally to a specific type of tactile stimuli (Barr and Kiernan, 1988). For example, there are specific receptors for gross touch (Meissner's corpuscles), vibration (Ruffini corpuscles), touch-pressure indentation (Merkel receptors) and flutter touch (pacinian corpuscles) (Martin & Jessell, 1991a). Each of these skin receptors has a specific location within the layers of the skin and underlying tissue (Martin & Jessell, 1991a).

Receptors may adapt slowly or rapidly to a touch stimulus. Slowly adapting receptors (e.g. Merkel receptors) respond to a stimulus for as long as it is present. Rapidly adapting receptors respond (e.g. Meissner's corpuscle) at the beginning and often at the termination of a stimulus (Martin & Jessell, 1991a; Moore, 1991).

The touch which individuals encounter in everyday activities tend to be complex and consist of multiple qualities (Barr & Kiernan, 1988; Martin & Jessell 1991) consequently activating numerous and varied tactile receptors.

Proprioception

There are two classifications of proprioception:

1. static limb position sense, when an individual is stationary, and
2. dynamic limb position sense, when an individual is moving (Moore, 1991).

Conscious proprioception – the conscious awareness of the position of one's body parts and their movements – is termed kinaesthesia or kinaesthetic sense (Barr and Kiernan, 1988; Moore, 1991a). The proprioceptive sense, for example, assists an individual to turn on a light in the dark, and to walk without watching his/her feet. It strongly contributes to the maintenance of balance, limb movement control and the evaluation of the shape of an object held in one's hand (Martin & Jessell, 1991).

Proprioceptors, the receptors involved in proprioception, are located primarily in muscles, tendons and joints (Schmidt, 1985). Skin receptors activated during joint movements, through stretching and compressing the skin, also contribute to proprioception (Martin & Jessell, 1991a; Schmidt, 1985). Proprioceptive sensations of the limbs arise from the body itself, not the environment (Schmidt, 1985).

Duration of a Sensation

The duration of a sensation is related to the duration of the stimulus, its perceived intensity and whether the sensory receptor adapts rapidly or slowly (Martin, 1991). When tactile input is of an extremely short duration, the sensory memory for that input is minimal (Weiss, 1990).

Intensity of a Sensation

The intensity of a sensation appears to be proportionately related to the strength of the stimulus (Martin, 1991). Stronger or more intense stimuli evoke greater activity in the sensory receptor and recruit more additional receptors than do less intense stimuli (Martin, 1991). If a stimulus continues for an extended period, adaptation generally occurs, that is, the intensity of the stimulus diminishes (Dodd & Kelly, 1991).

Sensitivity of Body Areas

Whilst sensitivity to touch varies across individuals, it also varies according to the areas of the body touched. The tips of the fingers, the lips and tongue are very sensitive to tactile stimuli (Matlin, 1986). The high degree of sensitivity of the finger tips allows, for example, people who are blind to read Braille. The elbows and shoulders are comparatively less sensitive (Kandel & Jessell, 1991) and the face is more sensitive than the area around the feet (Matlin, 1986).

PATHWAYS OF THE SOMATOSENSORY SYSTEM

Information received by somatosensory receptors is carried to the spinal cord and transmitted to the brain via the relevant pathway/s of the somatosensory system (Kiernan, 1987; Moore, 1991b).

Information from one side of the body is relayed to the cerebral cortex on the opposite side (Barr & Kiernan, 1988; Martin & Jessell, 1991b).

The Somatosensory System of the body – limbs and trunk – is comprised of two major ascending systems (Martin and Jessell, 1991b).

1. the Anterolateral System and
2. the Dorsal Column Medial Lemniscal System (DCMLS).

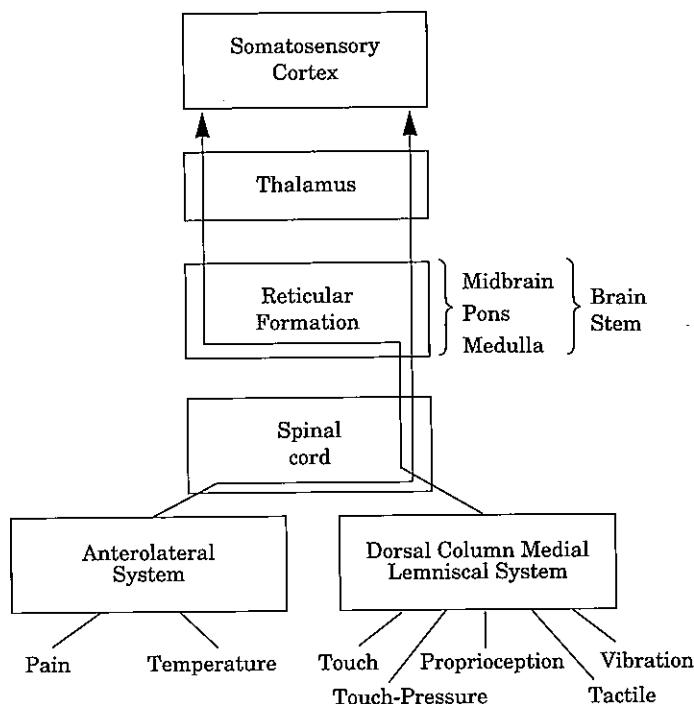
These are presented diagrammatically in Figure 4.1. The trigeminal nerve conveys sensory information from the face, lips and mouth to the cortex (Barr & Kiernan, 1988; Dodd & Kelly, 1991). Because the trigeminal system functions similarly to the somatosensory system of the limbs and trunk; one part of the system primarily mediates pain and temperature, and the other mediates tactile information, it will not be detailed here.

The Anterolateral and DCML systems interact and normally function in a balanced state (Moore, 1991b). Both systems are activated by the various somatosensory information encountered in

daily life activities (Zimmerman, 1985) and relay incoming information to the brain for three primary purposes:

1. Sensation and Perception
2. Arousal
3. Motor Control (Martin, 1991; Matlin, 1986).

Figure 4.1 The Somatosensory System – a simplified version



Note: Only the major functions of the Anterolateral and Dorsal Column Medial Lemniscal systems are identified. Each system relays information from both.

The Anterolateral System / Protective System

The anterolateral system is survival oriented and has a protective function. It has a major role in relaying information about pain and temperature, and a minor role in relaying touch and proprioceptive information from the body and limbs, to the cerebral cortex. The information is carried to the cortex via structures in the brain stem and midbrain areas, particularly in the reticular formation and the thalamus (Jessell & Kelly, 1991; Martin & Jessell, 1991b; Moore, 1991a; Zimmerman, 1985).

The anterolateral system has indirect reciprocal links with the limbic system, a region of the brain which contributes to emotional responses, and with the hypothalamus, which is primarily responsible for autonomic regulation (Jessell & Kelly, 1991). Such links may assist in explaining why certain forms of touch make us feel happy and content, or cause us to shrink from the person touching us, increase our respiration rate, and perspire.

The Dorsal Column Medial Lemniscal System / Discriminative System

The dorsal column medial lemniscal system (DCMLS) has a discriminatory and exploratory function (Moore, 1991a). Its primary function is to transmit proprioceptive, vibratory, tactile – fine touch, touch-pressure – information from the body and limbs via the spinal cord, reticular formation and thalamus to the cerebral cortex (Barr & Kiernan, 1988; Martin & Jessell, 1991b; Moore, 1991a). Most aspects of touch are carried by the DCMLS (Kandel & Jessell, 1991) including information about the texture, size and shape of objects (Martin & Jessell, 1991a), two-point discrimination (Kandel & Jessell, 1991) and localisation of tactile stimuli (Zimmerman, 1985).

Overlapping Functions of the Anterolateral and Dorsal Column Lemniscal Systems

The anterolateral and dorsal column systems are not separate and discrete (Martin, 1991; Moore, 1991), there is an overlap of function between the systems. For example, studies of individuals with brain damage indicate that some aspects of tactile discrimination are carried in the anterolateral system and that some aspects of pain are carried in the DCMLS. This overlap of function is viewed as advantageous because it adds “subtlety and richness to a perceptual experience by allowing the same information to be handled in different ways”; it also offers “a measure of insurance; if one pathway is damaged, the others can provide residual perceptual capability” (Martin & Jessell, 1991a, p.360).

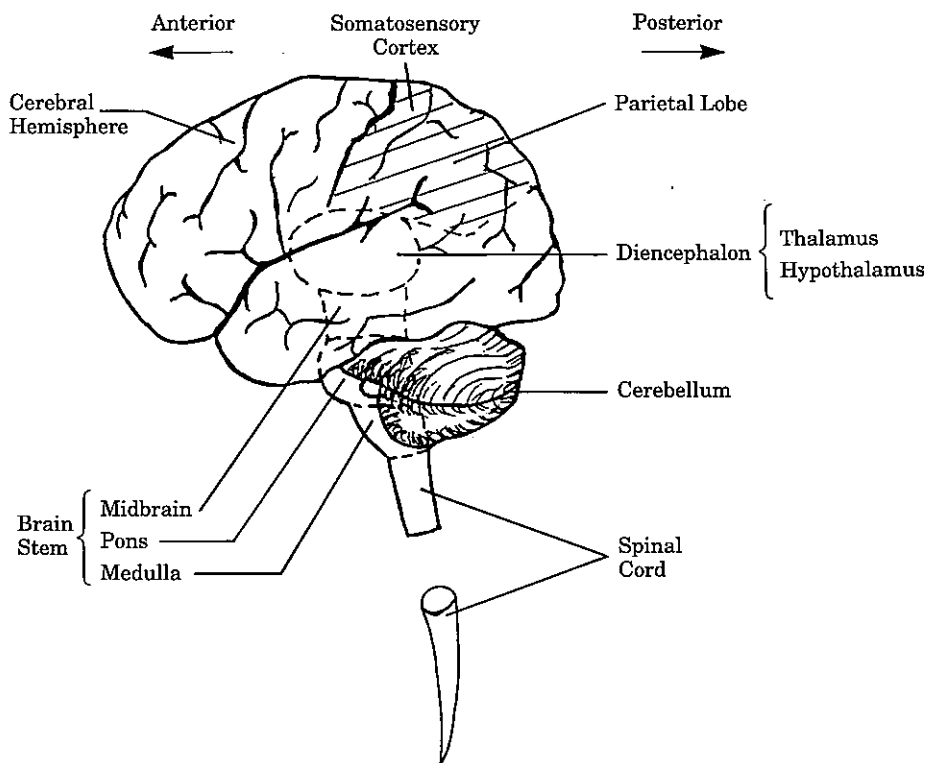
Damage to the Somatosensory Pathways

Protective systems are believed to be less vulnerable to CNS damage than discriminatory systems (Moore, 1991). Following CNS damage, the protective system may dominate (Moore, 1991). In the case of the somatosensory system, anterolateral system domination could result in protective responses to all forms of touch, similar to the reactions displayed by Keith in a previous scenario. Such withdrawal from touch potentially limits exploration of people and objects in the environment, inhibits development of discriminatory touch and reduces the opportunities for social and informative touch. Discriminatory systems are viewed as more amenable to learning and environmental influences than protective systems (Moore, 1991). Damage to one part of the somatosensory system, the pathways and structures involved, tends to affect other parts (Moore, 1991).

MAJOR CNS STRUCTURES INVOLVED IN SOMATOSENSORY PROCESSING

The major structures of the central nervous system (CNS) involved in the processing of somatosensory information are identified in Figures 4.1 and 4.2. Although each of these CNS structures – thalamus, reticular formation, midbrain and somatosensory cortex – has a unique role in the processing of somatosensory information, each is interdependent on the other.

Figure 4.2 **The Central Nervous system – simplified**
(Adapted from Kandel, 1991; Moore, 1991a)



Reticular Formation

Information is transmitted via the anterolateral and DCMLS to the reticular formation. This information is subsequently transmitted to the thalamus and then to the somatosensory cortex (Jessell & Kelly, 1991). The reticular formation plays a major role in arousal, attention and inhibition (Moore, 1991b). It filters out unimportant sensory information, enhances the information critical for survival and daily life, tasks and sends it to higher levels of the CNS (Moore, 1991a).

Midbrain

One part of the anterolateral system terminates primarily in the midbrain (Martin & Jessell, 1991b), an important centre for integrating visual (superior colliculus) and auditory (inferior colliculus) information (Barr & Kiernan, 1988).

Thalamus

Both the anterolateral and DCML systems transmit information to the thalamus, a major integrating centre for sensory input from all sensory systems except the olfactory system (Martin, 1991). The thalamus sorts sensations by modality (Tortora & Anagnostakos, 1987) and transmits somatosensory information to the somatosensory cortex (Martin, 1991).

The Somatosensory Cortex

The somatosensory cortex, situated in the parietal lobe, processes information which has been relayed via the somatosensory pathways from all the somatosensory modalities. The projections of the somatosensory cortex are complex. They include connections with many other areas of the cortex, and subcortical structures including the thalamus and spinal cord (Kandel & Jessell, 1991; Martin & Jessell, 1991b). The primary function of the somatosensory cortex, in conjunction with the posterior parietal cortex, is to provide individuals with precise conscious perception of sensations from specific somatosensory modalities (Tortora & Anagnostakos, 1987).

THE SOMATOSENSORY SYSTEM AND TOUCH-SPEECH CUES

Neural science literature offers support for a number of characteristics which the authors view as crucial in the design and implementation of a Touch-Speech Cue programme and particularly in the choice of a touch signal. These are outlined below.

Intensity of Touch Signals – Firm and Gentle Pressure

It is suggested that the optimal touch for a touch signal is a firm and gentle pressure. Touch-pressure is carried primarily in the DCMLS, part of the function of which is to inhibit the protective responses of the anterolateral system (Chapparo, 1992; Moore, 1991a). The use of touch-pressure should therefore increase the likelihood of the touch signal being an acceptable form of touch to the individual and reduce the likelihood of an aversive response. Touch-Speech Cues are unlikely to be effective for individuals described earlier in this chapter who are either under- or over-reactive to touch.

In addition, touch-pressure stimulates slowly adapting receptors (Merkel-receptors) (Martin & Jessell 1991a). Longitudinal observations by the authors suggest that many individuals with significant multiple disabilities require additional time to process touch

information. For these individuals, the stimulation of slowly adapting receptors through the use of touch-pressure may aid in the conscious awareness of the stimulus.

It is hypothesised that this firm and gentle touch provides an adequate degree of intensity to generate the required level of activity in the sensory receptors and to recruit additional receptors to facilitate both processing and conscious awareness of the touch signal in individuals with significant multiple disabilities.

Touch Signals Require Warm Hands

It is suggested that touch signals be given with warm hands, to prevent the possibility that cold hands may feel noxious to the individual and result in an aversive reaction.

Touch Signals and the Application of Two Stimuli

When possible touch signals should involve the application of the same touch stimulus applied twice, the second one closely following the first. Present knowledge does not enable specification of the exact time delay between the application of the first and second touch stimuli. Simultaneous application of each touch stimulus with the appropriate syllables of the target word while retaining the usual flow of speech production is suggested.

The primary purpose of the first touch stimulus is to alert the individual; to focus attention on the message about to be communicated. The connections of the anterolateral and DCMLS pathways with the reticular formation offer neurobiological support for this aspect of Touch-Speech Cues. The primary purpose of the second touch stimulus is to notify the individual with significant multiple disabilities of the communication message.

The authors recognise that for many Touch-Speech Cues, it would be incongruent to apply two stimuli. For example, the request "wait" is monosyllabic and therefore one touch stimulus would be more appropriate.

Duration of the Touch Signal

It is suggested that each stimulus of the touch signal be applied for approximately one second. The neural science literature does not provide specific support for this duration. It is hypothesised however that this length of time is adequate for the tactile stimulus to gain a sensory memory but avoids adaptation and inhibition of conscious awareness of the touch signal.

In practice, it is suggested that the initial touch stimulus be applied simultaneously with the first syllable of the target word, and the second touch stimulus applied with the second syllable of the target word. This will result in each touch stimulus being applied for approximately one second. For example, the touch signal for "handcream" may be a firm but gentle circular motion on the individual's palm; one circular motion would be applied while saying "hand" and the other while saying "cream". Photographs of this touch signal form Figure 4.1. The whole process of the application of

the touch signal while simultaneously saying the target word, "handcream", is embedded in the natural contours of normal speech production. In this way each touch stimulus would take approximately one second.

Figure 4.1 **The suggested touch signal for the target word 'handcream'.**



Location of a Touch Signal

The location of a touch signal should be determined after detailed assessment of an individual's preference for touch types and sites.

Neural science literature provides some guidance in determining the location for a touch signal. In general, the authors suggest that touch signals be administered on the limbs and trunk. The most sensitive body parts, that is, the lips and fingertips should be avoided. However, it needs to be remembered that *individuals may respond differently to an identical type, intensity, duration and location of touch.*

Touch Signal Congruence to the Action/Activity/Target Word

Research suggests that sensory stimulation must be congruent with an activity to achieve optimal integration by the CNS. It is suggested therefore that touch signals are appropriate to the message being communicated (Hyden & Egyhazi, 1962 cited in Ayres, 1972; Rósenzweig, 1966 cited in Ayres, 1972). It should be congruent with the activity, action and target word whenever

possible. For the example "handcream", in Table 4.1., the touch signal was both appropriate for the individual's tactile system status, and congruent with the target word and the action involved in carrying out the activity. This high degree of congruence will not always be achievable but should be aimed for.

Touch Signals May Involve the Movement of a Body Part

When congruent to the message being conveyed by the touch signal, the touch signal may involve both touching and gently moving a body part. It is suggested that each of the two touch stimuli are discrete movements. For example, the touch signal for "zither" (musical instrument) may be to gently but firmly hold the individual's hand, with the communication partner's palm placed across the individual's knuckles and thumb inside the individual's palm, and using one discrete motion, move the individual's hand a short distance backwards while saying "zi", return the individual's hand to its original position, repeat the movement while saying "ther", as shown in Figure 4.2. The communication partner maintains the touch-pressure on the individual's hand during the entire process, which occurs naturally and in a conversational manner.

Figure 4.2 **The suggested touch signal for "zither" involves moving the individual's hand.**



CONCLUSION

This chapter outlined the somatosensory system – the receptors, pathways and CNS structures – involved in the transmission and interpretation of somatosensory stimuli. This information, although vastly simplified, provides the basis for understanding the manner in which the touch signal of the Touch-Speech Cue is processed. The chapter provided a framework based on neurobiological knowledge for determining the intensity, location and duration of the touch signal used in a Touch-Speech Cue when this is an appropriate strategy. Congruence between the touch signal and the target word was promoted. The need for touch signals to be determined on an individual basis, primarily because individuals can react to identical forms of touch differently, was stressed. These different reactions suggest that while the somatosensory system of all individuals has many common features, the manner in which each functions is unique to the individual.

Chapter 5 provides an assessment framework for determining the suitability of a Touch-Speech Cue programme for an individual with significant multiple disabilities.

CHAPTER 5

TOUCH-SPEECH CUE SELECTION: ASSESSMENT FRAMEWORK TO DETERMINE CANDIDACY FOR TOUCH-SPEECH CUE PROGRAMMES

The aim of this assessment framework is to determine the suitability of a Touch-Speech Cue programme for an individual with significant multiple disabilities who has limited understanding of speech. A Touch-Speech Cue programme is one of a range of receptive communication strategies which may be employed by a communication partner to facilitate an individual's attention to, recognition and comprehension of spoken language.

The ecological model referred to in Chapter 3 recognises the need for assessment of performance across a wide range of environments, subenvironments and activities that are meaningful to an individual and his/her partners (Guess & Helmstetter, 1986; Helmstetter, 1989; Sigafoos & York, 1991). The ecological model allows for observation of actions and reactions in natural settings. The authors believe that the actions and reactions of communication partners are an essential aspect of assessment to determine the suitability of a Touch-Speech Clue programme for an individual with significant multiple disabilities.

The initial step in using an ecological model is to determine for each individual, relevant domains, environments, subenvironments, and the activities which occur in each. Table 5.1 provides an example of an activity, the environment and subenvironment in which it occurs, and the persons who may be involved in the activity. This is a preferred activity for James. In the domain of leisure, an example of an environment is school; the subenvironment is the garden and the activity is gardening.

Table 5.1 **An example of a leisure activity, the environment, subenvironment in which it occurs and the participants in the activity.**

<i>Learner:</i> James			
<i>Domain:</i> Leisure			
<i>Environment</i>	<i>Subenvironment</i>	<i>Activity</i>	<i>Participants</i>
School	Garden	Gardening	James Nick Jane Lisa



Ecological Assessment – James and friends gardening.

The individual's preferences, his/her likes and dislikes for particular activities, subenvironments and environments need to be carefully assessed. In addition, the persons with whom the individual prefers to interact for each of these activities, subenvironments and environments needs to be identified. The actions and reactions of an individual and his/her partners are assessed, described and documented in the sequence in which they occur.

Such detailed information is essential to determine the suitability of Touch-Speech Cue programmes. If Touch-Speech Cues are suitable, this information is used to develop that programme. If Touch-Speech Cues are viewed as unsuitable, this information provides the basis for developing alternate communication programmes.

A **team approach** is crucial in providing comprehensive, individualised assessment and programming for the individual with significant multiple disabilities. Such a collaborative approach is supported in much of the literature (Baumgart, Johnson & Helmstetter, 1990; Campbell, 1989; Thomas & Morsink, 1991; NSW Department of Education, 1989). Team members may include: the individual with significant multiple disabilities, family, friends, audiologist, counsellor, doctor, nursing staff, psychologist, residential care workers, respite care staff, social worker, teachers, speech pathologist, occupational therapist, orientation and mobility instructor, orthoptist and physiotherapist, – and any other people with a significant involvement in the individual's life. The level of involvement of each team member will depend on the setting and lifestyle of the individual involved.

Each team member interacts with the individual with significant multiple disabilities in a unique manner, in different environments, subenvironments and with varying activities. Each team member therefore provides information which contributes to developing a more complete and accurate picture of an individual's skills, abilities and difficulties relevant to determining the suitability of a Touch-Speech Cue programme.

Whilst the ecological model allows for "real-life" assessment of an individual and his/her communication partners, it is important for team members engaged in the assessment and interpretation of assessment findings to have a strong theoretical and practical base; including knowledge of touch and communication processes, developmental theories, a range of intervention strategies and the theory and practice implications underlying each.

Assessment to determine the suitability of a Touch-Speech Cue programme for an individual with significant multiple disabilities needs to be carried out on an ongoing basis, by monitoring in detail the following aspects of an individual:

- receptive communication status
- response to natural cues
- somatosensory, particularly tactile system, status.

Assessment also needs to focus on the following aspects of the actions of communication partners:

- opportunities provided for receptive communication status.
- range of natural cues used
- use of touch
- use of touch paired with speech.

This chapter addresses these factors and provides case studies to illustrate the assessment process.

INDIVIDUAL

Status of an Individual's Receptive Communication:

The receptive communication status of an individual with significant multiple disabilities is determined under the leadership of the speech pathologist. Team members contribute to ongoing assessment utilizing an ecological approach.

Specific observations of an **individual's receptive communication status** should include:

- attention to voices
- preference for particular voices, for example, male, female, child adult
- recognition of particular voices, for example, mother's voice, orthoptist's voice
- response to intonation, for example, scolding, friendly
- anticipatory responses
- response to his/her name
- response to frequently occurring words and phrases occurring in the natural course of her day including:
 - a person's name, for example, "here's *mum*"
 - an object's name, for example, "your *cup*"
 - an event, for example, "we're having a *party*"
 - an action, for example, "let's go *swimming*"
 - a location, for example, "you're at the *shops* now"
- evidence of comprehension, for example, to frequently occurring words and phrases
- individual delay time – whether the learner has a pattern of delay when responding, for example, to sounds, voices, touch; and
- the consistency of each of these responses

Current tests of auditory comprehension and receptive language fail to address in sufficient detail the unique receptive communication abilities and skills of the individual with significant multiple



Receptive Communication Status – attention to voices.

disabilities. According to Strain and Odom (1986) standardized assessment tools are unable to detect the subtle changes in behaviour of individuals with significant multiple disabilities. Failure to detect these changes may significantly misrepresent the individual's receptive communication status. Strain and Odom (1986) further state that the underlying assumption of norm-referenced assessments that individuals with significant multiple disabilities develop skills in the same order as individuals without disabilities, may be invalid.

An accurate assessment of the receptive communication status of individuals with significant multiple disabilities requires vigilant observation and detailed documentation of behaviours including facial expression, eye movements, body posture, body movements and body stilling across many settings. It is important to ascertain that body and eye movements are intentional and not reflexive. In addition, observation of biobehavioural states, including levels of drowsiness and agitation, (Guess, Mulligan-Ault, Roberts, Struth, Seigel-Causey, Thompson, Bronicki & Guy, 1988) may be useful in determining attention to, recognition and comprehension of spoken language in individuals with significant multiple disabilities. Team discussion is essential to determine consistency or inconsistency of an individual's responses.

The Individual's Response to Natural Cues

Whilst assessing the receptive communication status of an individual with significant multiple disabilities, responses to natural cues must also be carefully observed, documented and interpreted. This includes whether or not the individual detects and reacts to natural cues as outlined in Table 3.1, and the natural cues which elicit greater or lesser responses.

Specific observations should include the **individual's**:

- recognition of specific location/s, for example, becomes alert when near a pool after smelling the chlorine (olfactory cue) or hearing water being splashed (auditory cue);
- recognition of the significance of a particular location, environment or subenvironment, indicating anticipation of the activity that usually occurs at that location, for example, smiles as nears the pool (visual cue);
- recognition of a person by voice (auditory cue), odour (olfactory cue), appearance (visual cue), touch (tactual cue);
- responses to gestures for example, strains up towards an adult who is holding his/her arms out (gestural cue);
- responses that suggests an understanding of the significance/use of familiar objects, for example, reaches up to a cup (visual cue), becomes excited when (s)he sees the wheelchair (visual cue);
- identification of stimuli which result in no response.

Status of Somatosensory System

Available tests and checklists of somatosensory system functioning fail to provide adequate information regarding the responses to tactile stimuli by an individual with significant multiple disabilities.

An ecological approach to somatosensory system assessment allows for the careful observation, documentation and interpretation of the individual's responses to tactile stimuli across a wide range of stimuli, environments and personnel. The ecological model is an ideal approach to provide the detailed information necessary to adequately assess the touch modality of the somatosensory system which is dynamic and variable (Ayres, 1980). It is suggested that specific sensation testing is carried out by an occupational therapist, or other team member skilled in testing this system.

Once gathered, information needs to be synthesised and interpreted in conjunction with the information obtained regarding the existing use of touch in the individual's environment. Team discussion guided by an occupational therapist or other team member with sufficient knowledge of the somatosensory system, will then identify potentially suitable touch signals, their locations, durations and intensities, for a Touch-Speech Cue programme. Information on the somatosensory system and characteristics for the touch signal is provided in Chapter 4.

COMMUNICATION PARTNER

Opportunities Provided for Receptive Communication

Communication behaviours of individuals with significant multiple disabilities tend to be subtle and may be fleeting. Skilled and sensitive observers are therefore required to accurately assess both the individual's receptive language skills and the opportunities provided for receptive communication throughout the day. Crucial to the provision of such opportunities is allowing an individual time to respond to interactions initiated by others and time to initiate interactions (Gaylord-Ross, Stremel-Campbell & Storey, 1986).

The Present Range of Natural Cues Used with the Individual

Given the interactive nature of communication, it is essential to know the individual's responses to each of the natural cues used, and the range of these natural cues. It is possible that natural cues could be expanded and/or exaggerated to form a viable communication system for the individual and/or used in conjunction with Touch-Speech Cues.

The Existing Use of Touch

Documentation of the existing use of touch throughout the individual's daily activities needs to occur simultaneously with the assessment of the individual's receptive communication skills, responses to natural cues, somatosensory system status and the existing use of touch paired with speech. This documentation should include the types of touch used, as outlined in Table 2.1, the person using those types of touch, the location, duration and intensity of the touch.

The Existing Use of Touch Paired with Speech

Longitudinal observations by the authors suggest that many team members unconsciously pair speech with touch when interacting with an individual with significant multiple disabilities. Documentation of such instances provides useful assessment information. If a Touch-Speech Cue programme is deemed appropriate for an individual, information on the existing use of touch paired with speech may become particularly important in assisting to determine priority Touch-Speech Cues.

ASSESSMENT DATA COLLECTION

Information gained during assessment needs to be representative of an individual's daily routine. It should include systematic assessment of at least two activities in a range of environments and subenvironments, in each of the major domains of leisure, domestic, community and, when relevant, vocational. This information and additional anecdotes provided by team members will provide broad and consistent findings on the receptive communication status of an individual; responses to natural cues; somatosensory status; receptive communication opportunities provided; range of natural cues used; existing use of touch and existing use of touch paired

with speech. This information forms the basis for decision-making regarding the suitability, at a particular point in time, of a Touch-Speech Cue programme.

Data gathering forms may be developed to document the activities frequently engaged in by an individual with significant multiple disabilities, to detail the environments and subenvironments in which these occur and the persons with whom the individual interacts while engaged in these activities. Such data forms should include space to document the areas of assessment detailed above. It is suggested that videos be used selectively during the assessment process because their use in all environments may be inappropriate, time consuming and expensive.

The information gathered during the assessment period will yield essential information for the decision-making process to determine the suitability of a Touch-Speech Cue programme for an individual as well as provide valuable ideas for general communication programming.

SYNTHESIS OF ASSESSMENT FINDINGS

Comprehensive and individualised assessment provides essential data on the receptive communication of an individual with significant multiple disabilities, highlighting the interactions participated in and the opportunities those interactions offer for enhancement of comprehension. Team members meet under the leadership of the Speech Pathologist, to discuss the assessment findings, which are then collated, synthesised and interpreted. The individual's present communication programme is concurrently reviewed.

The subsequent decision-making process determines whether a Touch-Speech Cue programme is a suitable strategy through which to develop the receptive communication of an individual or whether an alternative strategy is more appropriate. If a Touch-Speech Cue programme is selected, the assessment findings will provide the information necessary to determine the target words and key word phrases which will be paired with the touch signal to form the Touch-Speech Cue. With the guidance of the occupational therapist, the assessment findings will also provide the information to determine the most appropriate location, duration and intensity for the touch signal.

SETTING GOALS

Once it is determined that Touch-Speech Cues are an appropriate strategy to promote receptive communication in an individual with significant multiple disabilities, individual goals are documented, and the design, implementation and evaluation of the programme determined. The determination and documentation of individual goals are an integral part of quality therapeutic intervention programmes (Chapparo & Hummell, 1993; Fey, 1986; Law, 1991) and the individual educational plan process (Campbell, 1987;

Nietupski & Hamre-Nietupski, 1987). The following programme goals are proposed:

1. To notify an individual of an impending action/activity/event with consistent touch-speech messages across people, situations and environments
2. To gain an individual's attention.
3. For an individual to demonstrate anticipation of a frequently occurring event/action/activity.
4. For an individual to demonstrate comprehension of a Touch-Speech Cue.
5. For an individual to demonstrate recognition of a target word.
6. For an individual to demonstrate comprehension of a target word.

Individual goals are determined relative to the touch signal and target words selected for comprehension. Discussion on selecting target words and evaluating goals is included in Chapter 6.

GUIDELINES FOR DETERMINING TOUCH-SPEECH CUE CANDIDACY

Touch-Speech Cue programmes appear to benefit an individual with significant multiple disabilities who:

- demonstrates limited or no comprehension of frequently spoken words; and/or
- is unable to make use of natural cues that aid comprehension, due to attentional or sensory impairments and/or;
- is inattentive to a speaker.

More specifically, Touch-Speech Cues may be viewed as a desirable interactive strategy to assist an individual with significant multiple disabilities to comprehend target words and key words and phrases when one or more of the following groups of characteristics are exhibited:

1. Individual who is Nonsymbolic and:

- has limited recognition of voices;
- does not appear to differentiate intonation patterns;
- does not appear to respond to own name;
- does not demonstrate understanding of frequently occurring words or phrases

2. Individual who is Nonsymbolic and:

- does recognise familiar voices;
- does differentiate intonation patterns;
- does recognise own name;

- does not demonstrate understanding of frequently occurring words and phrases

3. Individual who has Emerging Symbolisation and:

- recognises familiar voices
- differentiates intonation patterns
- responds to own name
- inconsistently demonstrates an understanding of frequently occurring words and phrases.

Table 5.2 **The primary functions Touch-Speech Cues serve in enhancing the receptive communication of an individual who is nonsymbolic or has emerging symbolisation.**

1. Gain the individual's attention.
2. Notify the individual of an impending event/action/ activity in a consistent manner.
3. Generate anticipation of a frequently occurring event/action activity.
4. Generate understanding of the Touch-Speech Cue.
5. Facilitate recognition of target and key words.
6. Facilitate comprehension of target and key words.

CIRCUMSTANCES INCOMPATIBLE WITH TOUCH-SPEECH CUE PROGRAMMES

Touch-Speech Cues are incompatible when:

- the individual has an adequate understanding of the key words and phrases used during the day
- the individual is responsive to natural cues and natural cues can be better utilised for the activity/action/event
- touch of all types and forms have been demonstrated in assessment to be distressing to the individual
- communication partners are unable to implement Touch-Speech Cues consistently
- communication partners are unable to provide the requisite paralinguistic features **congruently** with the Touch-Speech Cue
- the individual is engaged in a behavioural outburst and unable to attend to the touch-speech cue. Protective and nurturing touch may be used to assist the learner to gain control over the behaviour and then a Touch-Speech Cue can be used.

TOUCH-SPEECH CUE PROGRAMMES

Touch-Speech Cue programmes may play a temporary or permanent role in an individual's receptive communication programme. Ongoing assessment and programme evaluation by team members will determine the necessity of retaining or replacing Touch-Speech Cues with another strategy for the individual with significant multiple disabilities. This issue is discussed in Chapter 6.

CASE STUDIES

The following case studies demonstrate the assessment process detailed in this Chapter.

CASE STUDY - JUDY

Judy is a 12 year old girl with significant intellectual physical and visual impairments. Judy lives in a group home during the week with three peers, Angela, Stephanie and Jenny and, the group home leader, Joanne. She spends the weekends at home with her parents and older sisters, Margaret and Sue.

Table 5.3 **The environment, subenvironment, activity and participants for the excerpt in Table 5.4**

<i>Environment</i>	<i>Subenvironment</i>	<i>Activity</i>	<i>Participants</i>
School	Classroom	Applying Handcream	Judy Tim (teacher's aide)

Table 5.4

Learner and partner actions and reactions in an excerpt from the environment, subenvironment, activity and with the participants detailed in Table 5.3

LEARNER	PARTNER
<i>Judy is lying supine on a wedge; there is a tape playing in the background to which she appears to be listening</i>	Tim scolds Samuel using a loud, angry voice.
<i>Judy cries</i>	Tim says "It's OK Judy, I'm not cross with you, I'm cross with Samuel"
<i>Judy momentarily stills to Tim's voice, then continues to cry</i>	Tim walks over to Judy, crouches down, level with her face, holds her shoulders and gently rocks her from side to side, saying "Calm down Judy".
<i>Judy calms and stops crying</i>	Tim asks "Do you want a game with Tim?" Waits
<i>No response to question</i>	Tim asks "Do you want the zither or the handcream?"
<i>No response to question</i>	Tim asks "Do you want the zither?" Waits
<i>No response to question</i>	Tim displays the zither close to Judy's face and repeats "Do you want the zither?"
<i>No response to question</i>	Tim strums the zither. Waits
<i>No response to sound</i>	Tim comments, "You don't want the zither?" Waits
<i>No response to comment</i>	Tim asks "Do you want the handcream?" Waits
<i>No response to question</i>	Tim waves the handcream under Judy's nose, saying "Have a smell, it's lovely handcream".
<i>No response to smell</i>	Waits

No response

Tim says "I'll put some on your hands".
Waits

No response to statement

Tim rubs some handcream into Judy's hands, one at a time, using a circular motion and saying "I'm rubbing some handcream into your hands. It makes them feel soft".

Judy gives a very short vocalisation

SUMMARY OF ASSESSMENT FINDINGS FROM THIS ENVIRONMENT, SUBENVIRONMENT AND ACTIVITY.

INDIVIDUAL

Receptive Communication Status:

- Responds to music – lies quietly
- Responds to extremes of conversational tone – scolding, by crying
- No response to simple 'yes/no' questions – "Do you want the zither/handcream?"
- Response to Tim's familiar voice by stilling.

Response to Natural Cues:

- No response to an olfactory cue – perfume of handcream
- No response to visual cue – sight of zither

Somatosensory System Status:

- Response to firm touch on her shoulders when paired with gentle movement – calmed

INTERACTIONS WITH PARTNERS

Opportunities Provided:

- Tim waited for a response from Judy after each question or statement
- Tim offered Judy a choice of activity

Range of Natural Cues Used:

- Olfactory Cue – perfume of handcream
- Visual Cue – display of zither

Existing Use of Touch:

- Nurturing touch was used, simultaneously with gentle movement to calm Judy.

- Recreational touch was used to rub the handcream into her hands.

Existing Use of Touch Paired with Speech:

- Nurturing touch, using firm and gentle pressure on her shoulders, plus gentle movement paired with "Calm down, Judy".
- Informative touch – using firm and gentle pressure while rubbing in the handcream, paired with "I'm rubbing some handcream into your hands. It makes them feel soft".

SYNTHESIS OF ASSESSMENT FINDINGS

The following information was gathered primarily from observation and documentation from six activities, including the above excerpt, each occurring naturally in four different environments as detailed below:

Table 5.5 Environments, Subenvironments, Activities and Participants Involved in Assessment

Environment	Subenvironment	Activity	Participants
1. School	Classroom	Applying handcream	Judy Tim
	Gym	Barn dancing	Judy class peers and staff
2. Group Home	Kitchen	Eat dinner	Judy Angela Jenny Stephanie Joanne
	Living room	Return from school	Judy Joanne
3. Community	Car	Go for a drive	Judy Margaret Mum
4. Home	Garden	Play ball game	Judy Dad Sue

INDIVIDUAL – Judy

Receptive Communication Status:

- Responds to music, family conversation – lies quietly
- Responds to extremes of conversational tone (scolding, shouting) – by crying

Judy is unable to differentiate between speech directed to her or to another

- No response to simple yes/no questions including "Do you want the zither/handcream?", "Do you want dinner?", "Would you like to go for a drive?"
- No response to frequently occurring phrases including "Let's play with the football", "We're going to barn dance today", "It's great to see you back again", "time for dinner", "Catch the ball"
- No response to familiar voices.

Response to Natural Cues:

- No response to an olfactory cue including perfume of handcream, odour of food,
- No response to visual cue including display of zither, car keys, sight of football, familiar persons
- No response to auditory cue including jangle of car keys, hard tapping on football, exaggerated sound of plate being placed on table
- No response to gestural cue including holding out arms when asking "Do you want to come up?",
- No response to verbal cues including "Let's go for a drive", "It's dinnertime", "Here's the football"

Somatosensory System Status:

- Response to firm touch on her shoulders when paired with gentle movement -calmed; body stills when stroked on the cheek by her mother, given a hug by familiar adults and children, hair ruffled by Joanne in greeting
- No apparent reactions to other forms of touch including hands held during dancing, football in hands, application of handcream
- Delayed response withdrawal of body part touched to a noxious stimulus, for example, pin prick,
- No response to light/flutter touch
- Vibration was not tested because of contraindications due to spasticity

INTERACTIONS WITH PARTNERS – Judy

Opportunities Provided:

- Team members generally wait for a response from Judy after each question or statement.
- Team members try to provide opportunities for Judy to initiate communication
- Team members try to meticulously observe Judy's actions and reactions and respond sensitively to communicative intents from Judy

Range to Natural Cues Used:

- Olfactory Cues including perfume of handcream, odour of meal,

- Visual Cues including display of zither, cup, football, familiar persons
- Verbal Cues including "Let's go for a drive", "It's dinnertime"
- Auditory Cues including jangle of car keys, exaggerated sound of plate being placed on table, hard tapping on football

Although a range of natural cues are used appropriately with Judy, she does not consistently respond to any of them.

Existing Use of Touch:

- Nurturing touch, – by Tim simultaneously with gentle movement to calm her; cuddled by her family, stroked on the cheek by her mother, hair ruffled by Joanne,
- Recreational touch – to rub the handcream into her hands, dance with her, helping her catch and throw the football
- Requisite touch – primarily firm and gentle – used when lifting her into and out of the car, moving her from a wedge on the floor into her wheelchair prior to dinner, wiping her mouth with a cloth serviette after dinner
- Casual touch – primarily from peers in the group home and in the gym
- Informative touch – Margaret moving Judy's hands backwards and forwards when telling her it was time for a drive, Dad placing the football in her hands to inform her that the game was about to begin, Tim holding her hands and moving them side to side to indicate it was time for barn dancing.

Existing Use of Touch Paired with Speech:

- Nurturing touch, using firm and gentle pressure on her shoulders, plus gentle movement paired with "Calm down, Judy".
- Informative touch – Margaret holds Judy's hands, moves them backwards and forwards when saying "Time to go for a drive", Dad placing the football in her hands and saying "Let's play football", Tim holding her hands and moving them side to side while saying "We're going to barn dance today"

CANDIDACY FOR A TOUCH-SPEECH CUE PROGRAMME

Based on this assessment data, Judy is an ideal candidate for a Touch-Speech Cue programme for the following reasons:

- she does not demonstrate comprehension of frequently spoken words
- she does not demonstrate a response to natural cues
- she responds to extremes of intonation patterns
- she responds to sounds and voices in her environment
- she accepts a range of touch stimuli from familiar people.

GOALS OF THE TOUCH-SPEECH CUE PROGRAMME

Appropriate goals, determined collaboratively by the team, could include:

1. Judy will be notified of the impending activity of rubbing handcream into her hands with a consistent Touch-Speech Cue (describe), across people, situations and environments.
2. Judy will attend by displaying sustained stilling, to the Touch-Speech Cue for "handcream", embedded within the key word phrase "Would you like the handcream?"
3. Judy will indicate her anticipation of an activity/action by vocalising following her communication partners' application of the Touch-Speech Cue for "handcream".

CASE STUDY - JOSHUA

Joshua is an 18 year old man with a significant intellectual impairment and cortical visual impairment. He is ambulant and is at nonsymbolic stage of language development. He attends a swimming club for teenagers with and without disabilities once a week which is organised by Kerry.

In this excerpt, Joshua, his younger sister, Caroline, mother and father are sitting around the kitchen table, and have nearly completed eating lunch. Joshua is sitting quietly at the table having refused to eat. He indicated his refusal by grizzling and turning his face away each time food was offered to him using natural olfactory, verbal or tactual cues.

Table 5.6 **The environment, subenvironment, activity and participants for the excerpt in Table 5.6**

Learner: Joshua			
Domain: Domestic			
Environment	Subenvironment	Activity	Participants
Home	Kitchen	Eat lunch	Joshua Caroline Mum Dad

Table 5.7

Learner and partner actions and reactions in an excerpt from the environment, subenvironment, activity and with the participants detailed in Table 5.6

LEARNER	PARTNER
<i>Joshua is sitting quietly at the kitchen table. He appears to be listening to the mealtime conversation.</i>	Caroline asks "Mum, Dad, I've finished lunch, can I take Joshua for a walk?"
<i>Fleeting smile to voice Stiffens to his name</i>	Dad says "That's fine, Joshua might like a walk, might make him hungry."
<i>Eyes widen, grins to voice</i>	Caroline walks around to Joshua, faces him and says "Joshua,
<i>Stiffens to his name</i>	Waits let's go for a walk around the block".
<i>No response to the invitation</i>	Caroline teases, "Don't be a stay at home, come for a walk. Let's go".
<i>Joshua frowns No response to the invitation</i>	Caroline holds Joshua's wrist, positions his hand for using sighted guide techniques, both walk out the front door.
<i>Accepts touch</i>	

SYNTHESIS OF ASSESSMENT FINDINGS

The following information was gathered primarily from observation and documentation from six activities, including the above excerpt, each occurring naturally in three different environments as detailed below:

Table 5.8 Environments, subenvironments, activities and participants involved in assessment

Environment	Subenvironment	Activity	Participants
1. Home	Kitchen	Eating lunch	Joshua Caroline Mum Dad
	Bathroom	Teeth cleaning	Joshua Dad
.....			
2. School	Classroom	Music lesson	Joshua Clare (teacher)
	Gym	Exercises	Joshua class peers and staff
.....			
3. Community	Shopping Centre	Shopping	Joshua Steven (friend)
	Swimming Pool	Swimming	Joshua peers Kerry

INDIVIDUAL – Joshua

Receptive Communication Status:

- Responds to conversation of familiar persons – sits quietly
- Responds to familiar voices by smiling
- Responds to his father's voice by widening eyes and grinning
- Responds to intonation – teasing, shouting, scolding – by frowning,
- Responds to his name – his body stiffens
- Indicates a “no” response by grizzling and/or turning his head away.
- Does not respond to frequently occurring phrases, including “Let’s go for a walk”, “We’re going shopping”, “It’s lunchtime”, “Time to clean your teeth”, “Now it’s time for music, We’re going to do exercises”, “Are you ready to go swimming?”
- Above responses are consistent

Response to Natural Cues

- Responds to olfactory cues – nose wrinkles, frowns when dinner is placed on the table in front of him
- Responds to some auditory cues including, smiles to the splashing sounds, frowns to loud yelling at the pool, smiles on hearing musical instruments being played
- Responds to tactual cues – sits down when firm pressure is applied on one of his shoulders and a chair is touching the back of his legs, stands up from sitting when one of his arms is given a gentle tug
- No response to visual cues including the presentation of drums, familiar persons
- No apparent response to verbal cues including, “Let’s go for a walk”, “It’s lunchtime”

Somatosensory System Status:

- Likes firm pressure on his back, for example, smiles and turns to Steven when given a back rub;
- Accepts firm pressure on his arms, including, when walking with Caroline; when hand-on-hand instruction is used during exercises, music, dressing and undressing for swimming, teeth cleaning.
- Dislikes light touch – pulls his arm away if brushed lightly by his peers moving past him; pulls his face away and grizzles when his face is wiped by lightly patting it with a paper serviette after he has eaten.
- Responds to noxious stimuli, for example, pin prick, by frowning and vocalising.

INTERACTIONS WITH PARTNERS – Joshua

Opportunities:

- Team members usually wait at least 10 seconds for Joshua to respond to any conversation, requests or other communication with him
- Team members try to provide opportunities for Joshua to initiate communication
- Team members try to meticulously observe his actions and reactions and respond sensitively to his communicative intents

Present Range of Natural Cues:

- Olfactory cues including odour of food
- Visual cues including presentation of drums, familiar persons
- Verbal cues including “Let’s go for a walk”, “It’s lunchtime”
- Auditory cues including exaggerated sound of plate being placed on table, splashing and yelling by peers at swimming pool, briefly playing musical instruments
- Tactual cues to request him to stand up and sit down

There is optimal use of natural cues by Joshua’s communication partners in all environments. He responds consistently to some but not others. The primary reason for his lack of response to visual cues is believed by the orthoptist and other team members to be due to his visual impairment.

Existing Use of Touch:

- Nurturing touch, – punched in fun on the upper arm by Steven, hugged by his family,
- Social touch – Kerry shakes his hand firmly in greeting
- Recreational touch – Kerry and peers to assist him swimming
- Requisite touch – primarily firm and gentle – for hand-on-hand instruction during exercises, teeth cleaning, music, wiping his mouth after food consumption
- Casual touch – primarily from peers in the swimming club, the gym and classroom,
- Informative touch including – Kerry guides him towards the swimming pool; male peer from the swimming club guides him towards the change room; Clare places his hands on the drum, Dad places the toothbrush in his hand, Caroline positions his hand for walking using sighted guide techniques

Existing Use of Touch Paired with Speech

- Nurturing touch – Steven saying “How are you doing mate” when punching him in fun on the arm,
- Social touch – Kerry saying “Hi Joshua” while shaking his hand
- Informative touch – Dad saying “Here’s your toothbrush” when placing the toothbrush in Joshua’s hand; Clare saying “Here’s

the drum" while placing Joshua's hands on the drum; Kerry saying "The pool's this way Joshua" when she initially guides him towards the pool.

CANDIDACY FOR A TOUCH-SPEECH CUE PROGRAMME

Based on this assessment data, Joshua is an ideal candidate for a Touch-Speech Cue programme for the following reasons:

- he is attentive to the sounds and voices in his environment
- he recognises familiar voices
- he differentiates intonation patterns
- he is responsive to a number of natural cues
- he responds to his name
- he does not demonstrate comprehension of frequently occurring spoken phrases
- he accepts a range of touch stimuli from familiar people.

GOALS OF THE TOUCH-SPEECH CUE PROGRAMME

Appropriate goals, determined collaboratively by the team, could include:

1. Joshua will be notified of the impending activity of going for a walk with a communication partner through the provision of a consistent Touch-Speech Cue (describe), across people, situations and environments.
2. Joshua will attend by stilling to the Touch-Speech Cue for "walk", embedded within the key word phrase "Let's go for a walk".
3. Joshua will indicate his anticipation of an activity/action by smiling, following his communication partners' application of the Touch-Speech Cue for "walk".
4. Joshua will demonstrate understanding of the Touch-Speech Cue for "walk" by standing up and taking a step forwards, following the application of the Touch-Speech Cue.
5. Joshua will demonstrate comprehension of the target word "walk" by standing up and taking a step forward, following the completion of the key word phrase "Let's go for a walk".

Based on the synthesised assessment findings, the team determines the suitability of a Touch-Speech Cues programme for the individual with significant multiple disabilities who has limited comprehension of spoken language. Assessment findings provide necessary information for the team to determine target words, key word phrases and touch signals for the individual's programme.

Conclusion

This chapter has provided an assessment framework to determine the suitability of a Touch-Speech Cue programme for an individual with significant multiple disabilities who has limited receptive communication skills. It is based on an ecological model and requires assessment across a range of environments, subenvironments activities and participants. Consistent with the reciprocal nature of communication, the actions and reactions of both an individual with significant multiple disabilities and his/her communication partners are assessed. The contributions of all team members are crucial during the assessment process, to develop complete and accurate information about an individual's assets and problems. The assessment findings provide the basis for the decision-making involved in determining the appropriateness of a Touch-Speech Cue programme for an individual. If it is determined that a Touch-Speech Cue is a suitable receptive communication strategy, the assessment findings provide the information necessary to design, implement and evaluate the Touch-Speech Cue programme.

Chapter 6 describes the design, implementation and evaluation of Touch-Speech Cue programmes.

CHAPTER SIX

TOUCH-SPEECH CUE PROGRAMMES: DESIGN, IMPLEMENTATION AND EVALUATION

Team discussion of the assessment findings should identify if Touch-Speech Cues are an appropriate strategy for the individual. The speech pathologist's synthesis of the assessment data will enable her to make a judgement on the receptive communication of merit of Touch-Speech Cues for that individual. The occupational therapist's interpretation of that individual's somatosensory system function will further support a decision to selectively use touch for the individual at that time. Having agreed on the introduction of Touch-Speech Cues for an individual, the team need to collaborate on the following:

- identification of the *Key Word Phrases* from the individual's day that contain the **TARGET WORD** for comprehension.
- Identification of the *type, location, duration* and the *intensity* of the touch signal that will be paired with the Target word.
- Identification of the *number* of touch cues to be introduced.

Selecting Target Words for Comprehension

Target Words for comprehension are those words that the team feel are frequently occurring words that the individual does not understand. In the context of all the words the individual does not understand, target words are nominated as desirable, "priority" words for the individual to attend to, recognise, and comprehend. Target Words are contained within the key word phrase that provides the paralinguistic context for the target word. The Key Word Phrase is generated by the ecological assessment that reflects the meaningful activities of the individual's life. Under the guidance of the speech pathologist, the team needs to:

1. Analyse the assessment data to identify the pertinent actions/events/activities for the individual.
2. Identify the Key Word Phrases from these meaningful activities that are desirable for the learner to attend to, recognise, and comprehend.
3. Select Target Words from these Key Word Phrases, that will be paired with the touch signal.
4. Nominate from this "pool" of target words the initial words for Touch-Speech Cue introduction.
5. Group accord on the Target Word production – polysyllabic words are preferable as they provide a more natural opportunity for conveying paralinguistic features such as intonation and melody, e.g. select "lunchtime" over "lunch". The word's produc-

tion should be the truest representation of the action or item, avoiding colloquialism, e.g. "dessert" preferable to "pudding", "handcream" preferable to "Nivea".

6. Discuss existing use of touch in the activity – any informative touch types which can be standardised into Touch-Speech Cues.

Selecting the Touch Signal

The type of touch that will be used for a Touch-Speech Cue will be dictated by the assessment findings. Only touch types that appear acceptable to the individual should be used. As discussed in Chapter Three, *firm* and *gentle* touch pressure can be the foundations of a Touch Speech Cue as this type of touch appear most acceptable to an individual with significant multiple disabilities, and his/her unique somatosensory system functioning.

Location of the touch signal

Touch signal locations must be considered with respect for the individual's age and dignity. Certain locations will always be inappropriate as they violate respect for the individual. Group discussion will highlight touch locations that are already in use, or "reserved" by significant persons in the individual's life for other interactive purposes. For example, family always ruffle Sarah's hair as part of their expressions of *social* and *nurturing* touch.

The sensitivity of the fingertips, lips, and face cautions against the use of these locations for touch signal sites. Where possible the touch signal site should be congruent to the activity/event/action. It is suggested that the face is reserved as a site for cues relating to greetings or mealtime target words. *Congruence* is judged from the individual's perspective and what others feel (s)he associates with the activity in question.

Communication partners need to observe the target word activity closely to see what touch and movements may be associated by the learner with the activity. For example, a nominated target word for Joshua is "walk". Assessment revealed that Joshua's communication partners frequently take hold of his wrist when initiating a walk with him. Tables 6.1 and 6.2 describe the Touch-Speech Cue design process for Joshua and Judy respectively.

When there is *no* apparent touch or movement association already in existence with the learner and the activity, communication partners need to select a touch signal that is maximally different to the other types of touch and individual encounters. The touch signal needs to reflect the characteristics of the target word, e.g. sustained, rhythmic. Target words like "let's go", or "sit down" are appropriate for a touch signal which provides a double tap, press or squeeze, synchronised to the two syllables of those phrases.

Table 6.1 Touch-Speech Cue Design Process

Touch-Speech Cue for "Walk" – Joshua			
Target Word	Key Word Phrase		
Walk	Let's go for a walk		
Touch associated with activity			
Partners usually take Joshua's wrist, then place his hand on their arm			
Touch Signal			
Partner Action			
Cups and squeezes Joshua's wrist. then place his hand on their arm			
Location	Duration	Intensity	
Joshua's right wrist	Sustain	Firm squeeze, gentle tug for "walk"	
Context			
Environment	Subenvironment	Activity	Participants
All	Rooms, any locations	Moving from locations/ leisure option	All





Table 6.2 Touch-Speech Cue Design Process

Touch-Speech Cue for "Handcream" – Judy			
Target Word		Key Word Phrase	
Handcream		Would you like some handcream?	
Touch associated with activity			
Firm rubbing on palm and along fingers			
Touch Signal			
Partner Action			
Rubs Judy's palm in circular motion to hand-cream"			
Location	Duration	Intensity	
Judy's left hand (wears splint on right)	Sustained	Firm	
Congruence			
Rubbing is a part of the activity. Signal of rubbing palm paired to the syllables in "handcream", e.g. action of rub-rub as say "handcream"			
<hr/>			
Environment	Subenvironment	Activity	Participants
All	All	Leisure Grooming	All



Touch signals should at all times consider an individual's **physical status**. Just as certain types of touch assist motor control, other types may be detrimental. For example, an individual with cerebral palsy who has spasticity specific to the muscles of her shoulder girdle, upper trunk and limbs; the sternum or "breast bone" as a touch signal location would be ill-advised as touch to that part of their body may produce abnormal movement patterns of those upper body areas.

The Number of Touch-Speech Cues Introduced

The number of Touch Cues used with an individual will vary according to the individual and their unique receptive communication needs. When implementing a Touch-Speech Cue programme the following aspects must be considered:

- Somatosensory system overload
- Memory demand
- Differentiation of touch
- Communication partner memory demand

Longitudinal observations of individuals with significant multiple disabilities suggests that no more than six Touch-Speech Cues is respectful of the individual's language, memory and somatosensory systems.

Educating the Communication Partner

A nominated person from the team should take on the responsibility to ensure that the Touch-Speech Cues are being given in a uniform fashion without alteration over time. Communication partners need to practice the following "skills" prior to the implementation of the cues:

- Exact location of the touch signal
- Touch pressure
- Touch duration
- When to emphasise the target word and apply the touch signal in the key word phrase
- Accompanying extra and paralinguistic features

Implementation Issues

1. Crucial to successful Touch-Speech Cue implementation is the communication partner's ability to provide the corresponding extralinguistic and paralinguistic features of warmth, interest, and animated facial expression. If the communication partner is unable to provide these vital accompaniments, then the intent of the touch may be misinterpreted by the individual with significant multiple disabilities.
2. Sensitive analysis of the individual's lifestyle using an ecological approach will identify target words for use with Touch-Speech Cues from many environments. Consequently the Touch-Speech

Cue program should be implemented by all communication partners. Touch-Speech Cue implementation requires consistency and commitment from those persons to ensure that the target words are always paired with the touch signal. Attractive Touch-Speech Cue posters, charts, and books displayed in the appropriate environments assist people to remember to pair target words with the touch signal.

3. The communication partner must always allow sufficient time for the individual to process the target word and touch signal. Whilst each individual will have individual delay times, a rough guide is to wait between 5-15 seconds. For example, when Joshua's brother suggests they go for a walk, he provides the phrase, target word, and touch signal, then pauses to see if Joshua makes a response through nonsymbolic actions (facial expression, vocalising, changes in tone. etc.) before commencing the walk. The communication partner only repeats the cue as naturally occurring opportunities arise for production of the key word phrase, and subsequent use of the Touch-Speech Cue.

Data Collection and Evaluation

Whilst data does not have to be taken each time a Touch-Speech Cue is given, it is important to have a pattern of recording of the individual's responses to each target word and Touch-Speech Cue. Data forms need to be individualised, reflecting the particular group of responses that may reflect attention, recognition and comprehension. The observer recording the individual's response to the Touch-Speech Cue need to be familiar with the subtle, and at times fleeting responses that may indicate attention, recognition and comprehension.

Similarly, recorders need to be familiar with the individual's involuntary, reflexive behaviours to assist in making "true" judgements about that individual's responses. Every four weeks would appear a reasonable period of time to discuss the data with the Speech Pathologist to determine if any changes need to be made to the programme. Table 6.3 displays an example of a Touch-Speech cue data form for Sarah.

Programme Change

If indications of increased attention to, and comprehension of the target word is evidenced by the data the touch signal accompaniment may be gradually removed. Evidence of emerging symbolisation, as demonstrated by the comprehension of target words dispenses with the need to pair the target word with its touch accompaniment, as the individual is able to process that particular "symbol" without additional support.

Changes in the attention, anticipation, recognition and comprehension may be demonstrated by the following observations:

- decrease in time delay between communication partner's speech and touch, and learner's response;

Table 6.3 Example of Touch-Speech Cue Data Form

Touch-Speech Cue for "Wait" - Sarah			
Target Word Wait	Key Word Phrase "Wait a minute Sarah"		
Touch Signal Partner Action Presses her hands on both Sarah's knees			
Location Lower thigh, above knees	Duration Sustain for "wait"	Intensity Firm	
.....			
Response			
Note time lapse between cue and response			
Head	Eyes	Mouth	Lower Body
Orientates	Open	Opens	Stiffens
Raises	Widen ✓	Closes	Stills ✓
Lowers	Blink	Smiles	Relaxes
Averts	Close	Frowns ✓	No change
No change	No change	Vocalises	
		No change	
.....			
Comments: co-operated! paused momentarily before started to strain forwards again.			



- changes in facial expression, such as increased animation to partner's voice, differentiated facial expression to specific words or phrases;
- changes in head and body posture, such as stiffening or relaxing to specific words or phrases.

For the individual who does not display comprehension or realisation of the significance of the target word, then the maintenance of the Touch-Speech Cue may serve as a sensitive alerter to change and action. The individual's responses to natural cues also requires on-going monitoring. If increases in the individual's attention to the natural cues in his/her environment is observed, Touch-Speech Cues may be relinquished in favour of a natural cue for a target word.

The following three examples highlight both the transitionary and permanent roles Touch-Speech Cues may play in facilitating the receptive communication of the individual with significant multiple disabilities. The following examples describe Judy, a 12 year old girl with significant intellectual impairments, physical and visual impairment. Joshua, an 18 year old man with a significant intellectual impairment and a cortical visual impairment; Sarah, a ten year old girl with significant intellectual, physical, and visual impairment.

1. **Judy** – Nonsymbolic

- *attentive to sounds and voices in her environment*
- *does not recognise familiar voices*
- *differentiates intonation patterns*
- *does not recognise own name*
- *does not recognise, and understand frequently occurring words and phrases*
- *unresponsive to natural cues*

For Judy, Touch-Speech Cues may remain a useful adjunct to her communication partner's speech to alert Judy to an impending action/event/activity. Assessment identified "handcream" and "zither" as activities Judy appeared to enjoy participating in. Consequently, a touch signal was introduced for "handcream" (rub Judy's left hand in circular motion to "hand - cream"). After two weeks of implementation of this cue, the touch signal was introduced for "zither" (cup hand over Judy's left fingertips and gently swing hand back twice to "zith-er").

After two months of participating in handcream and zither leisure activities at different times of the day, the data indicated Judy to be displaying evidence of anticipation of an action following the Touch-Speech Cue. The team decided upon the following development to the programme:

Judy's partners now offer her a simplified choice and observe her reactions and responses closely. For example, her teacher's aide, Tim suggests: "Judy, Would you like some **handcream**?" (+ touch

signal). If no response after ten seconds, Tim suggests, "let's play with the **zither**" (+ touch signal). Tim observes her responses closely to see if "zither" elicits a different response to "handcream". If he observes a subtle response that indicates increased attention, he responds "Oh you like that! Have another listen", and accepts her choice/preference at that time to be the zither.

2. **Joshua** – Nonsymbolic – emerging symbolisation

- *attentive to sounds, voices*
- *recognises familiar voices*
- *differentiates intonation patterns*
- *recognises, understands own name*
- *responsive to some natural cues*
- *increasingly responsive to target words paired with a touch signal*

Initial assessment had generated three Touch-Speech Cues for Joshua ("walk", "sit down", "finished"). Four months after the introduction of these three Touch-Speed Cues for Joshua, the data showed evidence of recognition, and comprehension of the target words. The team discussed the data and consequently, partners were asked to say the key word phrase only, without pairing the target word with the relevant touch signal. Joshua's responses indicated that he attended to, recognised, and understood the target word without the accompanying touch signal. The team then decided to remove the touch signals for those words, and review the assessment data to identify other "target words" that could be paired with a touch signal to enhance Joshua's comprehension.

3. **Sarah** – Emerging symbolisation

- *attentive to sounds, voices*
- *recognises voices*
- *differentiates intonation patterns*
- *responds to, understands own name*
- *increasing recognition and comprehension of target words and key word phrases that have a natural visual cue. This appears to be related to a marked increase in her visual attention.*

For Sarah, assessment suggested Touch-Speech Cues for five actions ("dancing", "wait", "finished", "go", "lie down"). As Sarah's responses indicated that she was visually alert, in her attention to people, and objects, the team decided to introduce visual associations for certain activities. For example, Sarah's partners would suggest "dancing" (+ touch signal), pause, if her reactions suggested interest, and anticipation, partners would assist her to wear a bright yellow "dancing scarf".

After one week of incorporating the scarf into the dancing sequence, partners probed Sarah's response to "dancing" – NO TOUCH

SIGNAL. Sarah displayed signs of anticipation of "some" activity. Partners then presented the scarf, and Sarah started to bounce in her chair. These findings offered an expressive opportunity for Sarah's communication. Recognition of the significance of objects, (scarf) suggested to her Speech Pathologist that they introduce "Object Symbol" (Bloom, 1991) accompaniments to some of her Touch-Speech Cues. The Touch-Speech Cues for "dancing" was replaced with the yellow scarf. The introduction of an object symbol for dancing may now offer Sarah and **expressive** strategy for initiating that she'd like to do some dancing.

These case studies illustrate the highly individual nature of Touch-Speech Cues, and their applications for a particular individual with significant multiple disabilities who has limited comprehension of spoken language. The examples highlight the necessity of on-going evaluation of the individual's responses and reactions. Evidence of change dictates the team's development of the next stage in that individual's programme.

The reciprocal nature of communication is emphasised during the process of Touch-Speech Cue programme planning and implementation. Both participants can have a positive effect on each other's behaviour. Based on evaluation of the Touch-Speech Cue programmes in which the authors were involved as team members, it is proposed that the following shared outcomes may occur from the implementation of Touch-Speech Cue programmes:

Individual who is Nonsymbolic:

- His/her attention is attracted to the speaker.
- (S)He is alerted to a specific (recurring) message.
- (S)He is notified of an impending action/event/activity.
- Recognition of target words is enhanced.
- Comprehension of Touch-Speech Cues is promoted.
- Comprehension of target words and key word phrases is promoted.
- (S)He receives a consistent touch-speech message across people, situations and time.

Communication Partner:

- Provides consistent, selective linguistic input.
- Assumes a sensitive interactive style (Borbilas et al, 1990).
- Uses touch judiciously.
- Makes discerning observations which result in the detection and recognition of, and appropriate responses to, the subtle and fleeting expressions from the individual which are potentially communicative.
- Recognises responses that are indicative of comprehension.
- Provides the individual with adequate opportunities and time to respond to communication.

- Actively facilitates the receptive communication development of the individual.

Chapter 7 summarises the information presented in the monograph, and discusses some of the issues raised in examining Touch-Speech Cues as a strategy which communication partners can use to promote the receptive communication skills of individuals with significant multiple disabilities.

CHAPTER 7

CONCLUSIONS

The monograph addresses issues surrounding selective use of touch to enhance the receptive communication of individuals with significant multiple disabilities who have little or no understanding of spoken language. It explored a specific use of informative touch, the Touch-Speech-Cue, as one of a range of strategies which can be employed by communication partners to actively promote the comprehension of an individual with significant multiple disabilities. The monograph described a framework for the assessment, design, implementation and evaluation of Touch-Speech Cues.

By harnessing and refining the touch and speech used by communication partners, Touch-Speech Cues aim to promote attention to, recognition and comprehension of the target word, by the individual with significant multiple disabilities. The individual is alerted to, and notified of an impending action/activity/event in a consistent manner through the use of a Touch-Speech Cue.

This monograph reflects the philosophies of the authors toward their professional involvement with individuals who have significant multiple disabilities. The following principles are central to this philosophical basis:

- **The individual is unique and has dynamic needs.**
- **The individual is an active participant.**
- **Interactions are individual-centred.**
- **The individual is respected and accorded dignity at all times.**
- **Optimal learning takes place in natural contexts which are meaningful and enjoyable for the individual.**
- **The individual is provided with choices.**
- **A collaborative team approach is crucial to the assessment process, programme design, implementation and evaluation. The individual and his or her family are integral members of the team.**

Many of these principles are also fundamental to the philosophies and therapeutic practices of the Speech Pathology and Occupational Therapy professions.

Summary

1. The review of interactive uses of touch offers guidelines of caution to the communication partners of individuals with significant multiple disabilities. The authors nominate social and informative touch types, referred to in Chapter 2, Table 2.1, as highly desirable adjuncts to a communication partner's interactive style.
2. Autocratic and extraneous touch types, as defined in Table 2.1, are identified as undesirable accompaniments to a communication partner's interactions with an individual. The authors believe that greater use of social and informative touch with minimal use of autocratic and extraneous touch in intervention programmes results in optimal use of communicative touch for the individual with significant multiple disabilities.
3. The precarious nature of communication opportunities available to the individual with significant multiple disabilities is highlighted in Chapter 3. Receptive communication strategies which can be adopted to actively facilitate the individual's attention to, recognition of, and comprehension of spoken language are described.
4. Touch-Speech Cues expand the range of receptive communication strategies available to communication partners of individuals with significant multiple disabilities. Previously, these strategies were limited to sensitive interactive styles, and natural cues, as outlined in Chapter 3.
5. An interactive and neurobiological basis for selectively using touch is provided. The manner in which the somatosensory system processes touch provides support for the design and implementation of the touch signal component of a Touch-Speech Cue, in particular its location, duration and intensity, as described in Chapter 4. The need for touch signals to be determined on an individual basis is stressed.
6. Chapter 5 and 6 of the monograph affirm the importance of individualised, ongoing and ecologically-based: team assessment, programme design, implementation and evaluation of Touch-Speech Cues for the individual with significant multiple disabilities. Each Touch-Speech Cue is selected on the basis of the individual's unique communication and somatosensory system status.
7. An assessment framework is provided in Chapter 5 to determine the suitability of a Touch-Speech Cue programme for an individual who has limited comprehension of spoken language. This framework accentuates the importance of assessing the responses and reactions of both the individual and his/her communication partners.
8. Touch-Speech Cue programmes may be developed in conjunction with other receptive communication strategies. It may be used as a temporary or a permanent strategy in supporting the receptive

communication of an individual who is non-symbolic or has limited comprehension of spoken language.

9. The reciprocal nature of communication is emphasised during the process of Touch-Speech Cue programme planning and implementation, as outlined in Chapter 6. Potential outcomes of Touch-Speech Cue programmes were described for both individuals with significant multiple disabilities and their communication partners, based on evaluations of Touch-Speech Cue programmes in which the authors were involved as team members.

Directions for Research

The monograph's examination of the selective use of Touch-Speech Cues to assist the receptive communication of the individual with significant multiple disabilities generates several directions for further investigation. Both quantitative and qualitative research is required to identify the individuals for whom Touch-Speech Cues are most effective.

The authors have nominated the individual with little or no comprehension of speech as a suitable candidate for Touch-Speech Cues. Touch-Speech Cues however, may have a broader application. They may be of temporary or permanent benefit as a receptive strategy for the individual with an acquired neurological impairment who experiences difficulty in processing spoken language. Touch-speech Cues may also have application for the individual whose medical condition and/or treatment may result in decreased awareness and attention to speech.

Research methodology must reflect the individualised nature of Touch-Speech Cues. Single subject design may be the most appropriate avenue for initial research because it preserves the individual nature of the programme and progress (Repp & Brusca, 1983). Researchers need to develop finely graded measures of receptive communication required for accurate identification of the subtle changes which may occur as a result of the use of a Touch-Speech Cue programme.

As the body of knowledge on social interaction expands, it is anticipated greater insight will be gained into the role of partner touch in assisting the development of receptive communication in the individual with significant multiple disabilities. Further investigation and documentation of the variety of touch types and intents of interactive touch, and the prevalence of each, between individuals with significant multiple disabilities and their communication partners, would greatly add to the literature on social exchanges. Similarly, advances in neurobiological research may provide strong evidence to support the nature and extent of the interrelationship between touch and receptive communication. It is expected that refinement of the Touch-Speech Cue framework will occur based on research findings, further clinical experience and advances in knowledge from a range of disciplines including speech pathology, occupational therapy, teaching and the neural sciences.

The authors have emphasised a team approach in proposing the framework for the assessment, design, implementation and evaluation of a Touch-Speech Cue programme. A collaborative team approach offers the opportunity to meet the unique and dynamic receptive communication needs of the individual with significant multiple disabilities. Routines and events that are an intrinsic part of daily life provide the natural contexts in which receptive communication development can be actively promoted.

Shared participation in enjoyable, meaningful activities/events/actions provides the interactive foundation which is crucial to communication. The use of Touch-Speech Cues, in conjunction with a sensitive interactive style offers the communication partner a means of enhancing the receptive communication of individuals with significant multiple disabilities who have little or no understanding of spoken language.

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