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**Communication in young people with intellectual impairments: the influence of
partnership**

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Thesis submitted in partial fulfilment of the requirements of the Open University for the
degree of Doctor of Philosophy

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Abstract

Adults with intellectual impairments experience frequent communication breakdown in their everyday interactions. This can result from impairment of the linguistic skills required for effective communication and/or difficulties dealing with non-verbal information. Problems also exist, however, in the way that some non-impaired speakers, such as care providers, approach these communicative episodes. This thesis investigates communication in young adults with intellectual impairments with three different communication partners. These were a care provider, a student and a peer with intellectual impairments. Student partners were previously unknown to the main participants and not experienced in communicating with people with intellectual impairments. Communication structure and process are investigated according to the number of words and turns used to complete a co-operative problem-solving task and the types of conversational acts used by speakers and listeners. Non-verbal communication is investigated through the use of one non-verbal signal, gaze, during the task dialogues. An interactionist approach is taken to communication, where outcome or success is viewed as a product of the collaborative efforts of speakers and listeners. Communication is seen as multi-modal and involving the exchange of information via the verbal and non-verbal channels. The results show that when both parties were intellectually impaired performance was poorest. More surprisingly, dyads including a student partner communicated more effectively and efficiently than where the partner was a carer. One reason for this may be that carers used more complex, open questions to introduce new information into the task, and these were distracting rather than useful. Overusing open questions may be problematic for this population and less effective at establishing shared understanding than where listeners check their own interpretation of previous messages, a strategy preferred by student partners. Non-verbal signals can help to ease constraints on communication by providing interlocutors with feedback information on the levels of mutual understanding.

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Introduction

Research on communication in adults with intellectual impairments

‘Mentally handicapped people should be given the opportunity to live a life as similar in nature as possible to that of others, with similar rights and responsibilities’. Nirjie, 1992, p91.

Adults with intellectual impairment experience frequent communication breakdown. Surveys looking at the prevalence of communication disorder among this population suggest that between 33% - 89% of individuals experience some difficulty in communicating (Blackwell, Hulbert, Bell, Elston, Morgan, Robertshaw and Thomas, 1989; van der Gaag and Dormandy, 1993). This can result from difficulty encoding and decoding verbal and non-verbal signals or dealing with pragmatic aspects of communication. However, the development of effective communication skills is influenced by a number of factors along with those concerning the ability to process information. These include environmental features, such as the opportunities to engage with other speakers and listeners and to practise communication skills (e.g. van der Gaag, 1989b). The level of support provided by more proficient communicators, especially care providers, is another contributor to the level of communicative success achieved by individuals, as is the expectations of conversational partners (e.g. Cullen, 1988). Therefore, developing communication skills that can be used flexibly in different communicative situations can involve both situational and individual features. This introduction presents an overview of the areas of study and of the thesis.

A number of changes have taken place over recent years in the way that services are provided for people with intellectual impairments. This has been marked by a shift

towards approaches that place increased focus on the functional requirements of individuals, the people who support them and the ways in which they interact (Emerson, Caine, Bromley and Hatton, 1998). Greater emphasis has been placed on self-determination, choice, empowerment and principles of social inclusion (e.g. Brown and Gothelf, 1996), and of involvement in the planning and development of services by users themselves (Mattison and Walden, 2001). These developments evolved from the concepts of normalisation first outlined by Nirjie (1969) and Wolfensberger (1972), and operationalised in terms of O'Brien's (1987) five service accomplishments. These highlight the importance of ensuring that individuals are supported in making choices that affect their life and are encouraged to develop skills and attributes that are functional and meaningful in their own everyday situation. It was hoped that this would lead to increased self-advocacy, widened participation within society and greater access to community based facilities. Underpinning these stated aims is the notion that individuals are provided with opportunities to develop effective communication skills and to maximise their communicative abilities so that they can fully realise their potential within the community. Most recent government initiatives focus on rights, independence, choice and inclusion as key principles in the development of services for people with intellectual impairments, so that greater access might be gained to education, training and employment (Valuing People; Department of Health, 2001). It is important, then, that we also recognise the role of communication skills in allowing individuals to exploit these opportunities.

Much of the research looking at issues relating to communication and social inclusion has taken a functional approach to language use, in terms of the emphasis placed on exploiting available communication resources and how these might be developed and maintained by environmental factors (e.g. Butterfield, Linfoot and Arthur, 1994; Butterfield and Arthur, 1995). A functional approach targets the linguistic and non-verbal signals used by speakers and listeners as a vehicle for communication in their own everyday environment.

This represents a shift away from more traditional language programmes which tended to focus on form and content and much less on the ways that individuals might use their linguistic repertoires during conversation (Owen, 1991). Assessment of individual needs takes account of the communicative functions that are served by initiations, how these are used in a given situation and with whom interactions take place (Owings and Guyette, 1982).

Communication has a strong interpersonal element (Butterfield and Arthur, 1995).

Therefore, establishing effective skills will also depend on the opportunities provided for individuals to collaborate as speakers and listeners with different communication partners (e.g. Mittler, 1979; Cullen, Whoriskey, MacKenzie, Mitchell, Ralston, Shreeve and Stanley, 1995), and how sensitive these partners are to communicative needs (e.g. Stillman, Williams and Linam, 1997). Overestimating comprehension skills can lead to mismatches in the support made available by care providers and individual's communicative abilities (Bartlett and Bunning 1997), leading to reduced opportunity and fewer means for expressing personal choice. For example, Bradshaw (2001a, b) reports that individuals with intellectual impairments are often in environments where information is not adapted to their communication needs and that this can create barriers to their participation in exchanges (McConkey, Morris and Purcell, 1999a; McConkey, Purcell and Morris, 1999b; Purcell, Morris and McConkey, 1999). Mismatches can occur in the mode of communication used by care providers and those most suited to client needs, such as the overuse of verbal and under use of non-verbal means of communication, and the level of complexity of carer utterances (McConkey et al, 1999a, b; Bradshaw, 2001b).

Despite a vast amount of research in this area (Myers, Ager, Kerr and Myles, 1998), it is as yet unclear what factors determine how successfully individuals are able to become included and/or valued as contributing members of a community (Brinton and Fujiki,

1993). One frequently reported influence on quality of life is the development and maintenance of social relationships with peers and community members (e.g. O'Brien, 1987; Markova, Jahoda, Cattermole and Woodward, 1992). It follows, then, that factors influencing communicative effectiveness will impact on how successfully individuals are able to interact with those around them. These can include individual's own attitudes and beliefs (e.g. Leudar and Fraser, 1985; Kernan and Sabsay, 1997), society in general (e.g. Mittler, 1979; Lindsay, 1986; Leudar, 1997), and those providing care on a daily basis (e.g. Cullen, 1988; Bartlett and Bunning, 1997). It has long since been recognised that living in a community setting is a necessary but not sufficient guarantee of participation in society (e.g. Cheseldine and Jeffree, 1981; Cattermole, Johoda and Markova, 1988; Cullen, 1988; Miranda and Iacono, 1990; Cullen et al, 1995; Emerson and Hatton, 1996; Myers et al, 1998). Even where increased participation has been reported in comparison to hospital based adults, the use of community facilities such as pubs, banks and cinemas remains low (Allen, 1989). Simply 'being there ... is no guarantee of having interpersonal contact with other people using these services and getting to know them' (Markova et al, 1992). So opportunities to practise communication skills with a range of different speakers and listeners may be restricted and/or difficult to access (McConkey, Naughton and Nugent, 1983; *The Same as You*, Scottish Executive, 2000; Department of Health, 2001). It follows that the majority of communicative encounters experienced by adults with intellectual impairments will be with those assigned as care provider and/or other service users.

Care providers, therefore, are a key factor in assisting individuals to exploit available communication opportunities (Hastings and Remington, 1994; Myers et al, 1998), and their own resources. Research has shown that this raises a number of concerns. Care workers have been found to overestimate the comprehension abilities of individuals with intellectual impairments (e.g. Law, Brown and Lester, 1994; Bradshaw, 1998; Purcell et al,

1999) and experience difficulty adjusting their communication style to meet client needs (e.g. Stillman et al, 1997). Further, interactions have been reported as brief (Markova et al, 1992), leaving little or no opportunity for developing effective skills, and taking little or no account of the individual's ability to process verbal information or his/her preferred means of communication (e.g. McConkey et al, 1999; Bradshaw, 2001 a, b). For example, Bartlett and Bunning (1997) compared the number of information carrying words (ICWs) used by care providers and level of understanding in a group of adults with intellectual impairments. ICWs are those that encode meaning and need to be understood if messages are to be responded to appropriately. So, for example, the request 'pass me *John's cup*' contains two ICWs, where the speaker supports his/her utterance with a gesture of receiving, such as an outstretched hand (making the request to 'pass me' somewhat redundant). One measure of language comprehension is therefore the number of ICWs that an individual can understand in any given utterance (Knowles and Masidlover, 1982). Bartlett and Bunning (1997) found that staff consistently overestimated the comprehension abilities of individuals, particularly during informal interactions. They propose that making conversations more concrete e.g. using pictures or symbols to emphasise key words, may facilitate carers to engage with their clients at a level more appropriate to their needs. Bradshaw (2001b) reports that almost half (44.6%) of carer communication acts fell outwith the understanding of people with intellectual impairments. This was because carer communication acts (e.g. questions and giving information) were overly complex and abstract.

There is a critical need then for research looking at how communication partners might influence the communicative effectiveness of adults with intellectual impairments. In particular, it is important that ways are found for looking at the communication style of care providers and the strategies they use during interactions so that assessment can be made of how this might differ from 'naïve' interlocutors.

This thesis seeks to investigate the effectiveness of communication in young adults with intellectual impairments as a function of partnership. Communication partners were a care provider, a student and a peer. These three partnership groups were chosen as they allow for investigation of communicative effectiveness where a) partners have more sophisticated communication skills than the main participants and may attempt to support interaction i.e. carer x participant and student x participant interactions. This provides for direct comparison of the strategies that develop during interactions with a carer and a naïve (student) partner and how effective they are at achieving communicative success, and b) this level of support is not available, i.e. during peer interactions. Peers were adults with intellectual impairments that were invited to take part in the study by the main participants. Communication success is measured in terms of the performance on a co-operative problem solving task and the strategies that develop between speakers and listeners. The thirteen young people that took part as main participants were of mixed aetiology and ranged in age from 20.01 ys – 34.03 ys. No individuals had been diagnosed with Down's syndrome. A pragmatic or functional approach is taken to analysing communication style. This involves looking at the communication acts that are used by speakers and listeners and the functions that they serve. Communication is regarded as collaborative, involving the shared contributions of each interlocutor, and where outcome is a product of combined effort. It involves use of both the verbal and non-verbal channels, and so a brief examination is also made of one form of non-verbal signal, gaze, and how this is influenced by changes in communication partner.

It is proposed that changes in partnership influence the communication strategies that develop between speakers and listeners and that this in turn affects communicative success. Specifically, it is proposed that the communication style adopted by partners has a profound influence on the communication effectiveness of young adults with intellectual impairments and their ability to contribute equally during conversations, and that this

results from listener expectation rather than simply the language abilities of the main participants. It is proposed that non-impaired partners (carer and students) help to support interactions by contributing a higher number of words and communication acts than the main participants, and that this leads to a more successful outcome than where scaffolding is not available i.e. during interactions with a peer. This is because earlier research has shown that speakers with more sophisticated conversational skills can scaffold interactions with younger listeners (e.g. Ninio and Snow, 1994; Abbeduto, Weissman and Short-Meyerson, 1999) and those with an acquired language disorder (Anderson, Robertson, Kilborn, Beeke and Dean, 1997), so that it increases the likelihood of success.

This thesis reports on one area of language use, referential communication, and the ways that speakers and listeners co-ordinate their verbal and non-verbal contributions towards achieving shared goals. Conversations are analysed using Conversational Games Analysis (Kowtko, Isard and Doherty-Sneddon, 1991), one of a family of coding schemes based on the functional use of language. The ways that interactions are structured depend on the strategies that develop between speakers and listeners, how they attempt to establish mutual understanding and negotiate misunderstanding and communication difficulties.

Non-verbal communication is investigated in two ways. First, analysis was undertaken on gazing patterns that were established between the main participants and each of their three communication partners during the communication task. This provides one measure of the level of non-verbal communication during interactions. Second, assessments are made of the informational value of non-verbal signals that were exchanged between speakers and listeners during the course of conversations. Here two groups of naïve non-impaired participants (students) attempted to replicate the outcome of task procedures with a) access to visual and verbal information or b) verbal information only. Explanation is provided for the reported outcome measures.

Part 1 of the thesis discusses theoretical issues relating to language and communication and focuses in particular on pragmatic elements of language use. It selectively reviews the literature on language and communication skills in typically developing people before moving on to look in detail at the ways that conversations are managed during interactions.

Part 2 of the thesis addresses issues relating to language and communication skills in people with intellectual impairments. The section begins with a review on the development of language skills in children and adults with intellectual impairments. Here the main focus is again on language use and so a number of issues are discussed that influence communicative success, including context or environmental features and individual's communication history.

Part 3 outlines the issues addressed during piloting. This describes the tests that were used during assessment procedures. These were measures of social cognition (theory of mind), language skills, motor co-ordination skills and the use of specific phrases (same/different) by the experimenter during the instruction phase of the task. This section of the thesis also outlines the aims and objectives of piloting procedures in terms of the development of a modified task based on the Map Task, originally devised by Brown, Anderson, Shillcock and Yule, (1983). These modifications were then carried forward to the main study, which forms the central focus of the thesis.

Parts 4 and 5 provide detail of the empirical studies. Part 4 describes the participants and procedures that were used to investigate communication in young adults with intellectual impairments. Findings are presented from analysis on the Map Task (Brown et al, 1983) and the structure and content of interactions. Here one dialogue coding scheme, Conversational Games Analysis (Kowtko et al, 1991) is used to look at the ways that speakers and listeners collaborate during interactions and the ways that they attempt to establish mutual understanding. Part 5 investigates the use of non-verbal signal during the

Map Task. Non-verbal communication was examined in three short studies that looked at a) face processing skills, b) levels of gaze and c) third party discrimination of non-verbal information. Finally, the thesis is concluded with a discussion of research findings and how these extend and complement current understanding of communication in young adults with intellectual impairments.

The specific questions addressed during the current research are as follows:

- 1a). Does partnership influence the communicative effectiveness of young adults with intellectual impairments?
- 1b) If so, how was this influenced by the communication strategies that develop between speakers and listeners?
2. Are individuals with intellectual impairments aware of the communicative needs of their partner and how might they adapt their communication style to meet these needs?
- 3a) Does partnership influence the level of use of the non-verbal channel by interlocutors?
- 3b) Can evidence be found to support the use of non-verbal signals during information exchange and how might this influence outcome?

These questions and findings from earlier research allow us to generate a number of hypotheses. These are as follows:

1. Conversational partners will influence the effectiveness of communication in individuals with intellectual impairments.
2. Partnership will influence the communication strategies that develop between speakers and listeners. It is predicted that:

- 2a) The communication style of carers and naïve (student) partners will differ and this will influence success.
- 2b) Carers and students will attempt to support interactions with the main participants and this will lead to a more successful outcome than where scaffolding is not available i.e. during peer interactions.
3. Non-verbal signals will provide an additional channel through which interlocutors can access the processes of communication.

Part 1: Review of the literature on the development of language and communication skill in typically developing people

Chapter 1. An introduction to issues relating to language and communication

1.1. What is communication?

‘Communication is a process involving two information-processing devices. One device modifies the physical environment of the other. As a result, the second device constructs representations similar to representations already stored in the first device’. Sperber and Wilson, 1986, p1.

In its broadest sense, then, communication is the transfer of information between two or more entities and is designed to produce some change in the state of the receiver. But statements such as those outlined above capture only part of what we consider as truly human interaction. Questions remain around the content and intentionality of communicative episodes, and how this is encoded and decoded by speakers and listeners. A more generally accepted definition of communication involves intentionality of speaker messages and the recognition of this by listening parties (e.g. Schiffer, 1972). It alerts us to the possibility that it may be possible to describe ‘optimal communication proficiency’, and that this is in some way measurable (van der Gaag and Dormandy, 1993). What then would be described as effective communication skills and how does this relate to the context of human interaction? This chapter outlines language and communication in typically developing people and explores how these are utilised by speakers and listeners to maximise communicative success.

Human communication involves the conveyance of thoughts, assumptions, beliefs and meaning between two or more individuals. It involves the encoding of some verbal and/or non-verbal message a speaker has in mind and its subsequent interpretation by listening partners. Communication is in essence both a social and a cognitive activity (Shatz, 1983) as it necessarily takes account of a speaker’s ability to recognise the

communicative needs of their partner, and listener ability to recognise and interpret communicative intent. Understanding of messages therefore ‘presumes some compatibility between the internal representation of senders and receivers’ (Shatz, 1983, p843) and alignment in their mental frames of reference.

In describing communicative effectiveness, van der Gaag and Dormandy (1993) find it useful to distinguish between communication, language and linguistic communication, as follows. They suggest that communication involves ‘the expression, interpretation and negotiation of meaning involving interaction between two or more persons in context’ (p18), via verbal and/or non-verbal cues. Context describes the situational features surrounding the utterance of a message including location and the relationship between speakers and listeners. Interpretation of messages is governed to a greater or lesser extent by a listener’s familiarity with their communication partner and his/her knowledge of the world. So communication is a collaborative process and is influenced by environment and/or context such as the purpose of an interaction. Language is described as a set of ‘semantically interpreted well-framed formulas’ (p 19) that carry the representative, cognitive and semantic content of utterances. Van der Gaag and Dormandy (1993) lend support to the proposition put forward by Sperber and Wilson (1986) that language acts as a tool for the processing and memorising information, and that activities involving the use of language are essentially cognitive rather than communicative (Bates, Benigni, Bretherton, Camaioni and Volterra, 1979). So language is used to encode mental entities during the production of utterances and this is distinct from the act of communicating. Finally, van der Gaag and Dormandy (1993) bring together the structures used to encode intentions and internal representations with the meaning of utterances in their description of linguistic communication. While acknowledging that the meaning derived from an utterance in context may not necessarily concur with its semantic-syntactic structure (e.g. Searle, 1975; Bates, 1976),

they suggest that utterance meaning is nevertheless formulated within a linguistic framework. Even where utterances are ambiguous, such as in ‘the assassin watched his victim eat lunch through a key hole’, alternative interpretations of speaker meaning can clearly be derived from the linguistic code. Therefore, in order to realise the intentions and internal representation conveyed in speaker messages, listeners must also be equipped with the necessary linguistic formulas to decode utterance meaning according to cultural and social norms. Listeners may also take account of non-verbal and non-linguistic features such as changes in intonation and patterns of gesture (e.g. McNeill, 1985).

It is possible then to consider language and communication as separate entities within a framework of human interaction, while at the same time acknowledging their close and complex relationship in verbal communication (Shatz, 1983; Sperber and Wilson, 1986).

1.2. Language and communication.

‘Language and communication are often seen as two sides of a single coin’ (Sperber and Wilson, 1986, p172), inextricably linked in spoken forms of communication. Evidence suggests, however, that it is both possible and useful to consider language and communication as separate entities, especially in relation to developmental aspects of interaction (e.g. Prutting and Kirchner, 1983; Anderson and Boyle, 1994; Doherty-Sneddon, 1995) and for specific adult groups (e.g. Rondall and Lambert, 1983; Merrison, Anderson and Doherty-Sneddon, 1994; Anderson, et al 1997). ‘That humans have developed languages which can be used to communicate is interesting, but it tells us nothing about the essential nature of language’ (Sperber and Wilson, 1986, p173). Bierwisch (1980) proposes that there are three possible reasons for considering language and communication separately. These are that 1) language is not used

explicitly for communicative purposes, 2) communication may take place without the use of words and 3) language and communication operate by different rule systems. He suggests that the intention and internal representations behind speaker utterances (Searle, 1975) act as a link between socio-cognitive functioning and linguistic theory, and describes this as the 'communicative sense' of language use. This then embraces both the social aspects of verbal communication that are used to communicate speaker meaning and the syntactic-semantic structures that encode these representations in speech (Sperber and Wilson, 1986).

Evidence to support this separation is found in both the developmental and adult literature. For example, children with a pragmatic language disorder can be found to display relatively intact and sophisticated linguistic systems and yet are unable to communicate effectively (Prutting and Kirchner, 1983). Similarly, Blank, Gessner and Esposito (1979) report on a three year old child, John, who's measurable verbal ability was within the accepted range for children of a similar age but was almost entirely non-communicative. His linguistic productions were rarely appropriate to the context of interactions either as an initiation or in response to a previous utterance. Blank et al (1979) concluded that John was unable to use his linguistic knowledge for the purposes of communication and that his spontaneous verbal productions were modelled on utterances previously initiated by his parents.

Conversely, evidence has also been presented where communicative effectiveness far exceeds that of measurable linguistic ability in both children (e.g. Fey and Leonard, 1983) and adults. For example, relatively intact communication skills have been reported in adults with aphasia despite impairment in various aspects of linguistic functioning (Merrison et al, 1994; Anderson et al, 1997). These authors found that adults with aphasia were able to develop compensation strategies that allowed them to

exploit their available verbal and non-verbal repertoires and communicate most effectively. Though not all individuals were equally successful in developing these skills, those that did were able to maximise their communicative potential within a fairly limited range of linguistic structures.

Anderson and colleagues (e.g. Anderson and Boyle, 1994; Anderson, Clark and Mullin, 1994; Anderson, 1995) propose that effective communicators are those with an awareness of the subtleties of the interactive process and who show willingness to collaborate with their partner towards establishing shared understanding. Development of these skills continues alongside but independent of linguistic ability and with varying degrees of success, even in typical adult communicators. They found that typically developing children and some adults display interactive skills well below those predicted from general linguistic ability. Therefore, communication proficiency can reflect a fairly broad range of interactive proficiencies in any given population.

One difficulty with attempting to treat language and communication separately, however, is that it may obscure similarities and overlaps between them (Shatz, 1983). Nevertheless, doing so highlights the distinction between skills that develop during language acquisition and those that are conducive to communicative success or effectiveness. This in turn throws light upon those situations where disparity is found in linguistic and communicative ability and illustrates that proficiency in one area does not guarantee success in another.

1.3. Linguistic, non-linguistic and non-verbal communication

Individuals make use of an array of communication signals when encoding and decoding utterances. Where a message is spoken, this will include the syntactic-semantic and paralinguistic features of speech, such as intonation stress and rate. Non-

verbal signals provide an additional source of information, both to initiators of an interaction and listening partners (e.g. Argyle, 1988). The communicative value of non-verbal information can vary, however, according to the context of an interaction and for different speaker/listener groups (e.g. Doherty-Sneddon, Anderson, O'Malley, Langton, Garrod and Bruce, 1997). For example, younger children and people with intellectual impairments may rely more heavily on non-verbal signals to encode and decode information (e.g. Goldin-Meadow, Wein and Chang, 1992; Doherty-Sneddon, 1995; McConkey et al, 1999). This may be because non-verbal signals are cognitively less demanding for interlocutors than linguistic alternatives (Goldin-Meadow et al, 1992; Doherty-Sneddon and Kent, 1996).

Nevertheless, visual signals play an important role in helping to establish mutual understanding (e.g. Clark and Brennan; Boyle, Anderson and Newlands, 1994) and provide speakers and listeners with feedback on levels of mutual understanding, e.g. head nods and changes in facial expression (e.g. Feyerseisen and deLannoy, 1991). This is described more fully in Part 5 on non-verbal aspects of communication. Boyle et al (1994) report that more words and turns are required to secure communicative success where visual signals are not available (audio-only condition) in comparison to face-to-face interactions. Similarly, where visual signals are attenuated i.e. during video-mediated communication, listeners seem less confident about the progress of interactions and rely more heavily on verbal feedback mechanisms than those engaged in face-to-face conversation (Doherty-Sneddon et al, 1997). So these authors suggest that constraints on establishing mutual understanding are eased by non-verbal signals, and that this in turn influences the communicative style of speakers and listeners.

Not all agree with this 'added-value' approach. Some discussion around the relative value of non-verbal signals in comparison to linguistic alternatives considers them

'weak' in comparison to linguistic alternatives (Sperber and Wilson, 1986). According to this view, non-verbal signals lack the precision and complexity of linguistic descriptions and therefore are more open to misinterpretation. Further, because they are constrained to the 'here and now' of ongoing discourse, non-verbal signals also lack the flexibility of linguistic alternatives (van der Gaag and Dormandy, 1993). While it is true that the interpretation of non-verbal cues can be influenced by a number of factors, such as cultural norms (e.g. Argyle, 1988), it should be remembered that linguistic signs are also arbitrary in the way that they assign meaning to entities (e.g. Bloom and Lahey, 1978; Lahey 1988). Therefore, the distinction between words and non-verbal signals is not as precise as might be at first considered (Feyerseisen and deLannoy, 1991). For example, Kendon (2000) suggests that gestures might be used to strengthen speaker meaning where the verbal form can be interpreted in more than one way. He refers to hand movements associated with the telling of a children's story so that the listener might gain a clearer understanding of differences in attribution of the word 'sliced'. Here, non-verbal information in the form of a gesture provides the context in which to interpret the verbal expression (Kendon, 2000).

1.4. Chapter conclusion

Effective or proficient communicators need to take account of the communicative needs of listening partners so that they might recognise the intention and meaning encoded within the linguistic framework of speaker utterances (e.g. van der Gaag and Dormandy, 1993). Communication proficiency can vary, however, from one individual to another and is distinct from the development of language. Measures of linguistic ability therefore hold no one-to-one relationship with communication success and take no account of the collaborative efforts of speakers and listeners. Linguistic, non-linguistic, contextual and non-verbal cues provide a vast array of information during communication and this can be used by interlocutors to establish mutual understanding

(e.g. Clark and Schaeffer, 1987). These important aspects of communication and language use will now be explored more fully on the development of language and pragmatic skills in typically developing people.

Chapter 2. Review of the literature on pragmatic development and language skills.

2.1. An introduction to language development

Language is a code system where information, ideas and meaning are encoded in arbitrary and systematic ways (Bloom and Lahey, 1978; Lahey 1988; van der Gaag and Dormandy, 1993). Language is arbitrary in that the relationship between words and the referent is entirely symbolic. It is conventional because individuals speaking a common language agree that certain forms of lexical items correspond with meaning when formulated in a particular way. Lexical items, therefore, are mental representations of topics, events or propositions and combine with various syntactical structures to encode meaning between speakers and listeners. This chapter begins with a brief outline of the development of language skills in typically developing children following a framework described by Bloom and Lahey (1978; Lahey 1988), before moving on to look in more detail at pragmatic aspects of communication. Pragmatics, or the way that language is used in context, is central to how communication is investigated in the thesis and so is dealt with in detail in a number of the following sections (Sections 2.1.4, 2.2, 2.3, and 2.4).

Most research looking at early language acquisition has sought to investigate two main themes: how children come to acquire knowledge about words and how they acquire knowledge about how words combine to form meaningful utterances (Altmann, 1997). Bloom and Lahey (1978; Lahey, 1988) propose that language develops through the interaction of content, form and use on the one hand, and a child's ability to recognise their own resources and communicative needs on the other. They argue that the intersection of these three major components of language goes on to define language knowledge, which in turn determines not only the form of speaker utterances but also the level of skill attained by language users. Language content, form and use are first defined as outlined by Bloom

and Lahey (1978; Lahey, 1988) before description is provided of the ways they interact in normal language development.

2.1.1 The content of language

Words are not, in themselves, meaningful; it is only through their association with the context of an utterance or communicative event that meaning can be assigned (Bates, 1976; van der Gaag and Dormandy, 1993). Nevertheless, words, or lexical items, make up the building blocks of all verbal expression. Bloom and Lahey (1978; Lahey, 1988) describe meaning as the content of language that is encoded in various lexical forms and is represented linguistically through the semantic relationship between words. There are a number of ways in which meaning, or the semantic property of words, can be expressed. These are outlined by van der Gaag and Dormandy (1993) as follows: first, a word acquires meaning through its relationship with various other entities in the world and comes to be regarded as a label for that item e.g. a house or a tree. This is its referential meaning. Second, word meaning can be thought of in relation to the concepts or semantic categories it encodes. Some concepts may be simple in that they involve a one-to-one relationship with referent items (e.g. THING, such as dog, daughter), whereas others may include two or more concepts and their arguments, such as EVENT, which describes actions and happenings (Jackendoff, 1983). Finally, meaning can be encoded through the relationship of words to one another. This includes the use of synonyms (e.g. stop and cease), opposites (e.g. hot and cold, small and large), and where the meaning of one word is included in that of another, such as dog/animal, sparrow/bird.

Children learn about the content of language through generalising what they know of individual topics and the way they relate to one another. Therefore language content can be described as a taxonomy for categorising topics, actions and relationships between utterances, and rules for relating these to one another and new information (van der Gaag

and Dormandy, 1993). Children and language learners develop these taxonomies through the interaction of their own knowledge of objects and events in the world and contextual factors. So learning about the meaning of words is also influenced by the child's communication environment. This is important as it acknowledges that language development is affected by features external to the child as well as internal cognitive processes.

2.1.2 The form of language

Language form describes the phonological, morphological and syntactical features of utterances and the ways they combine during speech. Form is the means of connecting sound or signs with meaning, and represents this through the combination of different lexical items and semantic-syntactic relations (Bloom and Lahey, 1978; Lahey, 1988). So language form involves the various syntactic features of speech and the ways they combine during discourse. Language form involves the following (Bloom and Lahey, 1978; Lahey, 1988):

- 1) The kinds of words used to encode meaning e.g. substantive (e.g. car) and relational (e.g. big) words.
- 2) The semantic – syntactical relationships between word combinations i.e. the arrangements of words according to the meaning relationship between them. For example, 'the dog *bit* the boy' and 'the boy *bit* the dog'.
- 3) Phonology and phonetics – the systems and sounds that occur in language.
- 4) Morphological inflections i.e. features that indicate time, affixes and number (e.g. un-, -s, -ed, -ing)
- 5) Suprasegmental prosody i.e. differences in pitch, stress and intonation that indicate and differentiate meaning in an utterance (e.g. to contrast between declarative and interrogative forms).

So language form accommodates the purpose of an interaction (language use) and the meaning to be conveyed (language content) through the realisation of rules that allow linguistic units to be combined in a number of ways according to the requirements of the speaker. Further, it provides description for the realisation that no one-to-one relationship exists between the meaning of words and their semantic category or field. So we find that items from different semantic fields (e.g. EVENT, QUANTITY) may include several different items from the same syntactic category, such as nouns (EVENT: arrive; QUANTITY: more; and PLACE: home) (van der Gaag and Dormandy, 1993).

2.1.3 Language use

This refers to 1) the goals or functions of language users and 2) the influence of context on the choice of linguistic and non-linguistic items. Therefore language use is influenced by a number of contextual features such as the relationship between speakers and listeners (e.g. Wilkes-Gibbs and Clark, 1992; Boyle et al, 1994) and the purpose of an interaction (e.g. Cohen, 1984; Clark, 1985; Ninio and Snow, 1996). This necessarily includes reference to the ability of speakers to infer the needs of their listener and to adapt their communication style in order to meet these requirements (e.g. Bradshaw, 2001a, b). Language use, and through implication, communicative success, is also influenced by how effectively speakers and listeners are able to perceive the context of an interaction (van der Gaag and Dormandy, 1993) and deal with the underlying cognitive representations in utterance form, such as ambiguity, inference and synonyms (Pinker, 1994). So use takes account of all parties to a conversation, the context of interactions and ways in which they interact. It follows then that context, or communication environment, might influence the types of communication act performed by interlocutors (e.g. requests and statements) but also the opportunities to practice them during interactions (e.g. Markova et al, 1992). This is important, as earlier research has shown that communicative competence or effectiveness can be affected by the demands placed upon an individual to communicate (van der Gaag,

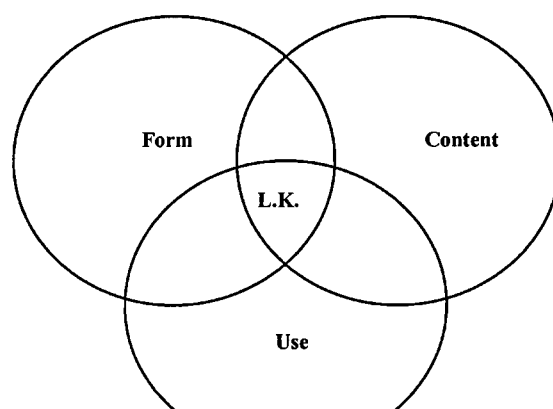
1989b). So situations that fail to promote language use may also lead to the development of communication skills less effective at taking account of listener needs.

Form is also influenced by other events. This includes whether a referent is physically co-present (e.g. 'the book on the table' or 'it is over there') and/or has been previously mentioned (e.g. Johnson-Laird and Garnham, 1980; Clark and Wilkes-Gibbs, 1992; Anderson and Boyle, 1994), or is contingent upon a previous initiation (Sacks, Schegloff and Jefferson, 1974). These areas are looked at in more detail in discussions on pragmatic communication (Section 2.2).

2.1.4 Language development: The integration of content, form and use

Bloom and Lahey (1978; Lahey, 1988) propose that language knowledge develops through the integration of content, form and use and that this guides behaviours of verbal production and comprehension. Language knowledge is the framework of rules for assigning sound (or movements associated with the production of speech) to meaning in messages, and for pairing sound and movement or movement and meaning to various communicative situations. They argue that children learn to induce these rules through practice and exposure to everyday language use (Bloom, 1983), and that this in turn shapes and influences their own mental framework. This can be represented diagrammatically as shown below in Figure 1.

Figure 2.1. The Intersection of Content, Form and Use in Language (Bloom and Lahey, 1978). L.K. = Language Knowledge



Language develops through a two-way interaction of a child's current working model of language knowledge and the practice of producing and understanding utterances. The child's capacity to develop this knowledge begins with their pre-linguistic behaviours (cries, vocalisations, smiling, gazing) and these progressively assimilate and adapt towards adult representations of linguistic and pragmatic use (e.g. Bates, Camaioni and Volterra, 1975). This learning process is usually scaffolded by a sensitive adult and only gradually taken over by the child exclusively (Shatz, 1983). Developing the necessary skills to become an effective communicator, such as establishing mutual understanding (Clark and Marshall, 1981), however, can take much longer to acquire (e.g. Anderson, Clark and Mullin, 1994; Anderson, 1995; Doherty-Sneddon, et al, 1997).

According to a number of studies (e.g. Shatz, 1983; Ninio and Snow, 1996), what appear as early precursors of conversational patterns (e.g. turn taking) may be more clearly understood as parental scaffolding of infant behaviour towards adult-like interactions. Without this scaffolding i.e. during peer interactions, patterns of turn alternation do not appear until the child is around 3 years old (Ninio and Snow, 1996). These authors propose that during the early stages of development children are able to map their utterances appropriately on to certain intentions, such as saying 'bye bye' when leaving, but that these are not intentional episodes of informational exchange. Parental scaffolding then maintains the structure of ongoing discourse rather than focussing on the transfer of propositional (information carrying) knowledge or development of effective communication skills (Shatz and O'Reilly, 1990; Anderson et al, 1994). This has important implications for the current research as it suggests that more proficient communicators have a key role in influencing the direction of conversations. Here it is predicted that care providers and students will attempt to scaffold interactions with the main participants and that this will lead to a more successful outcome than where support is not available (peer interactions). It may be the case, however, that certain forms of

scaffolding are more effective at supporting interactions and that this will increase communicative success. For example, effective scaffolding may involve providing conversational structures that readily facilitate and monitor levels of shared understanding while not removing the communicative initiative from less proficient interlocutors. This then would allow individuals to maintain the communicative lead during interactions within a framework aimed at establishing and maintaining mutual understanding.

Children learn language within social systems and according to cultural norms. So language use also involves learning how language functions within society (Golinkoff and Gordon, 1983). Within the domain of pragmatic language use there are a number of features that relate to how words are linked within the context of their communicative environment. These refer to the conversational acts performed by speakers (Austin, 1962; Searle, 1969), the functions these acts serve in meeting communicative needs (e.g. Halliday, 1970, 1975), understanding the conversational implicature of speaker messages (Grice, 1975), and the use of contextual information for coding and decoding speaker messages (e.g. Halliday and Hasan, 1976). These will be described more fully in Section 2.2 on pragmatic language use, but are referred to here in relation the model outlined by Bloom and Lahey (1978; Lahey, 1988).

Inherent in the notion of communicative success is the ability to judge what should be said to whom in a given situation and the behaviours concomitant with these communicative acts. This involves taking into account preceding situational events and what is intended to follow the production of an utterance i.e. the signalling of intent in performatives and embedded presuppositions (Grice, 1975; Bates, 1976). So individuals need to learn the words and structures that are associated with the expression of language content and form. Language use, therefore, has to do with the pragmatic choice, or alternation, of language forms based on the context of communicative event

Bloom and Lahey (1978; Lahey, 1988) describe that children come to learn the situational constraints that govern the use of alternative forms of language, and the relationship between form and content, by the beginning of their third year. This then allows them to communicate more flexibly according to the demands of the situation and according to how utterances should be constructed. That these messages are tailored to meet the needs of the listener has been a matter of debate. For example, Piaget (1926, 1959) observed that children tend to talk in 'collective monologues' rather than adapting their communication style to take account of listening partners. This compares to a number of studies that have found that pre-school age children are able to adapt their messages according to the perceived needs of the listener (e.g. Shatz and Gelman, 1973), such as when talking to younger or naïve/informed listeners (Perner and Leekham, 1986). Taking account of listener needs represents a major accomplishment in the development of effective communication skills and is investigated in the current research in relation to the way that the main participants might adapt their communication style in line with communication partner requirements.

As a result of the child's increasing ability to infer the needs of their listener and tailor their messages to address these needs, he/she can enter into conversations with communication partners and respond appropriately to speaker initiations. This involves putting into place a number of rules associated with language use such as turn-taking (e.g. Sacks et al, 1974), comprehension monitoring (Clark, 1996), initiating repairs (e.g. Schegloff, Jefferson and Sacks, 1977), and maintaining the coherence of the conversation by relating what has been said across sentence boundaries and speaker turns (Halliday and Hasan, 1976). Bloom and Lahey (1978; Lahey, 1988) find that children begin to learn these rules towards the end of their third year and use them to construct messages and maintain conversations. Learning these skills is crucial to the development of communicative effectiveness and they depend on the child's ability to infer mutual

knowledge with their listening partner. Monitoring of self and other's understanding, however, continues to develop over a number of years (e.g. Lloyd, Boada and Forns, 1992). So by around four years of age, most children relate their utterances to prior initiations and respond appropriately to (simple) adjacency turns such as question and answer sequences. Around this time they also learn to adapt the form of their utterances according to the point of view of participants and in relation to the context of conversations e.g. the use of I/you, this/that, and a/the. These skills continue to develop over a number of years and become closer in construction and style to adult like forms.

The remainder of this chapter discusses pragmatic aspects of communication, a major focus of the thesis. This involves looking at the ways language is used in everyday conversation and the features that constrain speakers and listeners in the process of establishing mutual understanding.

2.2. Pragmatics

Pragmatics has to do with 'how language is used in the process of communication' (Perkins, 2000, p9), and relates language form (signs) to the interpretation of speaker meaning. Morris (1938) was one of the earliest writers to distinguish between syntactic structures (form), semantics (content) and relationship of signs to interpreters, and to suggest no one-to-one relationship between language form and what it represents. Simply knowing the sounds, forms and meaning of language does not inform us about how it may be used (Clark & Bly, 1995). For that we must refer to the context of the interaction, the goals that individuals hope to achieve and the wider communicative environment (Cohen, 1984). This section outlines the ways that meaning and intention are encoded in speaker messages and the ways that interlocutors collaborate towards achieving communicative success.

2.2.1. Speech acts

Speech acts are basic linguistic units performed by speakers and listeners according to certain rule-governed behaviours (Searle, 1969). They refer to actions performed by the utterance of words in combination with speaker intention and sentence context. This includes acts such as warnings and promises. The notion of speech acts, or illocutionary acts, as a unit of analysis was first introduced by Austin (1962) in his seminal paper on the functions that language perform in everyday linguistic encounters. Austin (1962) differentiated between linguistic acts that describe or make a statement about something (constantives) and those that are performative in nature, i.e. where the utterance itself is part of the action being enunciated. For example, in uttering the words ‘I give and bequeath my watch to my brother’, Austin (1962) claims that speakers engage in the performative act of the bequest, and that this is distinct in nature from the act of uttering words (the locutionary act) and referring or predicating. He outlines certain features that are necessary for the felicitous completion of performative acts and proposes that where these can not or have not been met acts are incomplete or insincere. So recognising communicative intent is important in the performance of speech acts.

Illocutionary acts, then, can be identified independently from the production of the words (locutionary act) and the act of predicating and referring. Austin (1962) distinguishes further between the outcome or consequence of an illocutionary act and the intention, or force, behind speaker utterances. This, he termed the perlocutionary effect. To illustrate with an example from Austin (1962, p101):

Action 1 Locutionary act (he said that)	‘he said to me ‘shoot her’’.
Action 2 Illocutionary act (he argued that)	he urged me to shoot her.
Action 3 Perlocutionary act (he convinced me)	he persuaded me to shoot her/he got me to shoot her.

Intrinsic in the notion of these categorical procedures is the realisation that listeners may or may not choose to abide by the speaker's intention, or may fail to recognise the illocutionary force behind the speaker utterance. Equally, listeners may respond in a manner that was not intended by the speaker i.e. where he/she has misinterpreted the speaker's intention. It might be expected, therefore, that recognising and responding to speaker intent would be determined in part by the interlocutor's previous communication history. Individuals with intellectual impairments provided with occasion to initiate and respond to illocutionary acts, such as asking questions and giving information, have previously been shown to be more likely to develop and use pragmatic skills than where fewer opportunities were available (van der Gaag, 1989b).

Searle (1969, 1975) builds on Austin's (1962) work and proposes a speech act theory based on the functional use of language. Like Austin, he distinguishes between the utterance of words (the utterance acts), their reference to predicating and referring (the propositional act) and the actions performed by words as they combine in context with speaker intention and sentence content (the illocutionary act). Importantly, Searle (1969) goes on to broaden the definition of the perlocutionary effect to include the notion of meaning. He proposes that listeners should be able to recognise the meaning of (i.e. understand) the speaker's intention in order to respond appropriately to his/her intent. This, Searle (1969, p47) refers to, as the illocutionary effect:

'the speaker (S) intends to produce an illocutionary effect (I.E.) in the hearer (H) by means of getting H to recognise S's intention to produce I.E.'

So this takes into account the ability of listeners, albeit in passive manner, to recognise the meaning behind speaker messages as well as the speaker's intention to produce a response. Responsibility is more clearly focused on the speaker role to produce utterances that signal

intent so that listening partners may co-operate as communicative partners. The current research adopts a more collaborative approach towards identifying meaning and intent and regards co-ordination between speakers and listeners as a central tenet of effective communication. Here it is proposed that interlocutors establish meaning, or mutual understanding, through reference to their common beliefs (Clark and Brennan, 1991) and that they use this information to construct and interpret speaker messages. This collaborative approach is described more fully shortly (Section 2.3).

Searle (1969) identifies necessary and felicitous conditions for the indication of illocutionary force and the successful completion of speech acts. These relate to the propositional content of messages, the context of the interaction and speaker intention, and can be illustrated as shown below.

1. Propositional Content that the proposition can be identified from the rest of the utterance and predicates some future action.
2. Preparatory Condition that the context is suitable for the initiation of the speech act.
3. Sincerity Condition the speaker believes that he/she can perform the act.
4. Essential Condition that the speaker intends to perform the act.

So in the case of an assertion, the preparatory condition would be that the speaker has evidence for the truth of a given proposition and it is not clear to him/her that the hearer is aware of this. The sincerity condition stipulates that the speaker should believe the proposition to be true, and finally, that the proposition represents a true state of affairs (essential condition). By separating the grammatical structure of the sentence from the actions they perform, Searle (1969, 1975) demonstrates the functional role of language in transmitting speaker intention (the illocutionary force) and its influence on the response of communication partners (the illocutionary effect and/or perlocutionary effect). This is

important as it underpins the way that speech acts are used by interlocutors to signal intent. Dialogues produced during the current study are coded according to the communicative intent or goals of speakers. Details of the coding scheme, Conversational Games Analysis (Kowtko et al, 1991), are discussed shortly (Section 2.4) and outlined in more detail in Chapter 8 on the analysis of dialogues. The point here is that it is assumed that speech acts produced by the current participants abide by the sincerity condition of Searle's illocutionary force. That is, for example, that where a speaker requests feedback from his/her partner, it is assumed that the interlocutor sincerely requires the information, and believes that asking for feedback is an expression of the desire to elicit a response. This in turn implies that the reason for making the request is necessary and appropriate to the context of the interaction (Preparatory condition).

Finally Searle (1975) provides a taxonomy for classifying speech acts according to the illocutionary point of the speaker initiation. This takes into account the way that the propositional content of messages relates to the context of the utterance and the underlying feelings and states motivating speaker productions. These are as follows:

1. **Representatives:** statement about the truth of the proposition or speaker's opinion
e.g. predict, suggest.
2. **Directives:** attempts by the speaker to get the listener to perform some act in accordance with the directive, e.g. a request, advise, command.
3. **Commissives:** commits the speaker to some future course of action e.g. shall, intend, promise.
4. **Expressive:** expresses some state (feelings and attitudes) specified in the sincerity condition of the act e.g. apologise, welcome.
5. **Declaratives:** makes a statement that brings about some alteration in the state of affairs, e.g. 'you're fired', 'I resign'.

By classifying speech acts in this manner, Searle (1975) demonstrates that the same lexical items can be used to represent different illocutionary points, or purpose of the illocution, according to their syntactical structure. For example, the verb 'to advise' can take the form of a directive in 'I advise you to leave', or as a representative in the utterance 'passengers are advised that the train will be late' (Searle, 1975). Equally, the same illocutionary act can be performed using different words. The research reported here makes use of the distinction between the illocutionary point of speech acts by coding dialogues according to the underlying motivations or goals of speaker intention. This takes account of the way that words combine to form different types of speech acts, how they are used during interactions and the response of listening partners.

2.2.2. Referring as a speech act

It is assumed that individuals entering into a conversation will co-operate towards achieving some shared purpose or mutually accepted outcome. Therefore speaker and listener contributions should link in some way so that coherence is maintained and information can be grounded (Clark and Schaefer, 1989; Anderson, 1995). One axiom for guiding this process is that of collaborative effort (Clark and Wilkes-Gibbs, 1986), that is that contributors will collaborate their verbal and non-verbal exchanges towards establishing commonly shared goals.

One of the principle functions of language is to allow for the exchange of information between speakers and listeners. It is important, then, that listeners are able to identify and decode referring expressions that are embedded in speaker utterances. One of the problems encountered by interlocutors is that there is no one-to-one relationship between objects and their referring expressions (Glucksberg and Krauss, 1967): much depends on the context of an interaction (Bates, 1976) and the level of knowledge assumed to be shared between speakers and listeners (e.g. Cohen, 1983). For example, speakers may

shorten the length of an utterance with experienced listeners (e.g. Wilkes-Gibbs and Clark, 1992) or swap from definite to indefinite referring expressions when discrepancies in the level of assumed shared knowledge are exposed (Anderson and Boyle, 1994).

Searle (1969) proposes two general principles for the performance of propositional acts, while recognising that not every occurrence of a referring expression necessarily signals the performance of an act. These state that 'there should be one and only one object to which the speaker's utterance of the expression applies', and that 'the hearer must be given sufficient means to identify the object from the speaker's utterance of the expression' (Searle, 1969, p82). This places responsibility for the successful completion of referring acts on the ability of speakers to encode referring expressions so that this may be decoded by communication partners. A more collaborative or interactive approach (e.g. Clark and Wilkes-Gibbs, 1986), however, would highlight the interplay between speakers and listeners in their mutual attempt to co-construct understanding.

Searle (1969) suggests that certain conditions must exist for the successful use of reference so that whenever a speaker utters a referring expression in the presence of a listener the act of referring occurs. These state that in formulating their utterances, speakers should provide sufficient information for their listeners so that they can pick out and identify the description of an object from the surrounding context of an utterance. As such, this can provide a useful index on the development of cognitive skills (Shatz, 1978) and pragmatic language ability (Lloyd et al, 1992) as children often produce ambiguous messages (e.g. Whitehurst and Sonnenschein, 1978; Asher and Wigfield, 1981). One such condition provides for the use of implicature (Grice, 1975) in the construction of speaker messages and suggests a more active role for listening partners. This proposes that listeners should be able to infer speaker intention even where it is not explicitly stated during the course of an utterance. Principles outlining the use of conversational implicature are discussed more

fully in the following section on indirect speech acts. According to Searle (1969), speakers take into account the fact that listeners can recognise their intention to uniquely identify objects and can use this information along with the context of an utterance to decide on referent identity. Listeners must reason with the actions of speakers so that they are able to respond appropriately to initiations. They must decide when the illocutionary force behind an utterance was object identification, how this should affect their response and when to act (Cohen, 1985).

So according to Searle (1969), although the (propositional) act of referring and predicating is not strictly collaborative in nature, it nevertheless takes into account the active participation of both speakers and listeners and the communicative context of an interaction. Further, requests for identification may be encoded indirectly in speaker messages so that listeners must take into account the surface structure of speech and rules for relating utterances to their communicative context (e.g. Bates, 1976).

2.2.3. Indirect speech acts and implicature

Communication goals can be achieved through a number of illocutionary devices and one of these is implicature or indirect speech acts. These are illocutionary acts where the illocutionary force indicator for one type of act (e.g. a question) is uttered in performance of an additional type of illocutionary act, e.g. a request for action. In performing an indirect speech act, speakers intend their listeners to recognise the purpose of the initiation based on the level of mutual understanding. Implicature involves identifying and deciding between the literal sense of a referring expression and an alternative non-literal meaning.

According to Grice (1975), speakers should make their 'conversational contribution such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged' (Grice, 1975, p45). This he terms the Principle

of Co-operation. Flouting or violation of the principle can act as a signal to communication partners that the speaker has used an indirect speech act. Subsumed within this principle are four conversational maxims that relate to the felicitousness and volume of speaker contributions (Grice, 1975, p 45-46).

1. Quantity: contributions should be informative but no more so than is required for current purposes.
2. Quality: contributions should be true.
3. Relation: contributions should be relevant.
4. Manner: contributions should be plain to understand, avoid obscurity of expression and ambiguity and be brief and orderly.

Conversational implicature is communicated through violation of these maxims pertaining to the surface structure of utterances, such as asking for irrelevant information (maxim of relevance) and/or by referring to the felicity conditions of an act that the speaker wishes to convey. For example, 'do you know what the time is' can be used as a euphemism for 'tell me the time', and is therefore more than a request for irrelevant information (i.e. 'yes/no') (Bates, 1976). To decode the implicature carried in the illocutionary act listener must refer to the conventional meaning of words, the context of an interaction and other information shared with their communication partner. An example taken from the current research involves the location of a feature on the Map Task and is illustrated below. Speaker 1, a young adult with intellectual impairments, is attempting to guide her partner, Speaker 2 (carer partner), towards a landmark (a kite) on the map.

Speaker 1: So you draw straight down to the kite.

Speaker 2: Em, I'd have a very hard time on my map, drawing a straight line down and reaching the kite.

Here Speaker 2's intention is to produce in Speaker 1 the knowledge that she can not comply with the instruction through reference to the maxim of relevance, and that she intends Speaker 1 to recognise this. Searle (1975) proposes that listeners adopt an inferential strategy in order to understand indirect illocutionary acts. This involves first identifying that the illocutionary point of the utterance departs from the literal meaning of the utterance e.g. Speaker 2 is not stating that she finds it difficult to draw straight lines on the map. Second, listeners must then identify the alternative illocutionary point of the utterance, in this example that the kite is not directly below Speaker 2's current location. Searle (1975) suggests that using this type of inferential strategy is essential if listeners are to identify and understand indirect speech acts. So recognising conversational implicature is important during communication and takes account of co-ordination in speaker and listener knowledge.

2.2.4. Speaker meaning

Meaning can be described as the way that words are used to combine events in the world e.g. 'those spots mean measles' and according to cognitive actions that are intended as a consequence of the utterances, such as 'those three rings on the bell (of the bus) mean that the bus is full' (Austin, 1962). These are referred to by Austin as natural (in the way it describes spots in relation to measles) and non-natural meaning, where actions are the intended outcome of a speaker initiation. It is the latter of these two definitions of speaker meaning that will be discussed here.

Meaning is carried in the words and non-verbal signals transmitted between speakers and listeners in an intentional and purposeful manner. Speakers use their utterances and non-verbal actions to create certain beliefs in their listener partners and this is achieved in part by getting him/her to recognise this intention:

S (speaker) uttered x with the intention of inducing a belief by means of the recognition of this intention. Grice 1957, p385.

So meaning can be thought of as a series of cognitive acts that a speaker intends to create in their listening partner using verbal, non-verbal and/or non-linguistic signals (Bates, 1976). Therefore listeners may make reference to a number of linguistic and non-linguistic cues when decoding speaker meaning, especially where messages are unclear and/or ambiguous (e.g. someone requesting a pump at a fire is unlikely to be asking for a bicycle pump) (Grice, 1957). Equally, non-verbal signals (e.g. gestures, facial expression) may also provide additional clues behind utterance meaning (e.g. Goldin-Meadow et al, 1992; Doherty-Sneddon and Kent, 1996). Of interest are situations where the ability to infer speaker meaning appears to break down. For example, Frith (1998) proposes that some children with autism experience difficulty in comprehending the non-literal meaning of utterances. This, she suggests, can lead to the misinterpretation of utterances and difficulty in processing message content. Impairments in other areas of cognitive and/or social processing, however, may also account for the difficulty associated with linguistic and non-linguistic communication (Frith, 1998).

The transmission of meaning is a reflexive process (i.e. refers back to itself) in that speakers encode utterance meaning in their productions with the intention that listeners should recognise this, along with the notion that listeners are able to recognise this intention and that this was the intention of the speaker. Schiffer (1972) broadens the description of speaker meaning (s-meaning) towards a more co-ordinated perspective of the ways that speakers and listeners establish understanding. He revises Gricean descriptions of meaning to include the establishment of mutual knowledge that can be said to exist between interlocutors as a result of the collaborative process of speaking and listening. According to Schiffer (1972), certain knowing can exist between

communication partners and this knowing is recognised and acknowledged as existing by each collaborative partner. This he describes as mutually knowing* that p, or it being mutually known that p* by speakers and listeners. Schiffer (1972, p30) describes mutual knowledge as follows:

Speakers (S) and listeners (A) mutually know that p ($K^*_{SA}P=df$) where:

- $K_S P$ (the speaker knows that p)
 - $K_A P$ (the listener knows that p)
 - $K_S K_A P$ (the speaker knows that the listeners knows that p)
 - $K_A K_S P$ (the listener knows that the speaker knows that p)
 - $K_S K_A K_S P$ (the speaker knows that the listener knows that the speaker knows that p)
 - $K_A K_S K_A P$ (the listener knows that the speaker knows that the listener knows that p)
- and so on.

In this way, certain knowledge can be said to become the property of a person, and part of this property is knowing that each person sharing this property will also know that this is sufficient ground for assuming mutual knowledge. This mutual knowledge or shared meaning then becomes part of the background taken into conversations by speakers and listeners and forms part of their common ground (Clark and Brennan, 1991). So where Grice (1957, p385) describes a speaker's intention to produce some effect in the listener 'by means of the recognition of x', Schiffer (1972) requires that speakers produce their utterances intending that it is mutually known that they do so with the intention that listeners should respond in recognition of this.

2.2.5. Adjacency turns

Conversations are made up from the combination of illocutionary acts. Each of these acts is initiated and responded to by contributors to the discourse. However, decisions about who speaks next during exchanges is not entirely arbitrary. The allocation of speaker turn is organised around a number of features that ensure the smooth running of conversations (Sacks et al, 1974). These help to ensure the smooth transition from one speaker to another and the coherence of interactions (e.g. Clark, 1985).

One feature for selecting which speaker takes the next turn is adjacency turns (Schegloff and Sacks, 1973). These are sequential units of dialogue where a listener's response (e.g. an answer) is tied to the first turn part of the speaker's initiation, e.g. a question, and are the basic means for selecting the next speaker (Sacks et al, 1974). Adjacency pairs have five essential properties. These are as follows:

1. Each pair consists of a first pair part and a second pair part.
2. Different speakers utter each part.
3. First and second pair parts belong to particular utterance types, e.g. greeting-greeting, question-answer.
4. Listener response is contingent upon the type of first pair part.
5. The response is conditionally relevant upon the occurrence of the first pair part.

Adjacency turns then are units that aid interlocutors to achieve certain goals, or joint projects (Clark, 1996), and help to maintain the coherence of conversations. This is because they act to constrain the type of response that is felicitous given a certain situation, and provide opportunities for listeners to signal their understanding of previous messages.

2.2.6. Speaker turns

Conversations are organised in part around the allocation of speaker turns (Sacks et al, 1974). That they are helps to ensure the smooth running of discourse and the effective exchange of interlocutors waiting to take the floor. Sacks and colleagues (Sacks et al, 1974) illustrate a number of robust features that help to maintain the structure of interactions. These provide for the exchange of speaker turns, variations in turn length and order and certain turn allocation techniques that co-ordinate speaker transfer, e.g. transition-relevance places, adjacency turns and current speaker selects next speaker. As a result, conversational turns are managed in an efficient manner so that episodes of simultaneous speech and gaps between speaker turn are kept to a minimum.

Much of the early work looking at turn-taking proposed that simultaneous speech and gaps in the dialogue were violations in the communication process (e.g. Duncan, 1972, Schegloff and Sacks, 1973), and that mechanisms exist for repairing these episodes (Sacks et al, 1974). These include the use of interruption markers such as 'excuse me' and/or the premature ending of one or both speaker contribution. Violations are caused by listeners failing to react to turn yielding signals or attempting to take the floor when no turn yielding cue is displayed by the speaker (Duncan 1972). Sacks et al (1974) propose that conversational units end at a turn-relevance place (clause boundary), and that this is the point at which speakers and listeners may switch roles. They found that episodes of overlapping speech, brief as they were, occurred as a result of interlocutors competing for next turn selection and/or inaccurately predicting turn-relevant place. So turn-taking manages and constrains ongoing discourse and allows for flexible turn size and order of contributions, while preventing breakdowns in communication such as overlapping speech and gaps in the discourse.

An alternative perspective on turn taking comes from collaborative theorists, such as Herb Clark and colleagues (e.g. Clark and Wilkes-Gibbs, 1986; Clark and Brennan, 1992). They propose that interruption and overlapping speech is not problematic during discourse (e.g. Boyle et al, 1994) but rather is part of the process entered into by speakers and listeners as they collaborate to ground information. They suggest that many communicative acts produced non-verbally can overlap speech without causing difficulty with attention, understanding or identification of referents (Clark, 1996), and may instead supplement information made available in the verbal signal (Kendon, 1967; Boyle et al, 1994; Doherty-Sneddon, 1995). Clark et al propose that the structure of discourse results from the ways that people attempt to advance their joint actions and establish mutual understanding contribution by contribution (Clark, 1996), rather than relying on formal turn-taking mechanisms. Specifically, it is proposed that turn taking is managed interactionally by speakers and listeners and as such is influenced by the context, goal and/or contributors to a conversation (Clark, 1985).

Communicative success might be described then according to how smoothly interactions are conducted (Sacks et al, 1974) or how effectively speakers and listeners collaborate towards establishing mutual understanding (e.g. Clark, 1996). Boyle et al (1994) suggests that disruption in turn-taking (e.g. interruptions and simultaneous speech) does not interfere with communication performance. They found that well timed interruptions, such as those that occurred during periods of misunderstanding, increased collaboration between speakers and listeners and that this helped to maintain mutual understanding. So engaging the communication partner in collaborative sequences maintained the ongoing structure of dialogues rather than the surface structure of speech.

2.3. A collaborative approach

Co-ordination is never more important than in language use (Clark, 1985). For if communication is to be effective, speakers and listeners must co-ordinate their verbal and non-verbal contributions and collaborate towards establishing mutual understanding (Clark and Marshall, 1981) so that coherence can be maintained and goals attained. The collaborative theories of Herb Clark and colleagues (e.g. Clark and Marshall, 1981; Clark and Wilkes-Gibbs; 1986, Clark and Brennan, 1991) have produced an influential approach to outlining how mutual understanding is achieved and maintained during discourse. They propose that speakers and listeners collaborate on a moment-to-moment basis towards establishing the mutual belief that referents have been identified and messages understood to a criterion sufficiently for current purposes (Clark and Schaefer, 1989). Only then can individuals move on to the next stage of the interaction in the belief that information has been added to their common ground free from ambiguity or misunderstanding (Clark and Brennan, 1991). For their part, speakers should design their utterances to take account of shared or common beliefs so that contributions can be grounded in an efficient manner. Listeners can exploit this design feature of utterances (Clark, 1985) and try to ensure that their beliefs about mutual understanding are co-ordinated with the speaker (Wilkes-Gibbs and Clark, 1992).

As part of this negotiated process, speakers look for evidence that listeners have understood their utterances to a criterion suitable for current purposes (Clark and Schaefer, 1989; Clark and Wilkes-Gibbs, 1986). This may be in the form of an acknowledgement or backchannel response from listening partners (e.g. yes, mhm, and/or non-verbal gestures) or through the initiation of a relevant next turn (Schegloff and Sacks, 1973). Here listeners signal evidence of understanding a previous utterance by responding to the speaker's previous turn in an appropriate manner (e.g. question and answer sequence). However, speakers may only accept this response if they feel that their intention has been understood

correctly. Where problems arise, interlocutors have at their disposal certain self-righting mechanisms that can lead to repair, such as self- and other-corrections (Schegloff et al, 1977). These are organised successively around speaker turns and are ordered so that self-initiated repairs precede those for other-initiated corrections. This is because speakers can self-repair utterances within the same conversational turn while listeners must wait until the next turn-relevance place. Other-corrections include requests for clarification; e.g. open and closed questions ('what?' 'where?' yes/no) and/or partial or full repetition of problem utterances (Schegloff et al, 1977).

This system of repair is influential for two reasons (Clark, 1985). First, speakers are provided with the opportunity to correct their own mistakes without recourse to exchange of speaker turn, thereby minimising collaborative effort. Second, it places a responsibility on speakers to monitor their own and their partner's understanding: speakers must ensure that they keep track of their own utterances and the progress of dialogues as well as look for positive evidence of listener understanding. As part of their contribution to this collaborative process, listeners are required to signal breakdown in communication to their partner as quickly as possible so that utterances might be reformulated and mutual understanding re-established. In this way, listeners increase the effectiveness of communication by helping to ensure the accuracy of speaker meaning and the efficiency with which new information is grounded (Clark, 1985, Schrober and Clark, 1989). Communication therefore proceeds on two levels: according to the topic or purpose of an interaction and at the level of grounding that information to their shared or mutual belief (Clark and Wilkes-Gibbs, 1986, Clark and Schaeffer, 1987; Anderson, 1995).

In accordance with Gricean (1975) maxims of quantity and manner, collaborative theory predicts that interlocutors will engage to minimise the amount of verbal effort required to establish mutual understanding (Clark and Wilkes-Gibbs, 1986). This results in a trade-off

between how accurately messages are formulated and the likelihood that listeners will recognise speaker intentions. Speakers have to decide between what can be assumed as mutual knowledge (Anderson and Boyle, 1994) and the likelihood that listeners will be able to infer meaning from their utterances (Grice, 1975). As a rule, this procedure is unproblematic for typical adults as they do not anticipate a one-to-one relationship between language and language meaning (Ricard, 1993). This may not be the case, however, for individuals with communication delay or disability (e.g. van der Gaag, 1989b) and younger communicators (Anderson and Boyle, 1994).

So within this collaborative framework individuals actively engage to minimise the amount of effort required to successfully ground information (Clark and Wilkes-Gibbs, 1986).

Speakers take account of past experiences with their communication partner and formulate utterances according to the level of accumulated common ground (Clark and Wilkes-Gibbs, 1986): the more information individuals can assume is common ground, the easier it is for them to communicate (Schober and Clark, 1989; Wilkes-Gibbs and Clark, 1992).

This is because familiar/experienced partners enter into a conversation with an accumulation of previously shared knowledge and this allows them to predict the linguistic framework within which to encode and decode new information. This in turn leads to greater efficiency in terms of the number of words and turns required to establish mutual understanding (Clark and Wilkes-Gibbs, 1986; Wilkes-Gibbs and Clark, 1992; Boyle, et al, 1994).

One short cut available to listeners is the use made by speakers of referring articles (Clark and Schaeffer, 1987). This refers to definite or indefinite (a/the) referring noun phrases as indicators of novel or given information. As a rule, speakers tend to refer to novel objects/events by using the indefinite article 'a', whereas the definite articles ('the') is used to describe object/events already represented in the mutual knowledge grounded between

speakers and listeners (Clark and Marshall, 1981). Therefore, definite articles signal a retrieval process for listening partners while the use of the indefinite 'a' requires him/her to create a new referent in current model of discourse (Anderson, 1995). The significance of the choice of speaker article therefore is that it represents the separation of speaker and listener knowledge. This separation forms the basis of what has come to known as the 'mental model' approach towards language use (e.g. Johnson-Laird and Garnham, 1980). These authors postulate that speakers and listeners maintain independent representations of the context of an utterance (discourse model) and that this contains not only their own knowledge of a topic/event but also what is known about this by their listening partner. So information is encoded and decoded on the premise of what is believed to be common or mutual knowledge:

'a speaker structures his remarks partly on the basis of what he knows about the listener's discourse model: a listener interprets utterances partly on the basis of what he knows about the speaker's discourse model'. Johnson-Laird and Garnham, 1980, p377.

It follows then that for communication to be effective, speakers are required to create some representation of their partner's mental model of discourse (Cohen, 1984), and adjust it in light of listener feedback (Anderson and Boyle, 1994) and expertise (Shatz, 1983).

Accordingly, the successful grounding of information represents alignment or overlap between a speaker and listener's mental model of discourse and by extension, misalignment when this does not occur. This ability to construct and interpret messages with reference to others knowledge states, however, develops only gradually in typically developing children (e.g. Anderson, Clark and Mullin, 1991, 1994; Anderson, 1995; Doherty-Sneddon, 1995; Doherty-Sneddon and Kent, 1996).

In keeping with this perspective, a number of studies have suggested that the extent to which interlocutors engage in collaborative discourse depends on the communication strategies adopted by speakers (e.g. Clark and Wilkes-Gibbs, 1986; Anderson et al, 1994). For example, it has been found that questions tend to generate more collaborative sequences and produce greater increases in mutual knowledge when compared to statement forms produced during referential problem solving (Anderson and Boyle, 1994; Anderson, 1995). These authors propose that this is because questions function as an 'attention and response eliciting device' that signals the introduction of new information to listening partners. They suggest that question forms are more salient indicators of new information than the independent use of definite/indefinite articles as they combine rising intonation and changes in word order with indefinite article use. So questions are effective at establishing mutual understanding for two reasons. First, they separate the introduction of new information from the context of an interaction and this allows it to be grounded independently from any subsequent contributions. Secondly, they oblige (Sacks et al, 1974) listeners to respond to speaker initiations, thereby increasing the likelihood of a collaborative sequence (Anderson and Boyle, 1994; Anderson, 1995). Each of these actions in turn contributes towards increasing mutual knowledge and likelihood of a successful communicative outcome.

One adaptation made by speakers to meet the needs of the partner can be illustrated during asymmetrical conversations e.g. those involving child/adult interactions or where an individual has an acquired language disorder. During such interactions, more skilled participants tend to assume greater responsibility for scaffolding conversations in terms of the level of support they provide to their communication partner (e.g. Ninio and Snow, 1996; Anderson et al, 1997; Abbeduto, Weissman, and Short-Meyerson, 1999). This might involve responding in a sensitive manner to speaker initiations (Anderson et al, 1997) or providing strategies that assist individuals to construct unambiguous messages

and check their own understanding of previous messages (Abbeduto et al, 1999).

Additional support may also be provided by requests for clarification of ambiguous messages and attempts to repair breakdown in understanding (Ninio and Snow, 1996).

For example, Anderson et al (1997) propose that conversations including individuals with an acquired language disorder may be scaffolded by non-impaired partners initiating a higher proportion of conversational acts than would be associated with average speakers in similar communicative situations. They also found an association between communicative success and the types of conversational acts initiated by speakers and listeners. More successful dialogues were characterised by situations where aphasic individuals were more directional in the transfer of task related information and checked their partner's understanding of previous messages. Less successful outcomes were predicted where non-aphasic partners introduced a high frequency of open questions that introduced previously unmentioned information into the conversation and volunteered additional material not elicited by their communication partner. They conclude that adults with acquired language disorders are able to develop communicative strategies that allow them to exploit their available linguistic and non-linguistic repertoires, and that this can heighten success. Communicative success was further increased by non-impaired partners scaffolding interactions and assuming greater responsibility for initiating certain types of conversational acts, but not others.

So communication is essentially collaborative in nature and tends to be more successful where speakers and listeners co-ordinate their verbal and non-verbal contributions to meet the needs of their partner. Questions are useful at increasing mutual knowledge as they elicit collaborative sequences and signal the introduction of new information, although may be unhelpful where less sensitively applied. Scaffolding can provide additional support during asymmetrical dialogues as it represents a means of bridging the gap

between speakers and listeners understanding. Finally, familiar/experienced partners tend to be more efficient at establishing shared understanding as they can rely on previous experience to interpret and ground new information and this reduces the amount of verbal effort required to meet grounding criterion (Clark and Wilkes-Gibbs, 1986).

2.4. The current research

An interactionist or collaborative approach is taken to language use in the current research. Effective communication is regarded as a product of the collaborative efforts of speakers and listeners and the ways that they co-ordinate verbal and non-verbal contributions towards achieving shared goals. Adopting this approach allow us to assumes certain principles relating to the processes of communication and likely predictors of communicative success. These principles are that:

1. Communication will be more successful where interlocutors co-ordinate with each other and design utterances with reference to their shared or common ground (e.g. Clark and Marshall, 1981).
2. Certain types of illocutionary acts, e.g. questions and answer sequences, will be more effective at increasing the level of collaboration between speakers and listeners and these will be useful in establishing and/or maintaining mutual understanding (e.g. Anderson and Boyle, 1994).
3. Conversations will organise around certain dialogue structures such as turns, conditional relevance, adjacency turns and repair sequences, and these will be managed interactionally by speakers and listeners (e.g. Clark, 1985).
4. Interlocutors will make use of linguistic, non-linguistic and non-verbal signals in an effort to ground information, and this will increase the likelihood of communicative success (Clark and Brennan, 1991).

One way of looking at interactions from a collaborative perspective is to code dialogues hierarchically according to speaker intent and listener response. An example of a system for coding dialogues in this way is Conversational Games Analysis (Kowtko et al, 1992). This makes use of the observation that conversations are typically organised around sequences of speech acts and that each of these can be classified according to speaker intentions or goals (Houghton and Isard, 1987). The form of the initiation, such as a request for information or clarification, can then be used to predict the type of goal the utterance is being used for (Houghton and Isard, 1987) and the appropriateness of a response (Schegloff and Sacks, 1973). Conversational Games Analysis provides a framework for assigning codes to speaker intentions/goals and any collaborative sequences this may produce. It takes as its central tenet that interlocutors actively engage to establish speaker goals and that these will be recognised and responded to by listeners (Kowtko et al, 1992). Games analysis also takes account of the observation that the accomplishment of speaker goals may extend beyond a single exchange of turn and involve embedding of further speech act before they can be mutually accepted by speakers and listeners (Clark and Schaefer, 1989). There are six types of conversational games and these are outlined briefly below. A fuller description is provided in Chapter 8 on the analysis of communication process.

Game type

1. **Instruct:** a direct request for action.
2. **Explain:** information volunteered (not elicited) by a partner.
3. **Align:** checks understanding and readiness for the next move.
4. **Check:** checks self-understanding of a previous message.
5. **Query y/n:** a closed question that invites a yes/no response.
6. **Query-w:** introduces new information in the form of a question.

Conversational games are coded according to the purpose of the illocutionary act involved and may be embedded within one another in a hierarchical structure. Four codes are assigned to question initiations depending on the type of information requested. These are Aligns, Checks, Query y/n and Query-w. Coding dialogues according to speaker intent provides one measure of the communication style adopted by interlocutors and of the ways that carers, students and peers collaborate with their communication partner towards achieving success. It may be shown, for example, that partnership influences the types of conversational game that are initiated by speakers and respondents and in turn how effective they are able to ground information. So taking account of speaker goals can provide a useful means for investigating and describing differences that might occur in the communicative performance of interlocutor and how effective they are at maintaining mutual understanding.

2.5 Chapter conclusion

Effective communication requires that speakers and listeners acquire a number of skills relating to content, form and language use. This involves learning about the ways that words combine in the linguistic, non-linguistic and/or non-verbal signal to encode speaker meaning and communicative intent. To assist with this process individuals make reference to the context of the interaction and the communication goals they share with their partner. Communication is a collaborative process and involves the co-ordinated actions of all parties to a conversation. Listeners exert a powerful effect on this process as they provide feedback to speakers that intention has been recognised or that breakdown has occurred. Through co-ordinating their verbal and non-verbal actions (Clark, 1996), speakers and listeners collaborate to establish mutual understanding and resolve difficulties as they arise. This allows them to ground information (Clark and Brennan, 1991) and increase mutual or shared knowledge, which in turn leads to communicative success.

Part 2: Review of the literature on the development of communication skills in people with intellectual impairments.

Chapter 3 Language development in people with intellectual impairments

3.1. Introduction

It has been well documented that people with intellectual impairments experience difficulty communicating. Research has shown that most individuals demonstrate developmental delay in one or more area of language acquisition and/or encoding and decoding non-verbal information. It is important then that strategies are provided that can assist individuals to maximise their available communication resources and contribute successful during interactions. This chapter outlines language development in people with intellectual impairments and focuses in particular on functional aspects of communication, that is skills that are required for everyday interaction. Emphasis is placed on the influence of context or environment on the development of effective communication skills and how interlocutors contribute to shared understanding. Of concern here are communication skills that provide individuals with as much 'choice and control as possible' over their lives in the drive to 'open up' mainstream services to people with intellectual impairments (Department of Health, 2001). This necessarily captures those aspects of communication that help get the message across, but which can be particularly challenging for people with intellectual impairments.

Communication problems in interactions involving at least one individual with an intellectual impairment can result from breakdown in the linguistic, non-linguistic or non-verbal (e.g. gaze) skills associated with effective communication, or difficulty dealing with pragmatic aspects of a conversation, such as turn taking (Sacks et al, 1974), comprehension monitoring, (e.g. Abbeduto, Short-Meyerson, Benson and Dolish, 1997; Abbeduto and Rosenberg, 1980), initiating repairs (e.g. Bedrosian and Prutting, 1978; Brinton and Fujiki, 1994) and producing and comprehending speech acts (Austin, 1962). Particular difficulty may be encountered conveying meaning in connected discourse, in so far as listeners may

find it more difficult to clearly identify referents and the communicative intent behind speaker utterances. However, this is not unique to people with intellectual impairments. Earlier studies looking developmentally at the ways that speakers and listeners come to design and interpret messages suggest that younger typically developing children also experience difficulty appraising messages (e.g. Robinson and Robinson, 1980; Robinson, 1981). This can be because younger interlocutors fail to associate message quality with the outcome of communication and/or recognise that expressions should identify referents uniquely for listening partners (Patterson and Kister, 1981). It is only gradually, as the child comes to understand about the purpose of the speaker message, that he/she also becomes more able to reflect on the relationship between communicative success and failure (Robinson, 1981) and on the complementary role of speakers and listeners (Whitehurst and Sonnenschein, 1978).

Communication breakdown can lead to anxiety and frustration for people with intellectual impairments, especially where interlocutors are previously unknown to one another (Kernan and Sabsay, 1997), and abandonment or withdrawal of one or both parties from the communicative situation. The effects of withdrawal or abandonment can be profound. Individuals may come to be regarded as uncooperative or unwilling to engage during interaction (van der Gaag and Dormandy, 1993) and therefore seemingly uninterested in communicative exchange. Conversely, they may feign understanding in an attempt to preserve self image (Kernan and Sabsay, 1997) or find other ways of maintaining control (e.g. Leudar and Fraser, 1985; Beveridge, Spender and Mittler, 1978). Each limits the scope and opportunity for individuals to engage with other interlocutors and to practise available communication skills. In turn this can reduce opportunities to contribute equally during interactions and to participate in decision making (e.g. Grove, Bunning, Porter and Olsson, 1999). Additional confusion can also occur as some individuals may require longer to process and respond to other initiations (e.g. Cunningham, Glenns, Wilkinson,

and Sloper, 1985). This can delay responses to and understanding of speaker utterances and, where the interlocutor is not sensitive to this, create further opportunity for breakdown to occur. This is because as speakers we intend our communication goals to be recognised and attempt to co-ordinate what we say with listener understanding (Clark, 1985). We rely on positive evidence from the communication partner that they can recognise meaning and intention so that we can assume a certain level of mutual understanding and progress with the course of the interaction (Clark and Schaefer, 1989). It is important then that interlocutors are provided with opportunities to signal understanding or non-understanding where responses are delayed, so that they might participate fully in ongoing exchange. Communicative ability must therefore take account of situational features of an interaction as well as linguistic and non-verbal measures of performance.

Coping with these difficulties can be especially challenging for young adults with intellectual impairments coming to terms with the expectations of a more socially inclusive community. To address this, increasing communication skills has been identified as a key factor in assisting individuals to live independently within the community (Brinton and Fujiki, 1993; van der Gaag and Dormandy, 1993). Specifically, communication skills are required that fulfil the functional requirements of individuals, i.e. those that will meet their communicative needs and environmental demands (Owings and Guyette, 1982; Bedrosian, 1988; Halle, 1988; Remington, 1997), and allow them to communicate most effectively. This chapter explores current knowledge of communication skills in individuals with intellectual impairments and will begin by outlining language acquisition, before focusing in more depth on pragmatic aspects of speaker and listener interaction.

3.2 Language Development

Communicative effectiveness encapsulates the notion that there are a number of skills required of speakers and listeners that will allow them to communicate successfully. This

involves learning how to processes, comprehend and produce linguistic cues and the realisation of how language is used in a meaningful way in everyday interactions (Clark and Clark, 1977). A number of studies have found that adults with intellectual impairments demonstrate considerably less grammatical ability than typically developing people and are slowed linguistically (Rondal and Edwards, 1997). That is, linguistic ability is restricted in people with intellectual impairment in comparison to typical adults. Further, many are limited to producing short, simple sentences that are frequently grammatically incomplete (Rondal and Lambert, 1983). Nevertheless, individuals with mild to moderate intellectual impairment can go on to acquire the necessary skills to function in an informative manner as speakers and listeners within the context of everyday interactions.

In an early review of the literature, Rosenberg (1982) highlights a number of fairly robust features relating to language development among this population. These are 1) a developmental lag in the acquisition of linguistic performance (syntax, semantics, and phonology) with landmarks appearing at a later age than typically developing children, and with 2) individuals progressing through similar stages of acquisition as typically developing children, but 3) attaining lower overall achievement. Rosenberg (1982) concludes that mental age (M/A) better predicts language performance than chronological age (C/A) for this population (e.g. Bartel, Bryen & Keehn, 1973, cited Rosenberg, 1982) and that environmental factors, such as institutionalisation, can disadvantage individuals in some areas of language functioning (e.g. vocabulary acquisition). This final point is important and is endorsed in several studies looking more generally at the influence of environmental factors on the communicative success of individuals in community and institutionalised settings (e.g. Blackwell et al, 1989; van der Gaag, 1989b; Brinton and Fujiki, 1993). This will be discussed in more detail in Section 3.4 on the influence of communication environment. Rosenberg (1982) qualifies his concluding remarks,

however, by acknowledging that differences in methodology and data analysis across studies make it difficult to interpret and compare research findings too rigorously.

Rondal and Edwards (1997) explore the possibility that language skills continue to progress beyond adolescence in individuals with intellectual impairments. They found no evidence of progress in the phonological and receptive morphosyntactic aspects of language past the age of 12 – 14 years, though some improvement was evidenced in the comprehension and production of referential lexical ability and in pragmatic aspects of conversation. Increases were also found in lexical diversity from childhood through to adolescence. Communication ability and the way that language is used can therefore continue to mature throughout different stages of development and holds no one-to-one relationship with other cognitive measures such as M/A or IQ.

The relationship between receptive language ability and cognitive development is as yet unclear (Abbeduto, Furman and Davies, 1989). For example, Bartel et al (1973, cited Rosenberg, 1982) used the Carrow Experimental Test of Linguistic Comprehension (Carrow, 1968) to assess syntactic form class, grammatical morphemes and sentential knowledge of 9 – 13 ys old children with intellectual impairments (M/A: 2; 8 – 6; 0; IQ: 23 – 50). It is unclear from Rosenberg (1982), however, how M/A and IQ were assessed in this study. Bartel et al (1973) found that performance was poorer on certain grammatical morphemes and passives when compared to typically developing children matched on M/A. Although M/A and IQ were found to correlate highly with test output measures, performance did not improve incrementally on some items concurrent with increases in M/A. This suggests delay in specific aspects of receptive language processing.

These findings contrast with those described by Wheldall (1976). He found that typically developing children and those with intellectual impairments matched on verbal IQ (P.P.V.T; Dunn, 1959) did not differ in their overall performance on a forced choice

syntactic structure task. Cromer (1975) proposes that there may be a critical level below which typically developing individuals and those with intellectual impairments will be less able to deal with abstract linguistic structures. He found that people with a M/A of 6:3ys (established from a picture vocabulary) were able to distinguish between the surface structure of sentences manipulated for adjective use, while those below this level could not. This complements the view expressed by Abbeduto et al (1989) that below average M/A receptive language scores may be characteristic of individuals only at certain specific developmental levels.

A number of possible explanations may account for inconsistent in these studies. For example, specific areas of receptive language knowledge may be differentially impaired in people with intellectual impairments and studies testing discrete features of language acquisition may reveal delay depending on the linguistic form presented. This was investigated by Abbeduto and colleagues (1989). They looked at the relationship between receptive language and cognitive development as a function of linguistic form and M/A in typically developing children and those with intellectual impairments. The children were matched according to M/A ability (5 ys, 7 ys and 9 ys); IQ did not differ within each of the three groups. Receptive language skills were assessed using the Test for Reception of Grammar (TROG, Bishop, 1982). Abbeduto et al (1989) found that receptive language performance fell below that predicted from M/A measures for certain linguistic features in individuals with a M/A of 7 ys and 9 ys, but not for those with a M/A of 5 ys. This suggests that language comprehension may be lower than predicted as a result of specific linguistic deficits. Areas of difficulty included comparatives/absolutes, reversible passives, post-modified subject, x not y and above/below. These authors also grouped individuals according to whether their TROG scores were low for, commensurate with, or high for Leiter M/A measures. What is unclear from these procedures, however, is whether the Leiter International Performance Scale is a non-verbal assessment of M/A or if findings are

complicated by a verbal/non-verbal combination test. Asynchrony was defined as a discrepancy of one year or more between TROG and M/A scores. They found that the majority of children with a M/A of 7ys (55%) and 9ys (60%) evidenced receptive language delays of at least one year: 45% of individuals were found to lag 18 months beyond that predicted from M/A measures. No difference was found for those with a M/A of 5ys. Abbeduto et al (1989) conclude, however, that it would be overly simplistic to suggest that all individuals with intellectual impairments perform at receptive language levels below that predicted from other cognitive measures. Variations occur according to the linguistic form to be comprehended as well as within and between groupings based on M/A score.

Some similarity has been noted in the development of receptive semantic knowledge in typically developing children and those with intellectual impairments. Rosenberg (1982) suggests that although semantic knowledge develops at a slower rate in individuals with intellectual impairments than age matched typically developing children, the course of development is nevertheless similar in both populations. For example, he describes a study where children matched for mean length of utterance (MLU) performed similarly on tests of semantic relations expressed in telegraphic two word expanded and partially nonsensical utterances (Duchan and Erickson, 1976). Although some differences were found between the children with intellectual impairments (C/A: 4: 0 – 7:9; IQ: 50 – 80; MLU: 1.67) and typically developing children (C/A: 1:6 – 2:7; MLU: 1.56), overall performance was similar for both groups.

Receptive language ability appears, then, to lag behind that predicted from measures of cognitive development (M/A), at least in some aspects of linguistic performance and at certain levels of ability, but may share the same developmental route as in typically developing children. It is important to recognise, however, that receptive language is also influenced by a number of factors over the lifetime of an individual and so should not be

regarded as a static entity or equivalent across different communicative situations. Much will depend on context of the interaction and the communicative experience of individuals. This will be discussed more fully in Section 3.4 on the influence of the communicative environment.

Research looking at expressive language production tends to suggest a reduction in the rate of development (Rosenberg, 1982), though some similarity has been noted with typically developing children (e.g. Lozar, Wepman and Hass, 1973). These authors report that children in their study produced a similar percentage of words across syntactic form classes. They used cards to elicit speech samples from two groups of children with intellectual impairments (institutionalised/non-institutionalised) matched on C/A (11ys), M/A (7 ys) and IQ (61) and typically developing children measured for receptive language ability (Peabody Picture Vocabulary Scale (PPVT) (Dunn, 1959) score of 90 or higher). Differences were found in the overall volume of speech tokens produced by the groups of children, with typically developing children producing more words than those with intellectual impairments, but not in the form of syntactic class. Similarly, Lackner (1968) found no qualitative difference in the syntactic rules governing productions in five individuals with intellectual impairments (C/A 6:5ys – 16:2ys; M/A 2:3ys – 8:10ys) and typically developing children. They elicited samples of spontaneous speech, naming and sentence imitation from each participant and found that although individuals with an intellectual impairment evidenced less variety in their syntactic array than typically developing children, they used the same underlying syntactic rules. It has also been suggested by some authors that children with intellectual impairments process and structure semantic information in much the same way as typically developing children. For example, Coggins (1979) examined multi-word elicitations from four children with Down's syndrome (C/A 3; 10 – 6; 3; MLU 1.22 – 2.06) in a variety of contexts. He found that those performing at an early stage of linguistic development tended to use the same

relational meaning as typically developing children's early two word combinations and that the processes and structures by which meaning is constructed is similar in both populations. But beyond two words there is rapid divergence.

As highlighted by Rondal and Edwards (1997), however, many of today's adolescents and adults have not benefited from language programmes currently available to children with intellectual impairments. It is possible therefore that many of the individuals included in the studies reported here may not have been provided with opportunities that accurately reflect their true communication potential, or necessarily represent today's young cohort.

Bearing this caveat in mind Rondal and Edwards (1997) finds that most adult communicators produce sentences that are short and grammatically simple, and where many aspects of syntax are reduced and/or delayed. Characteristics include unstable morphology, infrequent use of subordinate clause and tense and complete omission of full syntactic passives. This supplements previous findings of low sentence complexity (ratio of compound verbs and subordinate clauses per utterance) and the infrequent use of articles and inflected verbs in adults with intellectual impairments and those with Down's syndrome and intellectual impairments (Rondal and Lambert, 1983). Rondal and Lambert observed free conversation between individuals with intellectual impairments (group 1 individuals with Down's syndrome: C/A 26 ys; IQ 45.1; group 2: C/A 28:5 ys; IQ 46.3) and a care provider. No difference was found between groups for lexical aspects under consideration (fifteen in all), though wide variation was found within groups. Mean length of utterance averaged 6 – 7 (S.D. 2.5) with around 50% of utterances grammatically complete. Nevertheless, exchanges were informationally rich in terms of the ratio of new information introduced into conversations, contributed to the continuity of ongoing discourse and were maintained successfully by individuals. Rondal and Lambert (1983) conclude that restriction in the linguistic repertoire of adults with intellectual impairments

does not necessarily lead to conversations that are devoid of informational value or are deficient in this respect. This illustrates the distinction discussed in Chapter 1 between language and communication ability.

Rondal and Edwards (1997) propose that variability reported in the use of some utterance structures within and between individuals may be accounted for in part by the extralinguistic demand of the communication environment and nature of the illocutionary acts performed. They suggest that individuals may find it more difficult to attend to and monitor their own linguistic resources as cognitive demands increase. This is not unique to people with intellectual impairments. Language production is similarly constrained in typically developing children as a function of the processing demands of external sources (Shatz, 1983). In sum, these authors find that, despite limitations in computational aspects of language ability, individuals with intellectual impairments produce semantically and pragmatically well organised utterances that are informative and appropriate to their own social situation. So adults with intellectual impairments communicate.

As with other areas of linguistic performance, then, expressive skills in people with intellectual impairments appear slowed and grammatically incomplete. Though syntactically constrained in short utterances, productions are nevertheless functional in terms of the informational value they encode and the way they contribute to ongoing conversation. The overall level of production and/or performance of individuals may be similarly constrained by features of the communicative environment and their previous experience as a communication partner. Context therefore plays a critical role in accessing communication.

3.3 Pragmatic Development

3.3.1 Introduction

Effective communication involves more than the acquisition of linguistic components of speech. It also involves learning a variety of cognitive and social or interactive skills that are relevant to every day language use. One such skill is the ability to relate ones own utterance to what has previously been mentioned in an appropriate and meaningful way. Pragmatic rules govern the way in which linguistic utterances relate to the context of an interaction (Bates 1976), and take into account the relationship between speakers and listeners and the purpose of a conversation. Until fairly recently traditional language programmes for adults with intellectual impairments tended to be highly structured and focused on a one-to-one basis with clinicians away from the context of everyday interactions and language use (e.g. Halle, 1988; van der Gaag and Dormandy, 1993). Furthermore, many were based on research aimed at improving children's language skills and concentrated on similarities and/or differences between child acquisition and mental age match, routinely ignoring the age, social experience and requirements of an adult population (Owings and Guyette, 1982; Bedrosian and Calculator, 1988). As a result, therapy programmes were frequently so constrained by their focus on the linguistic components of language use that they bore little resemblance to normal adult conversational interactions. Many failed to meet the functional requirements of individual needs (Bedrosian, 1988) or to generalised beyond clinic settings (Halle, 1988; Remington, 1997).

More recently focus has shifted towards training care staff in the practice of effective communication skills (e.g. van der Gaag and Dormandy, 1993; McConkey et al, 1999; Bradshaw, 2001), and on those aspects of verbal behaviour that are critical to the success of a wide range of conversational exchanges (Abbeduto, 1991) i.e. pragmatic development. This is because it has been assumed that deficits in these aspects of communication will

limit an individual's ability to participate in society and during everyday conversations (e.g. Owings, McManus and Scherer, 1981; Bedrosian, 1988; Abbeduto, 1991). This involves recognising that individuals require skills that can be used flexibly in a variety of conversational settings and for a number of different functions (e.g. Abbeduto and Rosenberg, 1992; Remington, 1997) i.e. those that underpin communicative success rather than purely linguistic elements of language use. These skills have been extensively researched by Abbeduto and colleagues and a number of other authors and are discussed fully below.

3.3.2 Comprehension monitoring

Effective communication requires that interlocutors work together to ground information well enough for current purposes (Clark, 1996). This requires that speakers and listener collaborate to monitor their own and partner's understanding of messages and signal and repair breakdown as soon as it occurs, e.g. 'eh?' and 'that doesn't work for me'.

Conversational repairs are joint actions (Clark, 1996) performed by speakers and listeners to manage breakdowns in communication. Here, speakers revise and adjust their utterances in response to listener feedback (Schegloff et al 1977) so that coherence and meaning are maintained.

Studies looking at comprehension monitoring in adolescents and adults with an intellectual impairment have found that in the main, listeners are able to detect and signal non-comprehension in a variety of settings (Abbeduto and Rosenberg, 1980; Brinton and Fujiki, 1996; Abbeduto et al, 1997). This has been evidenced in individuals with mild to moderate impairments (e.g. Fujiki and Brinton, 1993) and those with more severe intellectual impairments (Brady, McLean, McLean and Johnston, 1995). Consistency of monitoring, however, may vary according to a number of factors including, overall cognitive ability (Longhurst and Berry, 1975), the conversational setting (Bedrosian and

Prutting, 1978) and the source of non-comprehension (Abbeduto et al, 1997). For example, ambiguity may be more difficult for some individuals to detect than unintelligible, inappropriate (Fujiki and Brinton, 1993) or incompatible messages (Abbeduto et al, 1999). This is now discussed.

Adults with moderate intellectual impairments initiate repairs and requests for more information, at least in informal settings. Abbeduto and Rosenberg (1980) looked at the use of adjacency pairs and repair mechanisms during peer mealtime conversations of seven adults (C/A 22ys – 31ys) with moderate impairments. They were particularly interested to find out if individuals recognised and responded to the obligatory nature of certain speech acts (see Chapter 2, Section 2.2.5 on adjacency turns), such as question and answer sequences. They coded dialogues according to the nature of the speech act (obligatory/non-obligatory) and the responses produced by partners. Two codes were assigned to repairs: request for more information and request for clarification. Abbeduto and Rosenberg (1980) found that all seven participants produced repair eliciting devices and that communication partners responded to these appropriately. So people with moderate intellectual impairments demonstrate awareness of the need to collaborate with their partner where communication demands are low. This complements the finding reported by Bedrosian and Prutting (1978) that adults with moderate to severe intellectual impairments signal request for repair. These authors recorded the conversations of four adults (C/A 23ys – 28ys) with three familiar partners: a peer, a care provider and a typically developing child. They found that all four participants signalled ‘communicative distress’ with at least two communication partners by requesting the restatement of a previous utterance. Finally, Warne and Bedrosian (1986, cited Bedrosian, 1988) propose that repair initiations are more likely where the referents are absent and unrelated to the ongoing conversation than where they are absent and related. This suggests that

individuals monitored their own understanding of previous messages and were aware of changes in the topic of conversations.

A number of factors appear to influence the use of repair devices in adults with intellectual impairment. For example, Fujiki and Brinton (1993) investigated the ability of adults with mild and moderate intellectual impairments (mean IQ 61.4 C/A range 20 – 42ys) to self-monitor comprehension in a direction following task involving three types of trouble source. These were:

- 1) An unintelligible word was used to substitute a key word in the direction e.g. ‘give me a green /glib/’.
- 2) The investigator used an ambiguous referent to ask for an item e.g. ‘give me a rubber band’ when there were several different colours available.
- 3) The investigator requested an object not present (compliance problem) e.g. ‘give me a toothbrush’ when no toothbrush was present.

Data was analysed according to whether there was sufficient monitoring e.g. a verbal or non-verbal request for clarification, or insufficient monitoring e.g. the participant searched for the object. Fujiki and Brinton (1993) found that effective monitoring was the most frequent observed response (74%), and that participants identified compliance problems most frequently, and unintelligible trouble sources more often than ambiguous statements. Analysis of ineffective monitoring revealed that on eight to fifteen percent of trials, participants gave some non-verbal indication that they realised there was a problem (such as tensing the body), but failed to request clarification. They concluded that individuals with intellectual impairments experienced difficulty detecting and resolving comprehension problems beyond that predicted from their general level of functioning (IQ), particularly in response to ambiguous statements. What is unclear from this study, however, is whether individual’s comprehension skills were commensurate with, or below,

that predicted from cognitive measures. It is possible that the ability to comprehend specific forms of questions and instruction may have influenced performance on this task.

Abbeduto, Davies, Solesby and Furman (1991) also investigated listener response to ambiguity. They were interested to find out how effectively children with mild to moderate intellectual impairments (mean C/A 9:8ys; IQ 50 – 65; M/A 6. 4ys; receptive language 5:2ys) and a control group of typically developing children (M/A match) used conversational context and clarification requests, such as ‘which one?’, to resolve ambiguous statements. Matching individuals in this way i.e. according to cognitive ability (M/A) does not, however, necessarily guarantee parity in terms of receptive language skill. These authors report that receptive language scores were significantly lower for the children with intellectual impairments in comparison to the control group but that this was not unusual where individuals are matched on measures of M/A. However, this observation fails to address discrepancies that might occur in the participant’s ability to comprehend and respond to test items.

The experimental task was a shop keeper/customer role-play situation where the investigator (customer) requested objects from the child (shopkeeper) using either the determiner ‘that’ or the indefinite ‘a’ and a noun. The determiner ‘that’ was used to signal interest in a particular object e.g. ‘hand me that wallet’ whereas an indefinite noun phrase indicated interest in the category of objects. It was predicted that using a definite noun phrase when two alternative options were available would produce ambiguity for listeners (children). Abbeduto et al (1991) found that both groups of children were equally effective at isolating salient cues from the context of an utterance and used this information when confronted with messages containing multiple referents. They were also equally likely to seek confirmation of referents using the request ‘this one?’ when the investigator used a definite noun phrase rather than an indefinite one. However, when confronted with a

context that did not allow the speaker's message to be disambiguated (i.e. where requests were non-specific), children with intellectual impairments were less inclined to request clarification from the investigator. Here, typically developing children were more likely to request clarification by asking 'which one?'. These authors suggest that children with intellectual impairments may lack strategies for gaining additional information when it is not available from the context of a conversation and/or make unwarranted inferences about speaker goals. However, disparity between receptive language skill and M/A scores may also have contributed to performance outcome. Individuals with intellectual impairments may have been less equipped to deal with these types of requests based purely on their ability to comprehend ambiguous requests. The saliency or otherwise of specific lexical items may be but one factor contributing to the performance of individuals in this study.

Requests for repair nevertheless appear to be used inconsistently by people with intellectual impairments, even where messages are clearly inadequate. Rueda and Chan (1980) report that adolescents (C/A 15.75ys; IQ 44 (range 35 – 50)) infrequently asked for clarification or modification of inadequate messages unlike typical adults in their study. They suggest that this may be because individuals failed to adequately monitor their own understanding or were aware of the inadequacy of messages but failed to signal this to their communication partner. Abbeduto (1991) proposes that variation in requests for repair may be a function of situational features, such as uncertainty about when to initiate repairs, or the relationship between speakers and listeners. Further, they suggest that inconsistency in the use of clarification requests is not unique to this population, but can also be found in younger typically developing children (Shatz, 1983). Willingness to engage with other speakers and listeners can also be influenced by the interlocutor's previous communication history (e.g. Lindsey, 1986; van der Gaag and Dormandy, 1993).

Another speaker skill is the ability to respond appropriately to listener feedback. Adults with intellectual impairments do respond to requests for repair using verbal (e.g. repetition of part of a message) and non-verbal (e.g. gestural) means, though less frequently than typically developing children (Abbeduto and Rosenberg, 1980; Brinton and Fujiki, 1991). Brinton and Fujiki (1991) invited 22 adults from community (mean IQ 61.45; mean C/A 30 ys) and institutional (IQ 62.23; C/A 28 ys) settings to take part in dyadic conversations. They used stacked sequences of three requests for clarification of the same message; 'huh?', 'what?' and 'what?'. They found that the number of responses decreased significantly from the first request to the second request and from the first and second request to the third request, concurrent with increases in inappropriate responses, e.g. failure to respond, off topic utterances. Individuals used a variety of repair strategies, including repetition of all or part of a message and revision of messages with or without the addition of new information. Brinton and Fujiki (1991) conclude that although individuals with intellectual impairments appear to recognise the intent behind a request for clarification, they tend to respond less frequently to each of the three requests than 5 – 9 year old typically developing children. They propose that this may be due to 1) lack of sensitivity to listener feedback, 2) the perception that their original message was not appropriate and 3) a lack of persistence and/or motivation to persevere due to previous unsuccessful conversational experiences.

It is important to recognise, however, that adults with intellectual impairment have considerably more experience of communicative exchange than most control group participants i.e. typically developing children. A great many of these encounters may have been less than helpful or encouraging in assisting individuals to develop effective communication strategies (e.g. Cullen, 1988; McConkey et al, 1999a, b; Bradshaw, 1998). This can lead to the appearance of reluctance or unwillingness to contribute during

communicative exchanges with other speakers and listeners, even when able to do so (e.g. Lindsay, 1986; Booth and Booth, 1996).

Response to feedback may also be dependent on the type of signal produced by communication partners and/or an individual's cognitive ability (Longhurst and Berry, 1975). These authors found that individuals with a higher level of need were less effective at interpreting gestural and implicit feedback than those with borderline impairments, though less difficulty was encountered during explicit feedback. Feedback type differed in that the explicit forms contained specific information regarding the inadequacy of the previous message e.g. 'Look at it again, what else does it look like?' During implicit feedback, such as in 'I don't understand', the experimenter indicated that he could not guess correctly but did not inform the participant about what information might be helpful. Gestural feedback involved changes in facial expression indicating uncertainty. This trend is similarly found in younger typically developing children (e.g. Sonnenschein, 1984).

In summary, individuals with intellectual impairments initiate and respond to requests for repair. Consistency of use, however, may vary according to a number of factors including the context of an interaction, the linguistic demands of the interaction and the challenges these represent to speakers and listeners.

3.3.3 Turn-Taking

Conversations are usually organised so that one person speaks at a time. Turn taking is the basic form of structure for organising conversation (Sacks et al, 1974) as it allows speakers and listeners to construct communicative exchanges in an orderly fashion. Studies looking at turn-taking mechanisms in adults with an intellectual impairment have typically involved analysis of the occurrence of errors in speaker exchanges such as interruption rates (Abbeduto, 1991). These suggest that individuals with intellectual impairments

are able to manage turn-taking almost as effectively as typical people (Abbeduto and Rosenberg, 1980; Warne and Bedrosian, 1986, cited Bedrosian, 1988) and appear to use the same mechanisms for doing so (Abbeduto and Rosenberg, 1980). For example, individuals may halt their verbal contribution to a conversation during overlap with a preceding or subsequent speaker (Warne and Bedrosian, 1986, cited Bedrosian, 1988) or reintroduce interrupted utterances.

Abbeduto and Rosenberg (1980) propose a relationship between turn-taking proficiency, the ability to use conversational obligation (adjacency pairs) (Schegloff and Sacks, 1973) and the extent to which individuals actively participated in the exchange of information during conversations. They found that individuals less proficient at turn taking produced the most communicative failures and contributed at a lower rate i.e. were more passive during interactions. Turn-taking errors were described as overlaps in speaker utterances or interrupted speech. Communication failure represented episodes where listeners failed to respond appropriately to the first part of an adjacency pair, for example, question/answer sequences. Intelligence quotient was not related to any of these measures. However, as highlighted by Rosenberg and Abbeduto (1993), a degree of caution is required when interpreting research looking at turn-taking skills based on current knowledge. Turn-taking rules differ according to the communicative context of an interaction (Sacks et al, 1974), and it is likely that the performance of individuals with an intellectual impairment will be affected by situational changes. Much of the research looking at turn-taking skills has occurred in familiar surroundings where the purpose of the interaction is clear and during fairly simple cognitive tasks. Differences may occur when the conversation is less straightforward or where interlocutors are previously unknown to one another.

Some violations may be purposeful. For example, gaps left between speaker turns may signal uncertainty, embarrassment or yield authority to co-correspondents (van der Gaag

and Dormandy, 1993). Interruptions and overlapping speech may also be part of the collaborative process entered into by interlocutors as they attempt to ground information (Clark and Brennan, 1991). Taken from this perspective, overlapping speech can be seen to reflect the pursuit of joint speaker and listener projects (Clark, 1996) during ongoing discourse rather than errors of co-ordination. The frequency of overlapping speech and/or interruptions may simply reflect the formality of interactions and not necessarily difficulty in the management of turn-taking.

3.3.4 Speech acts and adjacency turns.

For conversations to remain cohesive, the content of successive turns must relate in some way (van der Gaag and Dormandy, 1993). Adjacency turns (Sacks et al, 1974) are speech units made up of first pair part and next turn responses and permit speakers to maintain control of an interaction by allowing them to select which addressee speaks next.

Responses are constrained by their affiliation to the first part initiation as during question and answer sequences. Abbeduto and Rosenberg (1980) found that individuals with mild intellectual impairments were able to recognise the assertion or request (illocutionary force) behind speaker initiations and respond to them in an appropriate and meaningful way (perlocutionary effect). They propose that individuals manage speech acts appropriately using adjacency sequences such as questions and answers, at least during informal interactions with peer partners.

A number of studies suggest, however, that question and answer sequences may create difficulties for some individuals. This is reflected in a tendency toward response bias in acquiescence (e.g. Sigelman, Budd, Spanhel and Schoenock, 1981; Bicklen and Mosely, 1988) and/or withdrawal from conversations (e.g. Booth and Booth, 1996). Shaw and Budd (1982) propose that acquiescence may occur as a function of cognitive ability and perception of the social desirability of a response. They found that participants with more

severe impairments contradicted themselves in response to questions relating to prohibited and permitted behaviours (e.g. is it against the rules to / are you allowed to). The direction of bias varied according to the type of question posed to individuals. No/no responses were more common in response to prohibited questioning whereas yes/yes was much higher for permitted or desirable behaviours. Shaw and Budd (1982) conclude that familiarity with a topic (i.e. whether it is desirable or prohibited) and style of questioning (whether it exceeds individual's language abilities) will in part predict proclivity towards, and the direction of, biased responses to closed type questions. This reflects in part then the social experience of individuals and how lifetime events can influence communication style. Individuals may come to adopt a particular communicative posture in response to previous encounters a speaker or listener and their perception of the success or otherwise of these encounters.

Question type can also influence response rate. For example, it has been found that open style questions, i.e. where there could be a number of different possible answers, increases responsiveness in comparison to closed yes/no style questions (e.g. Money, 1997; Purcell, McConkey and Morris, 2000). Responses may also be more valid during open style questioning than where the format requires a simple yes/no answer (Prosser and Bromley, 1998). However much can depend on the individual's strengths and level of need. A number of studies have shown that responding to open questions can be particularly challenging for people with intellectual impairments (e.g. Bicklen & Mosely, 1988; Booth and Booth, 1996) especially where needs are higher, that is where receptive and expressive language skills may be more constrained (Prosser and Bromley, 1998). The research suggests that open questions may overwhelm some individuals and that information should be broken down into smaller component parts so that several questions can address the focus of a topic. This can facilitate clearer understanding and increase the likelihood of a response. Multiple choice type formats and either/or questions may also be useful as a

means of avoiding systematic response bias (Sigelman, Budd, Winer, Schoenrock and Martin, 1982; Prosser and Bromley, 1998) as they are more constrained than open questions, but not leading. Sigelman et al (1982) suggest that response rate can be high to yes/no questions in comparison to open ended questions but that they raise concerns relating to response bias. Individuals with intellectual impairments overwhelmingly acquiesce in response to yes/no questions, especially where the question is not understood or the answer is unknown (Sigelman et al, 1981). Therefore questioning style and the content of questions can influence both the direction and likelihood of a response.

Research looking at the comprehension of speech acts in people with intellectual impairments indicates developmental delay, with performance sometimes below that predicted by receptive language measures (Abbeduto, Davies, and Furman, 1988; Abbeduto, 1991; Rosenberg and Abbeduto, 1993). Abbeduto et al (1988) examined the ability of children with intellectual impairments (mean IQ 63.2) to use contextual and linguistic cues as predictors of speaker intent. They examined the use of utterances that could be interpreted as yes/no questions (interrogatives) or as requests for action (declaratives) depending on the available contextual cues. They proposed that typical adults follow an 'answer obviousness' rule (Clark, 1979) whereby utterances are interpreted as questions if the answer is not obvious to the speaker but as a request for action where it is. Answer obviousness was manipulated according to contextual (compatibility/incompatibility of the request) and linguistic (would you?, could you?, and do you think?) cues. They found that individuals with intellectual impairments (M/A 5 ys, 7 ys, 9ys) and a group of typically developing children (matched on M/A) demonstrated some form of answer obvious rule. Speech act comprehension was not related to receptive language ability for either group and was predictable from measures of M/A in individuals with intellectual impairments. Abbeduto et al (1988) propose that both groups of children

gradually develop the necessary skills to identify salient contextual clues from the context of an utterance and rules to decide between interrogative and declarative forms. Further, they suggest that mastery of conversational rules, and the strategies to acquire them, develop separately from the acquisition of grammatical knowledge and the ability to recognise speaker intent. They suggest that the systems eventually become integrated towards one capable of identifying speech acts and the ability to use them productively during everyday interactions. This is similar in principle to the proposal by Shatz (1985) that language develops progressively through the combination of internal cognitive processes and the communication environment. She suggests that early, more primitive language systems eventually become integrated with more specialised and sophisticated programmes through sensitivity to communicative environmental and the constraints placed upon them by internal regulatory mechanisms. This ensures the preservation of structures critical to language acquisition despite variations in the quantity and quality of the external communicative environment.

Further evidence of a disparity in pragmatic development and other areas of language development is reported by Rosenberg and Abbeduto (1993). They describe one study where children with Down's syndrome displayed more mature pragmatic awareness in response to maternal initiations than typically developing children matched on mean length of utterance (Leifer and Lewis, 1984, cited Rosenberg and Abbeduto, 1993). So awareness of, and responsiveness to, various aspects of pragmatic development may mature at a different rate from other linguistic measures. These findings may also reflect experiential differences in comparison groups when matched on mean length of utterance.

Studies looking at the production of illocutionary acts in adults with moderate intellectual impairment have found that these individuals produce the same acts as typical people and

can use them for various functions in different situations (Abbeduto and Rosenberg, 1980; Owings and McManus, 1980; Owings et al, 1981; Warne and Bedrosian, 1986, cited Bedrosian, 1988). A number of these have examined speech act production following segmentation of conversations into broad categories of acts depending on the intention of the speaker, as described in Chapter 2, (Section 2.2.1) on speech acts. For example, Abbeduto and Rosenberg (1980) coded peer mealtime conversations according to whether turns were considered to be obligatory or non-obligatory. Non-obligatory turns do not obligate the listener to respond but may be responded to in agreement, disagreement, or acknowledgement. These included:

- 1) assertions: a speaker states a proposition he/she believes to be true, e.g. 'but you made it'.
- 2) commissives: the speaker commits him/herself to some future action, e.g. 'so we're extra late: I'm gonna buy some beer and drink.'
- 3) expressives: the speaker conveys feelings or opinions over a proposition, e.g. she's more important than this lousy meeting'.
- 4) questions: where the speaker obligates a response e.g. yes/no or wh- question.
- 5) requests: the speaker obligates the listener to perform an action, e.g. 'pass the apple sauce'.

Obligatory responses require co-correspondents to respond in a certain manner (Schegloff and Sacks, 1973) and failure to do so constitutes a breakdown in communication. Examples include question/answer, request/compliance or non-compliance, greeting/greeting and summons/answer. Abbeduto & Rosenberg (1980) found that interlocutors produced a high frequency of adjacency pairs and that assertions (non-obligatory) and questions (obligatory) were used more commonly than expressive, commissives and requests. This suggests that individuals engaged in question and answer sequences as a means of exchanging and gathering information and volunteered unsolicited information to their

partner when under no obligation to do so. The most frequent form of response to both obligatory and non-obligatory pairs was requests for clarification and more information. Therefore peers may have been aware of the need to collaborate with their partner if understanding is to be mutually established and maintained. Finally, Abbeduto and Rosenberg (1980) reported a low incidence of 'communication failure' (e.g. overlapping speech and interruptions) and concluded that individuals were able to recognise conversational obligation and respond to it in an appropriate manner.

Owings et al (1981) grouped dialogues involving one male adult with moderate intellectual impairments (C/A 28.4 ys; MLU 3.4, receptive vocabulary 5.3 ys) under headings of questions, information giving, commands, describe and repetition among others to examine communication in a group home setting. Interrogative forms included those beginning with a wh- (e.g. what, when, why) and yes/no questions. They found that the majority of utterances were appropriate for the speaker situation and suggest that the individual was aware of the social consequences of his actions. Of interest is that speech acts varied according to the communicative context of interactions. Owings et al (1981) report that more than half the total number of speech acts observed during recording procedures were directed towards a staff member, rather than to peers or self (self-speech). Of these, questions and information giving occurred most frequently in dialogues including a staff member whereas imitation (repetition of another's utterance) and imperatives were more commonly used during interactions with a peer. The authors suggest that these differences occurred as a result of individual's expectation of each communicative situation and the perceived appropriateness of different illocutionary acts. Therefore, despite fairly profound limitations in his linguistic repertoire, this individual demonstrated flexible use of a number of speech acts across various communicative situations.

So despite initial delays, individuals with intellectual impairments may eventually come to attend to the salient dimensions of a conversation and select and produce speech acts according to their current understanding of the context of the interaction. As listeners, they recognise the functions of a variety of speech acts and act on them appropriately with familiar partners and during simple tasks (Bedrosian and Prutting, 1978; Abbeduto and Rosenberg, 1980; Abbeduto and Rosenberg, 1992). This facilitates performance of, and access to, the same basic social acts as typical people and the ability to use them as a means of initiating conversation and maintaining social interaction. Why is it, then, that communication is reported to break down during everyday situations? A number of points appear relevant to current discussions:

1. Most of the studies reported here have included individuals with mild – moderate intellectual impairments interacting with familiar partners in fairly predictable communicative situations (e.g. meal times). This does not necessarily guarantee that individuals will be able to attend to salient features of discourse in more linguistically challenging situation, such as where speech acts are embedded within other illocutionary acts. Difficulty may also occur where the topic of a conversation is less predicable from its immediate context and/or includes unfamiliar co-correspondents (Rosenberg and Abbeduto, 1993). It does not necessarily follow that findings reported here will generalise to individuals with a higher level of need.
2. Communication is collaborative and so the outcome of an interaction is influenced by the expectations of both speaking and listening partners. A number of studies have shown that some non-impaired interlocutors, such as care providers, may be less sensitive to the communicative needs of individuals (e.g. Stillman et al, 1997). For example, it has been reported that carers tend to misjudge how frequently they rely on verbal forms of initiation and overestimate their use of non-verbal forms of communication, such as gestures (Bradshaw, 2001a). Overestimation of client's

comprehension ability by care providers has also been reported by several authors (e.g. McConkey et al, 1999; Bartlett and Bunning, 1997).

3. Equally, some adults with intellectual impairments may be reluctant to engage in interactions where the partner and/or context is unfamiliar, as a result of previous communicative experiences (e.g. Lindsay, 1986; van der Gaag and Dormandy, 1993; Rowlands and Schweigert, 1993). Communication may break down where interlocutors are not sensitive to this. These points (points 2 and 3) are discussed in more detail in the following section on the communicative environment.
4. Adults with intellectual impairments frequently depend on others to meet their needs (e.g. Cattermole et al, 1988; Grove et al, 1999) and this can lead to asymmetry in their relationship with communication partners (e.g. Mirenda and Iacono, 1990, Bartlett and Bunning, 1997, Leudar, 1997). Individuals may, therefore, be reluctant to assert their viewpoint where misunderstanding occurs and instead feign understanding or agreement. It is clear that individuals with intellectual impairments are sensitive to negative feedback from others (van der Gaag and Dormandy, 1993) and experience difficulty asserting control during interactions (Bedrosian and Prutting, 1978). Communication partners therefore play a critical role in facilitating individual's equal contribution during interactions.

3.4. Communication environment

Effective communication results from the co-ordinated joint actions (Clark, 1996) of speakers and listeners. Therefore, the success or otherwise of an interaction is influenced by the level of collaboration between interlocutors and how effectively they are able to co-construct mutual understanding. For communication to be optimal, the verbal and non-verbal contributions of speakers must meet the underlying needs of the communication partner so that messages are understood and can be responded to appropriately (van der Gaag and Dormandy, 1993; Bartlett and Bunning, 1997). Over recent years, increased

focus has been placed on the communication environment of individuals with intellectual impairments and their care providers (Bartlett and Bunning, 1997) as this has been found to exert a profound influence on the types of experiences encountered by this population (Cullen, 1988).

Adults with an intellectual impairment typically under use their communication skills in situations that fail to make sufficient demands on them to communicate (van der Gaag, 1989b). In particular pragmatic skills, such as initiating and responding to illocutionary acts, appear susceptible to the influence of the communication environment. Van der Gaag (1989b) suggests that opportunities to practise communication skills increases individual's willingness to engage in communicative encounters and the overall proficiency with which they can utilise their available linguistic repertoire. This reinforces the notion that the communication environment exerts a powerful effect on the ability to communicate effectively (e.g. Money, 1997), and that effectiveness in one situation does not necessarily guarantee adequacy in another (e.g. Owings and Guyette, 1982; Leudar and Fraser, 1985; Halle, 1988). It is important, then, that the communication abilities of individuals with intellectual impairments are investigated in a variety of different contextual settings and for different communicative functions (e.g. Bedrosian and Prutting, 1978; Owings et al, 1981; Halle, 1988). Goals should focus around the functional requirements of individuals i.e. those that occur in everyday settings, meet his/her communication and environmental needs and influence the surroundings (Owings and Guyette, 1982; Bedrosian, 1988; Rowlands and Schweigert, 1993). This increases the likelihood that skills will be maintained beyond a clinical setting and generalise to different communicative situation (Halle, 1988; Remington, 1997).

Halle (1988) broadly defines functional communication as the linguistic skills required by individuals that allow them to participate in any given communicative context. Rowlands

and Schweigert (1995) outline three main characteristics of functional communication. These are that 1) it occurs in everyday or 'real life' situations, 2) it is effective in influencing the communicative environment, which in turn responds to speaker intent, and 3) individuals are able to use their communication skills flexibly as and when required to do so. Butterfield and Arthur (1995) argue that functional communication must include expressions of personal preference (e.g. indicating choice, requesting) and more social dynamics of interaction that are relevant to the individual such as joint attention, i.e. establishing a temporal relationship between the initiation of a communicative act and the attention of listeners, and turn-taking. They view the role of conversational partners as critical to the development of functional communication as they can provide opportunities for individuals to initiate interactions and also respond in a consistent manner to speaker initiated behaviours. Increasing personal choice and the opportunity to engage with other speakers and listeners forms part of the cornerstone to greater social inclusion for people with intellectual impairments (O'Brien, 1987; Scottish Executive, 2000; Department of Health, 2001). Functional communication can help to facilitate this process by providing individuals with the skills to maximise their communicative repertoires and bring about change.

Problems can occur however, as a result of the way that some non-impaired speakers approach these communication episodes. For example, a number of studies suggest that carer providers may overestimate their clients' comprehension abilities and misinterpret their ability to communicate (McConkey et al, 1999a, b; 1999; Purcell et al, 1999), and that this may prevent them from communicating effectively. This is evidenced most clearly in research looking at the communication environment of people with severe and profound intellectual impairments. Here, verbal and non-verbal strategies used by carer providers frequently fail to meet client needs (Bradshaw, 2001a, b), leading to fewer opportunities for self-advocacy and/or social interaction. For example, Bradshaw (1998) reports on

communicative exchanges between care staff and a male adult with severe intellectual impairments, profound hearing loss and challenging behaviour. She found that exchanges took place at a surprising low rate (1.18 per minute) and that 28% of communication acts initiated by staff were unsuccessful. This was because care staff failed to attract the client's attention prior to initiation (26%) and tended to use a mode of communication not suited to his needs (verbal: 19%). Intervention focused on a holistic approach towards increasing deaf awareness among staff members and the appropriate use of signs to support communication acts. This resulted in increased initiations on the part of the client through signs and non-verbal signalling (gaze) and a reduction in the level, duration and frequency of challenging behaviours. Bradshaw (1998) lends support to previous opinion (e.g. Kaiser and Goetz, 1993; Remington, 1997) that assessment and intervention of communication must take place within the context of the communicative environment as 'challenges to participation in communication exchanges involve both the person with a learning disability and staff' (Bradshaw, 1998).

Conversational maxims (Grice, 1975) normally associated with communicative exchange may be violated where one individual is intellectually impaired (Leudar, 1997). These relate to quantity, quality, relation and manner, as described in Chapter 2, Section 2.2.3. Grice (1975) proposes that speakers and listeners interact under the broad assumption that these conventions or maxims are in place and that they act to constrain speaker utterances according to the felicity of their contribution. Where maxims appear to be violated, listeners reinterpret messages so that meaning and implication is preserved and information can be disambiguated. Leudar (1997) illustrates how maxims of relevance and quality are frequently violated during interactions between people with intellectual impairments and other individuals, and suggests that even obviously true and indisputable utterances are often treated as if they require validation (see Extract 1 below).

Extract 1. Example of dialogue where the maxim of quality is violated (Leudar, 1997).

(R = Instructor; K = female adults with intellectual impairments)

R: so have you saved up any money for Christmas?

K: yeah.

R: have you?

K: yeah.

Leudar (1997) argues that the reply given by R violates the maxim of truthfulness in K's reply and that somehow she is untruthful or uncertain regarding her actions. Further, he suggests that this is typical of interactions where co-correspondents are differentially disempowered, such as during interactions involving people with intellectually impairments and care professionals. He proposes that the reification of communication disorders in people with intellectual impairments is due in part to the focus of researchers on the manner in which individuals may violate certain communicative norms, rather than distortions and/or lack of opportunity in their communication environment. Leudar (1997) proposes that two problems result from such violations: a) conversational maxims are suspended during these exchanges and b) conventions are not reapplied in future conversations. He concludes that as a rule, individuals with intellectual impairment communicate and abide by the same maxims as typical people but that the opportunity to practise and demonstrate these skills is denied through distortions in their communication environment.

Another distortion to the communicative environment occurs where interlocutors systematically misalign their communication style with the needs of co-correspondents. Purcell et al (1999) found that care staff in a residential and day service setting

systematically misinterpreted their client's ability to communicate. This included underestimating hearing difficulties, overestimating receptive and expressive language skills and poor identification of non-verbal signals. Most staff members placed responsibility for communication difficulties on client ability rather than relating this to possible inadequacies and/or deficits in the communication environment. Investigation of the same carer/client group by McConkey et al (1999a, 1999b) showed that individuals were given few opportunities to contribute as equal partners during interactions. Care providers typically adopted a didactic posture to communicative events and focused their initiations on corrective, instructional and reinforcing communicative acts. Particular difficulty was encountered by staff encoding and decoding non-verbal signals such as facial expression and posture shifts (McConkey et al, 1999b). Here, care staff consistently failed to accurately predict and recognise their own use of non-verbal forms of communication and that of the client group. Although staff members were four times as likely to initiate communicative acts than the client group, a high proportion of these were produced verbally, even though approximately 50% of the client group were non-verbal. Response rate to communicative initiatives was equivalent in both groups.

So, although clients were equally as willing to collaborate towards the completion of speech acts, they were less inclined to initiate interactions. As highlighted by McConkey et al (1999a), however, these figures mask differences in the response rate of individuals depending on whether they communicated through verbal or non-verbal means. Those relying on non-verbal communication (n = 21) responded at a significantly lower rate than those able to respond verbally (n = 22). Therefore not only were staff initiations less accessible to these individuals, they were also less likely to elicit a response. This suggests these individuals would be less able to access decisions affecting their everyday life and less likely to signal choice. McConkey et al (1999a) concludes that future initiative should focus on 1) providing carers with the necessary skills to identify individual needs and ways

of matching these to communication requirements and 2) critical evaluation of the cultural and organisational value structures of services provided for people with intellectual impairments. This may increase the probability that clients will be considered equal partners in their relationship with care providers and staff members.

3.5. Chapter conclusion

Individuals with intellectual impairments communicate. They encode and decode communication signals and engage with other speakers and listeners in circumstances that are sensitive to their needs. A major focus of this chapter has been on issues relating to communication effectiveness and the development of skills that can lead to success. One important influence on success is context or environment. This has a considerable impact on communication ability as it influences the opportunities provided to individuals to formulate and practise effective strategies that can lead to increased personal choice and self-determination. Communication environment also involves sensitivity to individual needs. A number of the studies described here have highlighted a surprisingly high level of disparity in the communication style adopted by some non-impaired individuals, such as care providers, and the requirements of people with intellectual impairments. This is of great concern as people with intellectual impairments are amongst the most vulnerable and excluded members of society (Department of Health, 2001). Carers can form an important bridge between these individuals and increased social inclusion, and so it is important that difficulties within the communication environment of client/care provider interactions are identified. This is the focus of the current study. The thesis attempts to explore and isolate features of carer/client communication style that might influence success. Particular attention is paid to the ways that care staff attempt to establish mutual understanding with their clients and how this might some times lead to communication difficulty rather than success.

Beyond this, several of the studies outlined here have shown that formal measures of linguistic and/or cognitive ability do not necessarily predict how effectively individuals are able to contribute during interactions. What appears more certain is that performance may be in some way constrained by the processing demands of the situation and individual's ability to comprehend and produce verbal and/or non-verbal cues during discourse.

Though frequently compared to typically developing children, adults with intellectual impairments communicate in different ways and for very different reasons than their usual control group counterparts, and have many more years of communicating under sometimes challenging circumstances. The current study avoids comparison to M/A matched groups by using a procedural design that allows participant's communication outcome with one partner (e.g. a carer), to be compared with that of another, in this case a student or peer.

This approach takes communication outcome as a product of the interaction between speaker and listener contributions, and effectiveness or success as a measure of level of understanding established during conversational exchange. Communication effectiveness is investigated in the current study as a function of the collaborative efforts of young adults with intellectual impairments and each of their three communication partners (carers, students and peers).

The current research adopts a similar approach to that outlined in Section 3.3.4, page 72 and classifies illocutionary acts according to speaker intention (please also refer to Chapter 2, Section 2.4 and Chapter 8 for a description of Conversational Games Analysis, Kowtko et al, 1991). Here the focus is on the transaction of propositional (information carrying) knowledge and the ways that speakers and listeners establish and maintain mutual understanding. Conversational acts are coded according to form (questions, commands and statements) and question type. Question type are those that monitor levels of understanding (Aligns and Checks), introduce previously unmentioned information into the discourse (Query-w) and require a yes/no response (Query y/n) (Kowtko et al, 1991).

Chapter 4. Referential research paradigm

4.1. Introduction

Researchers interested in the development of language and communication skills in typically developing children have found the referential paradigm a particularly useful method for eliciting dialogue from speakers and listeners. This type of communication task has been used extensively to examine a number of different areas relating to the processes of communication, such as the adequacy of speaker messages (e.g. Whitehurst and Sonnenschein, 1978), monitoring of comprehension by listeners (e.g. Lloyd et al, 1992) and the role of attribution in constructing speaker messages (e.g. Flavell, Botkin, Fry, Wright and Jarvis, 1968). Referential tasks have also been used with individuals with intellectual impairments as a means of identifying strengths in their communicative repertoire and those areas of speaking and listening that appear to be more challenging. Although the task used in the current research differs from the paradigm reported here, many of the findings generated through referential design procedures have relevance for the present research and communication in general. I will begin with a brief description of the ways that referential tasks have been used to explore issues relating to the development of language in typically developing children, before moving on to its use with people with intellectual impairments.

4.2. Referential communication

Referential communication refers to communication aimed at helping listeners to select a particular item from others that may be similar but not identical. Much of the research looking at the development of referential communication skills in typically developing people has focused on 1) the adequacy of messages 2) number of trials required to reach criterion, 3) salient features identified or omitted by speakers and listeners and 4) the extent to which ambiguity is detected and resolved (Lloyd, et al, 1992). Until recently

more collaborative aspects of communication, such as how speakers and listeners co-construct mutual knowledge (Clark and Marshall, 1981) were frequently ignored during design procedures or actively discouraged beyond single turn exchanges. Emphasis was placed instead on consideration of the adequacy of speaker messages in isolation from the response of the listener and/or the listener's ability to identify salient features from ambiguous statements.

Much of the work looking at referential communication has been based on the writings of Piaget and paradigm procedures first introduced by Glucksberg, Krauss and Weisberg, (1966). Piaget's (1926) influence on this paradigm was in his explanation of the communication failures of younger typically developing children. He suggests that children below the age of 7 – 8 years of age do not design messages for the listener, as they are unable to appreciate the point of view of another, that is, they are egocentric. This he contrasts with older children and adult 'socialised speech' where others' views are taken into account and therefore more closely match listener needs. Glucksberg et al (1966) used the referential paradigm to examine egocentric speech in children's communicative performance and their ability to take account of the needs of their listener. This involved participants sitting on opposite sides of a screen so that they could not see one another. Individuals assigned to the role of speaker were given stimulus items to describe to their partner, the listener, so that he/she could select the correct referent from a number of distracter items. A successful performance required speakers to construct unambiguous messages that enabled the listener to identify what has been referred to: success was characterised by listeners selecting the target item as described by the speaker from an array of alternative options.

Interest has focused in particular on skills that are required for effective communication and how these are influenced by cognitive and/or social development. For example,

Flavell and colleagues developed a number of tasks designed to explore the relationship between communicative success and the ability to attribute belief to others. Flavell et al (1968) proposed that individuals must acquire certain knowledge for communication to be successful, and that this relates to the ability to discriminate self from the role of others. Until this knowledge has been gained and can be used in a flexible way, communication will, on the whole, be unsuccessful. Individuals have to come to know about: 1) existence – awareness that the self and others have different perspectives of an event/object, 2) need – be able to engage in assuming the perspective of others as required, 3) prediction – be able to discriminate relevant perspectives, 4) maintenance – be able to establish and maintain the separation of ones own and another's point of view, and 5) application – use this knowledge to encode verbal messages.

According to Flavell et al (1968), breakdown in any one of these areas may lead to communication difficulty. So failure to assume the perspective of another (egocentrism) accounts at least in part for communication breakdown in younger, typically developing children.

Glucksberg, Krauss and Higgins (1975) also highlight certain competencies underlying communication performance. These are based on the ability of children to cope with different components of referential communication, aside from cognitive and other correlates of communication ability. According to Glucksberg et al (1975), individuals need to be aware and able to discriminate between a number of components of referential communication for the outcome to be successful (Glucksberg et al 1975). These are discussed in the following sections. As pointed out by Sonnenschein and Whitehurst (1984), however, communicative effectiveness can also be influenced by the context and complexity of a situation (Shatz, 1983) and so referential communication can be unsuccessful even for mature adult speakers and listeners.

4.2.1. Speaker skills

4.2.1.1. Encoding: perceptual problems

Typical adults are generally able to discriminate referents from non-referent items.

Younger children, however, tend to provide more ambiguous, redundant or non-descriptive information than older typically developing children (Flavell et al, 1968; Whitehurst and Sonnenschein, 1978). This can be due to insufficient editing of critical and non-critical features of the target and non-referent items or failure to specify referents in terms of their differentiating features (Whitehurst and Sonnenschein, 1978). Problems can also occur as children may fail to reliably encode only that information which is salient in identifying target items (Whitehurst and Sonnenschein, 1981). Speaker performance can be poor even where it has been previously shown that they possess the required and necessary skills to communicate successfully (Whitehurst and Sonnenschein, 1981). This can result from constraints placed upon younger interlocutors from the processing demands of complex communication tasks (Shatz, 1977, 1983).

Rosenberg and Cohen (1966) propose a two-stage model to account for the development of effective referential communication skills. They suggest that initially, children use a sample descriptor to label referent items and take no account of competing non-descriptor items. Through time the child learns to compare labels that describe target items with those that refer to non-referent items. Until this stage of development has been reached, he/she will be unsuccessful at uniquely identifying any given target item unless 1) the descriptor used coincidentally discriminates this from competing non-referent items or 2) referent and non-referent items are so dissimilar that they could not be confused. Typically developing children are in the main able to differentiate referent/non-referent items by around 7 – 9 years of age (Whitehurst, 1976), though much depends on the referents that are used (e.g. Glucksberg et al, 1975).

4.2.1.2. Sensitivity to characteristics of the listener and listener situation

For communication to be effective, speakers must be aware of the communicative needs of their partner and adjust their style to meet to these requirements (e.g. Flavell et al, 1968; van der Gaag and Dormandy, 1993). They should then be able to judge certain attributes of their listening partner and encode their message based on this knowledge. A number of studies have found that typical adults and children alter their communication strategies to take account of listener age/ability (e.g. Ninio & Snow 1996), and that this increases as a function of age (Flavell et al, 1968). Even younger typically developing children appear to adjust their speech to their expectation of listener needs (e.g. Shatz, 1977).

4.2.1.3. Sensitivity of speakers to listener feedback

Speakers and listeners should co-ordinate their contributions towards establishing shared goals (e.g. Clark 1996). Speakers must therefore be prepared to redesign or modify their utterances in light of verbal and non-verbal feedback from listening partners (e.g. 'what?' or 'I don't get that'). Glucksberg and Krauss (1967) found that younger children (kindergarten and first grade) appear less responsive to listener feedback than older children and preferred instead to repeat descriptions or remain silent. In comparison, adult or older children (grade 5) offered re-descriptions of referent items (e.g. 'it's like a boat' to 'it's like a hat') or modified messages in some other way (e.g. 'it's a boat with a motor on the back). However, where feedback is explicit, as in 'they're both --. Do you mean the -- or the --?', even five year olds appear able to detect inadequacy in speaker messages (Sonnenschein, 1984). This author suggests that simply witnessing a listener make an incorrect selection following an inadequate message is sufficient to inform children of the inadequacy of referring expressions. Sonnenschein (1984) proposes that the ability to respond to listener feedback may depend on whether task demands are appropriate to the age/ability of interlocutors. Performance can be influenced by the cognitive demands of the task even where the child possesses the necessary skills to discriminate and describe a

referent uniquely (Shatz, 1977, 1983). Shatz proposes four underlying principles to support this claim (Shatz, 1977). These are as follows:

1. People are limited in their capacity to process information.
2. Techniques are available for organising the resources required for complex tasks, such as the rules of syntax and turn allocation devices (Schegloff and Sacks, 1973).
3. Each technique has an associated 'workload value' and this can vary depending on the property of the technique and expertise of the speaker.
4. Combinations of weighted techniques are called upon during complex tasks but these can not exceed the capacity of the information processor.

The importance of this model is twofold (Shatz, 1977): a) it allows for attempts to be made on complex communication tasks, even where the interlocutors are not in possession of the necessary skills. b) Expertise or more efficient organisation of information processing can lower the workload value of techniques, thereby freeing up cognitive resources for other tasks. So where the cognitive demands placed upon interlocutors are high, such as during complex tasks, techniques requiring more considerable processing capacity, such as newly learned skills, may appear less frequently than where the workload is lower. Shatz (1977) proposes that this may account in part for children's variable performance on communication tasks of differing complexity.

4.2.2. Listener skills

Listeners share responsibility for the success or otherwise of a communicative episode. One skill required of listeners is the ability to monitor self-understanding of current and previous messages. Effective listeners should be able to judge their own level of comprehension and recognise ambiguity as it occurs. They must signal communication difficulty to the speaker so that he/she may attempt to repair the conversation (Sacks et al,

1974) and re-establish mutual understanding (Clark and Marshall, 1981). It has been shown that even four year olds perform reasonably well as listening partners when referents are described by adult speakers (Glucksberg et al, 1966). Performance is less successful for younger listeners, however, when interacting with age matched speaking partners in comparison to adults and older children (Glucksberg et al, 1966; Lloyd et al, 1992). Robinson and Robinson (1980) suggest that children assign blame for breakdown in communication along a continuum from speaker to listener regardless of which role they themselves assume. They designed a task where children assumed the role of speaker and listeners in partnership with an experimenter and were given ambiguous instructions as the listener, and asked to clarify ambiguous messages as the speaker. Robinson and Robinson (1980) found that five year olds tended to blame listeners for communication problems because they selected the wrong referent item regardless of speaker age, even where messages were clearly ambiguous. This may be because children of this age regard ambiguous messages as good irrespective of whether listeners select target or non-referent items (Sonnenschein, 1984). In contrast, older children (7 years old) blame speakers for communication difficulties when messages are ambiguous (Robinson and Robinson, 1980). By this age children are aware of the need to construct messages in line with listener needs whereas five year olds tend to assume that all messages are good. Children's performance on typical referential communication tasks matches that of adult communicators by the time they are around 8 –9 years of age (Whitehurst, 1976).

4.3. Limitations of using Glucksberg (1966) type referential procedures

The referential paradigm has provided a useful means of examining various aspects of the development of language in typically developing children. It creates communicative situations where one participant, the speaker, has knowledge they wish make available to another, the listener, and in this sense is typical of everyday interactions. As communication goals are usually clear to both participants and investigators, contributions

tend to be highly structured and task specific and therefore open to analysis of communicative success. Beyond this, manipulations of the communicative context of interactions allow for the investigation of specific aspects of speaker and listener behaviour in isolation from other contributing factors.

Limitations associated with the use of referential tasks tend to focus on the constraints these manipulations impose on speakers and listeners since participants are encouraged to focus on the descriptive features of target items with little or no feedback from their communication partner. As a result, contributions tend to be short, linguistically primitive and devoid of the social dimensions of everyday negotiation (Lloyd et al, 1992). This is highly unrepresentative of everyday conversation which tends to occur iteratively, is collaborative in nature and geared towards establishing mutual knowledge through the joint actions of speakers and listeners (Clark, 1996).

Visibility between speakers and listeners is also often constrained during referential task procedures so that emphasis can be placed on verbal signals with no transfer of information through non-verbal means. This can be useful in studying linguistic limitations, however, does not represent everyday conversation. Although this is generally unproblematic for adult interlocutors, it has been shown that children tend to rely more heavily on non-verbal signals to encode and decode information (e.g. Doherty-Sneddon, 1995). Therefore restricting access to the non-verbal channel may have a more profound effect on younger children, and one that is qualitatively different from that experienced by adults and typically developing older children. So changes in the availability of visual signal may increase the cognitive load of referential communication tasks beyond that predicted by the investigators. This may have contributed to earlier claims in the referential literature of particularly limited skills in younger children (e.g. Glucksberg and Krauss, 1967).

4.4. Summary

Referential tasks have revealed a number of points relating to children's development of communication skills. These can be summarised as follows:

1. Speaker skills – by around 7 – 9 years of age, children come to develop the necessary skills to discriminate and describe critical features of a referent so that their listeners can identify it uniquely from an array of possible alternatives (e.g. Whitehurst and Sonnenschein, 1981). Before this age, however, children are able to reformulate messages in light of explicit feedback from communication partners (e.g. Sonnenschein, 1984). Typically developing children design messages to take account of their listener from as early as 3 years of age (e.g. Ninio and Snow, 1997).
2. Listener skills – children assign responsibility for communication failure along a continuum from speaker to listener (e.g. Robinson and Robinson, 1980). Younger children typically portion blame for communication difficulty with the listener role and view success as a feature of the speaker message. By around 7 years of age, typically developing children correctly assign blame to poor speaker messages, such as where they are ambiguous or incomplete.
3. Communication constraints – restrictions on access to visual cues during Glucksberg type procedures raise a number of concerns. This is because some populations, such as younger children, rely more heavily on non-verbal cues to encode and decode information and therefore can be particularly disadvantaged where visual access is denied. Limitations also surround the usefulness of separating speaker and listener contributions, and the idiosyncratic nature of the dialogue they produce.

Bearing these points in mind, I will now go on to describe some of the findings from research looking at language and communication skills in adults with intellectual impairments. It might be expected that concerns raised about the use of traditional referential tasks with typically developing children might also be relevant for people with

intellectual impairments. This is because a) paradigm procedures are atypical of the sorts of everyday encounters experienced by the majority of the population and b) like younger typically developing children (Doherty-Sneddon, 1995), people with intellectual impairments may rely more heavily on visual cues as they are cognitively less demanding to process than verbal signals.

4.5. Referential research paradigm and people with intellectual impairments

Much of the research reported here indicates that people with intellectual impairments experience difficulty with referential communication. Equally, however, many of these studies also highlight strengths in individuals' performance and help to provide explanation for why problems occur. The review of research has been grouped under the same headings as the previous section and with the additions of two further categories. These are scaffolding and social cognition.

4.5.1. Speaker skills

Individuals with intellectual impairments experience difficulty producing clear, unambiguous messages (e.g. Longhurst, 1974; Longhurst and Berry, 1975; Rueda and Chan, 1980). Problems appear to be associated in part with individual's awareness of the need to construct messages for listening partners (e.g. Hoy and McKnight, 1977) and with more global assessments of the separation of self from another. This will be discussed more fully in Section 4.7 on social cognition. However, difficulty with referential expression may extend beyond those predicted from measures of linguistic performance (Beveridge and Tatham, 1976). These authors found that acquisition of the necessary comprehension and productive skills for a dyadic referential task did not necessarily guarantee their use during the procedures. Beveridge and Tatham (1976) propose that individuals experienced particular difficulty where emphasis was placed on the sentence

verb rather than the object and subject of a picture. They suggest that the class of grammatical category carrying sentence information may influence the adequacy of speaker messaging. They also noted that a) less successful participants improved across trials and eventually reached the level achieved by more effective communicators and b) that good listeners were also good speakers. This suggests that awareness of the needs of the listener tends to co-exist with effective listening skills for some individuals.

4.5.1.1. Encoding: perceptual problems

One explanation for the difficulty experienced by individuals with intellectual impairments in coping with referential communication tasks may be that they are unable to compare and/or discriminate critical features of the referent/non-referent array (Rueda and Chan, 1980). Another relates to the choice of stimulus items used during a number of earlier studies (e.g. Beveridge and Tatham, 1976). These tended to use meaningless abstract stimulus items that were both difficult to describe and/or discriminate from non-target referents.

Rueda and Chan (1980) addressed these issues by using cards depicting Dr Seuss-like animal characters and objects (e.g. a bell) as referent and distracter/comparison items. They found that participants (C/A 15:75 ys; IQ 35 – 50) were more successful at describing target items that were physically different from distracters and from a different semantic class, (e.g. bear/bell). This compares to referents from the same semantic category but with different features, e.g. a clown with a round hat, buttons and shoes/clown with triangular hat, buttons and shoes; oak like tree/Christmas tree. They suggest that communicative success was influenced by the speaker's skill in comparing the perceptual features of available referent items and the complexity of the task. Complexity was defined in terms of the level of critical analysis required to compare referent features. Rueda and Chan (1980) conclude that although communicative success was undoubtedly

influenced by poor monitoring skills of listening partners, performance during the task was more likely to be a product of the quality of speaker messages.

This suggests that individuals with moderate intellectual impairments taking part in this study were effective as referential communicators where the demand for fine tuned perceptual comparison was lower. This finding is strengthened by Brownell and Whitely (1992), who found that children with and without intellectual impairments performed at an equivalent level on a simple referential task i.e. comparing two dissimilar objects that differed in size and colour (M/A 5 years, 8 years, and 11 years). Beyond this level of complexity, differences were apparent in performance along developmental lines and between typically developing children and those with intellectual impairments.

Participants took part in a picture-matching task (car, ball, fork and a chair) where objects varied according to their size (large/small) and/or colour (red/yellow). Following perceptual feedback training (e.g. 'that's good; you told me how the card with the dot was different from the other' for informative messages and 'that's wrong; there are two (or three) like that. You did not tell me how the card with the dot was different from the other(s)' for ambiguous messages), Brownell and Whitely (1992) found that individuals provided more informative messages than those that did not receive perceptual feedback. They suggest that like typically developing children (Whitehurst and Sonnenschein, 1981), children and adolescents with intellectual impairments may benefit from perceptual feedback training. Further, they propose that difficulty in acquiring perceptual comparison rules may result from a lack of feedback in their everyday communicative encounters. They cite research on typically developing children that suggests that corrective feedback from care providers, though infrequently used, can improve referential skills (Robinson, 1981). Robinson observed that adults provided little feedback on communication difficulties to a group of children (age range 3:4 – 5:3 ys) in a number of different settings (pre-school, home and school) and instead, place more focus on maintaining the structure

of interactions (Robinson, 1981). Brownell and Whitely (1992) suggest that this might similarly occur in the communicative encounter of people with intellectual impairments where care providers place more emphasis on maintaining interpersonal exchanges rather than on transactional (information carrying) communication.

4.5.1.2. Sensitivity to characteristics of the listener or listener situation

Evidence to support the notion that individuals with intellectual impairments are able to adapt their communicative style to take account of listener needs is equivocal, since much of the research looking at referential communication has focused independently on speaker and listener skills. Longhurst (1974) found that information carried in the speaker message was less meaningful to other listeners than when the speaker then assumed the listener role. He looked at the ability of adolescents with borderline to moderate intellectual impairments to describe ambiguous stimulus items to their communication partner, as a function of cognitive ability. Unsurprisingly, a more successful performance was accomplished by individuals with borderline (IQ 70 – 90) impairments compared to those with mild to moderate impairment (IQ 58 – 69; 40 – 51). However, even the most successful communicators (M/A 10 years +) could not match the performance usually associated with typically developing children of a similar mental age. Longhurst (1974) suggests that speaker utterances were idiosyncratic and appeared to take no account of the needs of the communication partner. This was because speaker messages led to a less successful outcome during interactions with another listener than where the speaker then listened to an account of his/her own message.

A number of features associated with this study, over and above the use of abstract stimulus items, however, preclude rigorous interpretation of these findings. For example, manipulations were made to the experimental paradigm in order to test the informative value of speaker messages. These involved changing the communicative context from a

non-face-to-face to a face-to-face condition and the content of utterances (correction of articulator errors). This marginally improved performance across each experimental condition (four in all) but necessarily confounds interpretation of the effect of the independent variable (speaker v/s listener role) on task performance. Nevertheless, the tendency towards idiosyncrasy in speaker messages has been found elsewhere (e.g. Rueda and Chan, 1980). Rueda and Chan (1980) observed, however, that messages were no more meaningful to speakers who then assumed a listening role than to naïve listeners. They report that typical adult participants frequently commented on the informational inadequacy of messages produced by adolescents with intellectual impairments, whereas the participants themselves did not.

In contrast, Hoy and McKnight (1977) found that individuals with intellectual impairments within a M/A range of 2 – 8 years (C/A 6 – 18 ys) were able to modify their communication style according to listener ability. They hypothesised that communicative success would vary not only as a function of speaker ability but also according to the ability of listening partners. Performance was evaluated according to three criterion: 1) communication channel – speaker attempts to use verbal, gestural and manipulative (touching game materials) means; 2) listener understanding – the percentage of items communicated successfully to listeners and 3) speech style – measures included verbal effort (words, utterances and words per utterance), diversity (type token ratio), the use of imperatives, interrogatives and declaratives, and sensitivity to listener needs (gaining attention, repeating phrases and contingency of response to queries). Unsurprisingly, children with more profound impairments (M/A 3:7 ys; IQ 36.3) used significantly shorter utterances than those with a higher M/A (6:6 ys; IQ 47.3), and these contained less lexical diversity.

More importantly, listener level of understanding was also found to affect communication form. Speakers from both M/A groups used the verbal channel alone less frequently when interacting with individuals of lower ability. However, utterances were longer, more diverse and more complex during this condition, though they did contain more imperatives and attention getting devices, e.g. 'see' and 'look'. Individuals from the higher M/A group also repeated all or part of their utterances during instruction to individuals with a lower M/A. These modifications were unsuccessful at increasing understanding for individuals with a lower M/A, and in fact resulted in a significantly poorer performance outcome than where speakers and listeners were both from the lower M/A group. Hoy and McKnight (1977) suggest that this was due to the preference for verbal instruction in individuals with a higher M/A as well as the length and complexity of their utterances in comparison to speakers of a lower M/A. Nevertheless, these findings show that individuals of varying ability are aware of the differing needs of listeners and attempt to adjust their communication style in light of this, even though this may not necessarily lead to increased listener understanding. Hoy and McKnight (1977) propose that individuals should be assessed in a number of communicative contexts in order to appreciate their overall communicative abilities.

4.5.1.3. Sensitivity to listener feedback

Sensitivity to listener feedback during referential communication has been found to vary as a function of form and ability (Longhurst and Berry, 1975). These authors found that individuals with borderline impairments (C/A 16:2 ys; IQ 78) were more successful at interpreting gestural and implicit feedback and offered more re-description than those with more profound needs (group 2 C/A 14:6 ys; IQ 63: group 3 C/A 15:4 ys; IQ 47). No difference was found between the performance of groups during explicit feedback. Feedback was presented to speakers in three forms: 1) gestural feedback – changes in facial expression indicating uncertainty; 2) implicit feedback – e.g. 'I don't understand' or

'I don't think I can guess that one', and 3) explicit feedback – e.g. 'Look at it again, what else does it look like?' or 'Tell me something else about it'. Longhurst and Berry (1975) suggest that differences in the response to gestural and implicit feedback may have occurred because individuals: 1) may not have understood the meaning of the feedback given and were unsure how to respond and/or 2) may not have been motivated to respond to listener feedback. Responsiveness to gestural feedback may also have been influenced, however, by the ability of individuals to process facial signals. A number of studies suggest that individuals with intellectual impairments may experience difficulty decoding facial information such as expressions of affect (e.g. Dimitrovsky, Spector, Levy-Shitt and Vaki, 1998), recognition of age (Bell and Espie, 2000a, b) and personal identity (e.g. Hobson, Ouston and Lee, 1988). This will be discussed more fully in Part 5 on non-verbal communication.

Finally, although explicit feedback does appear to improve performance on referential tasks for some individuals (Brownell and Whitely, 1992), problems may still exist in maintaining this once feedback is removed (Beveridge and Mittler, 1977). These authors suggest that this may be because feedback motivates listeners to attend to the task and more specifically on utterances, rather than increase understanding of speaker/listener roles.

4.5.2. Listener skills

Individuals with intellectual impairments often fail to understand much of what they hear and are inconsistent in their signalling of non-comprehension (e.g. Abbeduto et al, 1991; Rosenberg and Abbeduto, 1993; Fujiki and Brinton, 1993). One determinant of this may be the nature of the inadequacy in speaker messages (Abbeduto et al, 1997).

The ability of children with mild – moderate impairments (C/A 10:2 ys: IQ 50 – 65) to resolve ambiguity was investigated by Abbeduto et al (1991). They developed a role-play scenario to allow individuals to disambiguate referential information during face-to-face encounters. Children with intellectual impairments were required to resolve ambiguous requests depending on whether the determiner was definite ('that') or indefinite ('a'). Results suggest that participants were able to use sentence context when confronted with ambiguity as effectively as M/A matched typically developing children. However, individuals with intellectual impairments were less successful than the control group when confronted with contexts that did not allow them to disambiguate the speaker message. Here, individuals preferred to select referent items rather than request clarification, e.g. 'which one?' Abbeduto et al (1991) suggests that participants with intellectual impairments may have been aware of the inadequacy of speaker messages but lacked the strategies to gain additional information.

Therefore, although children with intellectual impairments are delayed in resolving ambiguity in speaker messages, this may not be beyond their level of cognitive functioning (M/A) (Rosenberg and Abbeduto, 1993).

Listener response to three types of messages was investigated by Abbeduto et al (1997) in a non-face-to-face referential communication task. Message types were ambiguous, incompatible or fully informative. Participants with C/A 9 – 20:1 ys; M/A 5.6 – 10.3 ys; receptive language 3:6 – 11:00 ys (TROG, Bishop, 1989) took part in a direction-following task where either a child or adult speaker provided instructions. In fact there was no real partner: instructions and responses to signals of non-comprehension were pre-recorded and replayed to participants to ensure consistency across conditions. Performances were scored according to the type of signal elicited from participants and typically developing children matched on M/A and language (receptive and expressive skills) ability. Signals of

non-comprehension following instruction were categorised as follows: 1) non-specific request for repetition, - e.g. 'huh?', 'what?'; 2) request for confirmation – the participant repeated all or part of the direction using intonation patterns associated with the interrogative form; 3) statement of non-existence – an explicit statement that a feature was not present on the participant's task material; 4) statement of existence – e.g. 'there are two blue roads'; 5) request for specific information – e.g. 'which blue road?' or indication that the message was not sufficient to identify the target referent e.g. 'I don't know which one you mean'.

Abbeduto et al (1997) found a main effect of direction type for both groups, with signals of non-comprehension produced more frequently for incompatible directions than ambiguous and fully informative messages. Ambiguous direction also elicited more signals of non-comprehension than fully informative directions. No difference was found in the rate of signalling between groups, however, differences were apparent in the style of listener feedback. 1) Individuals with intellectual impairments produced fewer statements of existence or non-existence (e.g. 'there isn't a blue road'), and 2) requested specific information (e.g. 'which blue road?') more frequently than typically developing children. Abbeduto et al (1997) interpret these findings to suggest that, like typically developing children, individuals with intellectual impairments experience particular difficulty dealing with ambiguous rather than incompatible messages. Further, they propose that problems may have occurred because individuals were more focussed on their needs as listening partners rather than the adequacy of speaker messages. This, they suggest, may have resulted from previous encounters as conversational partners and the tendency to self-blame when communication difficulties occur.

This tendency towards placing responsibility for the adequacy of messages with the listener is a characteristic feature in the development of communication skills in younger

typically developing children (Robinson and Robinson, 1980). So although individuals with intellectual impairments respond at a similar rate to the incompatibility/ambiguity of speaker messages as typically developing children, only those in the former group placed responsibility for this inadequacy with themselves as listening partners.

Earlier research on the assignment of blame found that children and adolescents with intellectual impairments (C/A 9:10 – 17:0 ys (mean 14:7 ys); verbal receptive skills 4:4 ys, expression 4:3 ys (Reynell Language Development Scale, Reynell, 1969)) attributed blame systematically according to whether they placed responsibility for communication breakdown with the listener, the experimenter or themselves (Beveridge et al, 1979). No trend was found towards assigning blame exclusively to the speaker role and no child consistently attributed blame correctly. Of interest here is that some participants produced clearer (less ambiguous) messages and assumed self-blame less frequently during periods of communication difficulty. The experimenters manipulated communication breakdown by producing ambiguous messages in the speaker role and selecting the incorrect referent as the listener. This finding suggests that these participants may have been aware on some level of the role of message adequacy in the act of referring but experienced difficulty in disassociating this from self-blame as a communicator. This compares to typically developing children where responsibility for communication failure is portioned along a continuum from listener to speaker blamers as a function of age (Robinson and Robinson, 1980), as described in Section 4.2.2. Typically developing children eventually correctly judge that inadequacy in the speaker message leads to communication difficulty. From the evidence reported here, it would appear that some young people with intellectual impairments routinely assume responsibility for communication breakdown as both speakers and listeners. Beveridge et al (1979) suggest that the proclivity towards self-blame for communication breakdown in some individuals may develop as a result of failure over a number of years as a communicator.

4.6. Scaffolding

Abbeduto et al (1999) investigated the influence of parental scaffolding on the success of speaker and listener performance during a referential communication task. They found that although children with intellectual impairments were more likely to begin trials with an ambiguous utterance, performance improved across task trials until it matched that of typically developing children. This suggests that they are sensitive to listener feedback (as described in the previous section). Abbeduto et al (1999) propose that performance was due to parental scaffolding of the child's utterances while in the speaker role. They categorised scaffolding according to the types of assistance demonstrated by parents to encourage the child to disambiguate information. These were:

- 1) Statement of non-comprehension: the parent asserted that the child's description was inadequate to allow the referent to be identified e.g. 'I don't know what you mean'.
- 2) Request for new information: the parent responded to the child's description by explicitly asking for additional information e.g. 'which one?'

The latter was considered to be more effective at eliciting feedback as it made the obligation to respond (Austin, 1962) more explicit. Parents of both typically developing children and those with intellectual impairments tended to use requests for new information rather than statements of non-comprehension. Further, they encouraged their child to request new information when in a listening role rather than make statements of non-comprehension to disambiguate information. This, the authors suggest, allowed parents to work within their child's zone of proximal development (ZPD) (Vygotsky 1978) in that it encouraged the children to assume responsibility for the interaction while avoiding cognitive overload. It has been proposed that using concepts of ZPD could provide professionals with a more dynamic view of the abilities of both adults and children with intellectual impairments (Rutland & Campbell, 1996). These authors suggest that such a measure would reflect not only individual's current level of skill but also their level

of potential development (Vygotsky, 1978). Shatz (1983) proposes that parental scaffolding can help to co-ordinate children's contributions, while not necessarily leading to more sophisticated language use.

4.7. Social cognition

Social cognition refers to the ability to use understanding of the other's role as a tool for communicating effectively (Flavell et al, 1975). It involves inferring others' communicative needs, opinions and beliefs and using this knowledge to shape and interpret messages. Most studies looking at the development of social cognition in people with intellectual impairments have tended to include only individuals previously diagnosed with Down's syndrome 1) as this is the largest homogenous group of people with intellectual impairments, 2) under the assumption that findings may generalise to other people with intellectual impairments, and/or 3) as a comparison group for research looking at the development of theory of mind in people with autism (e.g. Baron-Cohen, Leslie and Frith, 1985; Tager-Flusberg and Sullivan, 1994a, b; Yirmiya and Shulman, 1996). It is unclear from these studies whether the development of social cognition lags behind or is concomitant with other cognitive and/or language skills. In relation to comparison with autism in particular, one important aspect of social cognition is theory of mind. This is the ability to reason about mental states. Recognition of a theory of mind reflects the acquisition of a set of explicit and interconnected concepts for representing cognitive states (such as thoughts) and the ability to use them as a way of explaining and predicting other's behaviour (e.g. Olson, Astington and Harris, 1988; Happe, 1994). So having a theory of mind can help interlocutors to assess levels of mutual understanding. Speakers use this knowledge to organise their messages so that they are most accessible to their listener (Tager-Flusberg, 1993). Having a theory of mind enables the listener to interpret messages according to what he/she believes to be the speaker's intent. This co-ordination is essential during human interaction (e.g. Baron-Cohen et al, 1985; Clark and Wilkes-Gibbs, 1986;

Anderson et al, 1994; Frith, 1998), and no less so than during transactional communication. This is because here, listeners must retrieve the propositions encoded in the speaker message and use them to achieving joint reference.

Research focused on people with intellectual impairments of mixed aetiology has generally found that individuals demonstrate first order belief attribution. That is, the ability to attribute mental states to the self and others (Perner and Wimmer, 1983). However, performance tends to fall below that of typically developing children matched on M/A where assessment includes individuals' ability to reason about another person's beliefs of the world, i.e. second order theory of mind (e.g. Benson, Abbeduto, Short, Bibler and Maas, 1993, Abbeduto et al, 1997). One explanation for this may be that M/A measures may not reliably predict how equipped individuals with intellectual impairments are able to deal with the language processing demands of typical second order tests. The ability to make a second-order belief attribution appears to develop at around the age of 6 – 7 ys in typically developing children (Perner and Wimmer, 1985).

Therefore, two main points of criticism are raised regarding the use of false belief test to assess social cognition with this population. These relate to 1) the use of M/A as a means of matching individuals with intellectual impairments to other population groups as this measure does not necessarily predict individuals' language ability (Miller and Chapman, 1984) and 2) the linguistic demands of the test are such that language ability may act as a more accurate predictor of success than individual's knowledge of other's mental states (Abbeduto et al, 1997). Abbeduto et al (1997) hypothesised that success on a test of false belief (along with other measures) might predict performance on a referential communication task looking at comprehension monitoring in individuals with intellectual impairments. Although an association was found between these two measures, comprehension monitoring was more closely linked to receptive language skills. They

concluded that comprehension monitoring and performance on tests of false belief might more accurately reflect an individual's receptive language ability rather than the contribution of a theory of mind.

4.8. Limitations in using Glucksberg type procedures with people with intellectual impairments

Using this type of task to examine referential communication in individuals with intellectual impairment raises concerns (Abbeduto, 1991) that are similar to those outlined previously for typically developing children. These are as follows, below:

1. Although individuals with intellectual impairments may on occasion interact in the absence of visual cues (e.g. by telephone) this is not typical of everyday interactions. Performance on this type of task may not relate to more typical situations.
2. Design procedures frequently isolate output from speakers and listeners. This is unrepresentative of typical everyday encounters in that individuals are usually able to resolve ambiguity by referring to the context of a conversation (Clark, 1996). Therefore, findings may not reflect individuals' communicative ability during collaborative sequences with a speaking/listening partner.
3. Glucksberg type procedures are designed so that success can be measured through the selection of the correct referent item by listening partner. Success depends therefore on the ability of speakers to isolate and describe the target from competing non-referent items with the minimum of collaboration from their communication partner. Again, this is atypical of everyday conversation, where individuals frequently have to decide between alternative meanings of referent descriptions but can use the context of an interaction to disambiguate meaning. Using this type of task therefore tells us little about the ability of individuals to disambiguate referential descriptions in more typical communicative situation (Rosenberg and Abbeduto, 1993).

4.9. Chapter conclusion

This chapter has looked at referential communication in typically developing children and people with intellectual impairments. A number of these studies have drawn parallels between these two populations and suggested that development in the latter group represents a reduction of referential communication skills in line with other cognitive and pragmatic correlates of communicative ability. Particular difficulty is apparent in speaker skills, with performance often falling below that predicted from M/A measures.

Limitations of Glucksberg type procedures make generalisation beyond the referential paradigm problematic, however, a number of the studies outlined above extended this paradigm and allowed for face-to-face interaction and/or collaborative sequences between speakers and listeners. These provide evidence that individuals are sensitive to the differing needs of their partner and attempt to adapt their communication style in accordance with this. Furthermore, naturalistic evidence has shown that individuals are able to contribute to conversations in an informative way (Rondal and Lambert, 1983) and can achieve impressive levels of success in many areas of communicative functioning (Rosenberg and Abbeduto, 1993). These are discussed in Chapter 3 on the development of language and communication skills in people with intellectual impairments.

The approach taken in the research presented in this thesis is to maintain some of the experimental control of the referential paradigm while encouraging naturalistic interaction. The research addresses many of the problems that exist with a more traditional referential paradigm. Here the task was the Map Task (Brown et al, 1984), a co-operative problem-solving task where visibility was not restricted and participants were actively encouraged to collaborate towards achieving task goals. The interlocutors collaborated in face-to-face interactions and so access was gained to both the verbal and non-verbal channels.

Participants work in pairs so that the route drawn on one map, the Information Giver map,

might be replicated onto the Information Follower map. The maps are similar, though not identical, creating a genuine mismatch in speaker and listener knowledge and the need for collaboration if mutual understanding is to be maintained.

A detailed description of the task is given in the following section on the Pilot Studies (Part 3, Chapter 5).

Part 3: Pilot Studies: development of the Map Task for people with intellectual impairments

Chapter 5. Pilot Studies: development of the Map Task for people with intellectual impairments

5.1. Introduction

This chapter outlines details of the Pilot Studies that were carried out six months prior to the main data collection stage of the research. The principle aim of piloting was to test the suitability of a problem-solving task, the Map Task (Brown et al, 1984), as a paradigm for looking at communication in people with intellectual impairments. Six young adults with intellectual impairments each took part in the Pilot Study with three separate partners.

These were a carer, a student and a friend. These partnership groups were selected as they 1) allow for comparison of communication effectiveness during interactions with a care provider and an unfamiliar non-impaired adult (student). Here the focus of interest was to investigate if more able partners would attempt to support interactions with the young adults with intellectual impairments and how this might influence communicative success. Importantly, it provides us with an opportunity to investigate previously reported difficulties in the communication style of care providers (e.g. Cullen, 1988; McConkey et al, 1999) and to examine how some of these problems might occur. Second, the research design also allows us to look at interactions where this level of support is not available, i.e. during peer interactions. This provides one measure of communication outcome for interlocutors with intellectual impairments and the ways that they attempt to negotiate understanding.

The Map Task is a co-operative problem solving task that has been extensively used with a range of different populations (e.g. Anderson et al, 1997; Doherty-Sneddon et al, 1997; Lamb, Bidy and Wood, 1997), although to date this has not included young adults with intellectual impairments. The task was selected for a number of reasons. First, the Map

Task has previously been shown to reliably elicit spontaneous collaborative sequences in adult and child interlocutors and to allow for objective scoring of communication outcome and process (e.g. Anderson et al, 1994; Doherty-Sneddon, 1995). This allows for certain predictions to be made about how differences in the communication environment might influence communicative success. For example, a more effective outcome would normally be expected where participants work together to produce shared understanding and/or where they are previously known to one another (Boyle et al, 1994). It was anticipated that the Map Task would provide a useful means for looking at communication in adults with intellectual impairments and the ways that different speakers and listeners attempt to establish mutual understanding. Second, earlier studies reveal problems in carer/client communication in a range of informal and natural settings (e.g. Markova et al, 1992; Bradshaw, 1998). One apparent source of difficulty is that staff appear to overestimate the comprehension abilities of people in their care (e.g. Bartlett and Bunning, 1994; Banat, Summers and Pring, 2002). This can occur where carers fail to recognise the role of context in supporting interactions (Bradshaw, 2001b), leading to disparity in the complexity of carer contributions and listener understanding. The Map Task provides a framework for looking at levels of carer/client understanding where utterance meaning cannot necessarily be inferred from situational cues. Here communication success relies more heavily on the exchange of verbal and/or non-verbal information than accompanying situational features, such as objects or actions, and on the ways that interlocutors construct joint meaning. The task allows us to look independently at the success of speaker and listener contributions and to establish how effectively they can create and maintain shared discourse meaning (e.g. Johnson-Laird and Garnham, 1980). Third, though interest has increasingly focused over recent years on the communication environment of adults with intellectual impairment, few studies have looked explicitly at how successful individuals are at getting their message across (Bradshaw, 1998). The current research aims to

increase understanding of communication success in this population by providing an indication of the level of information transfer from speakers to listeners during a collaborative problem-solving task. Information Followers (carers, students and peers) make use of information that becomes available through collaboration with their partner, the Information Giver, and this allows them to draw a route on a map. Communication 'success' is measured according to how accurately the Follower route replicates that shown on the Information Giver's map. Fewer differences tend to occur where more information is exchanged between the interlocutors as compared to where the level of interaction is lower, and less information is shared.

The main aims of the Pilot Study were:

1. To investigate the usefulness of the Map Task in eliciting spontaneous dialogue in young adults with intellectual impairment.
2. If necessary, to develop the task in such a way that it became more accessible to Pilot Study participants and their communication partners.
3. To establish a procedure that could be used in future investigation of the communicative effectiveness of young adults with intellectual impairments with different communication partners.
4. To develop pre-test assessments for investigating cognition, vocabulary and motor coordination skills most relevant to the task.

5.2. Participants

Participants in this study were young adults with intellectual impairments and their communication partners. Each participant completed a number of assessments prior to taking part in the Map Task. These help to describe the young people taking part in the study and provide background information on those skills most relevant to the task. These

are comprehension and expressive language skills, social cognition, motor co-ordination skills and understanding of the terms 'same' and 'different'. Consent was gathered from all of the participants following a period of familiarisation with the experimenter (minimum of one month for Day Centre participants), and once it was felt that individuals had an understanding of what participation in the study might involve. Participants with intellectual impairments were asked to discuss their involvement in the study with a parent/guardian/carer outwith the Day Centre facility prior to returning their consent form to the experimenter. It was hoped that this would help to make it clear to these participants that they had a choice about participating in the study. Letters and information sheets were prepared for parents/guardians/carers detailing information about the study and requesting their support in assisting the participants to complete a short questionnaire and consent form. Participants/parents/guardians/carers were also encouraged to contact the experimenter with any queries about the research. Appendix 1 shows an example of the consent form, letter, information sheet and questionnaire given to Day Centre participants and their family/guardian/care provider.

5.2.1. Pilot Study Participants

These were 3 female (mean age 27 ys) and 3 male (mean age 27ys 7 ms) young adults in receipt of services provided for learning disabled people in a medium sized industrial town in Central Scotland. All attended one of two local authority Day Centre facilities on a regular basis. Participants elected talking as their preferred means of communication in a pre-test questionnaire. No individual reported problems with hearing or visual acuity that would have affected their ability to participate in the study. Pilot Study participants had not been diagnosed with Down's syndrome.

5.2.2. Communication Partners

Carers: These were Day Care Officers (DCO) previously assigned to each Pilot Study participant in their own Day Centre. All five DCOs (one participant did not complete a trial with his DCO) formed single sex partnerships with their partner.

Students: Student partners (n = 4, as two participants did not take part in the Pilot Study with a student partner.) were studying for a Higher National Diploma (HND) at a local College of Further and Higher Education, with the exception of one participant, who studied outwith the area. Students were also gender-matched with Pilot Study participants.

Peers: Each Pilot Study participant was asked, where possible, to select a friend of the same sex from their Day Centre to take part in one trial. This resulted in 5 gender matched dyads (2 female, 3 male) and one female/male partnership (Participant 1), ages: female = 22 ys and 28 ys 8 ms; male = 22 ys 6 ms; 41 ys 6 ms and 47 ys 3 ms. All peer partners selected talking as their preferred means of communication in a pre-test questionnaire. No individuals reporting difficulties with hearing or visual acuity that would interfere with their participation in the task.

5.3. Language Profile: Pilot Study Participants

Participant's language skills were assessed using the Communication Assessment Profile for People with a Mental Handicap (C.A.S.P.), a functional communication assessment profile for people with intellectual impairments and the British Picture Vocabulary Scale (B.P.V.S.). Table 5.1 provides a full language profile for each Pilot Study participant. C.A.S.P. (van der Gaag, 1988) aims to assess individual ability in four major sub-components of language through an array of pictures and photographs. These are phonology (sound segments of speech); syntax (grammatical arrangements of words);

semantics (meaning of words) and pragmatics (the ways that language is used in everyday situations). Stimulus items selected for the current study were chosen to examine participants' understanding and expression of single words (Table 5.1, columns 4 & 5); sentence structure (Table 5.1, columns 6 & 7) and functional use of communication skills, such as turn-taking and the ability to tell a story (Table 5.1, column 8). The assessment produces sub-test percentile rank scores indicating where on average an individual performs in comparison to the population of adults with intellectual impairments. The participants in this study fell within the upper quartile range of language ability for people with intellectual impairments. The B.P.V.S (Dunn, Dunn, Whelton and Burley, 1997) contains 168 stimulus pictures presented in groups of four and measures receptive vocabulary acquisition for single words (Table 5.1, column 9). Outcome measures are transformed to produce age equivalent scores of verbal ability (mean age equivalent: females; 6 ys 9 ms, male; 7 ys 9 ms). Testing ends when eight or more errors are recorded in any set of twelve items. Speaker intelligibility was estimated by the author to be within the expected range for people with intellectual impairments in the upper quartile range of language ability, though was not formerly tested during the current procedures. Estimates were based on the author's own experience of communicating with people with intellectual impairments.

Subject	Sex	Age	Single Comp.	Single Express	Sentence Comp.	Sentence Express.	Commun .Function	BPVS (years)
1	Female	29.02	85	Approp	80	100%	60	10:10
2	Female	28.07	60	Approp	80	97%	80	4:05
3	Male	26.01	85	Approp	60	77%	80	5:05
4	Male	27.0	80	Approp	90	90%	80	8:08
5	Male	30.01	85	Approp	90	97%	80	9:04
6	Female	24.09	85	Approp	90	83%	80	5:01

Table 5.1. Participant Profiles: Communication Assessment Profile for People with a Mental Handicap (C.A.S.P.) and the British Picture Vocabulary Scale (B.P.V.S.) age equivalent scores.

N.B. With the exception of sentence expression (Column 7) all C.A.S.P. scores are percentile rank measures showing where on average an individual fits against a population of adults with severe to mild intellectual impairments: Column 4 = mean scores for vocabulary comprehension (Section 3); Column 5 = vocabulary expression. This is scored according to whether a response is considered appropriate for test items. An appropriate response is intelligible and describes the test item, e.g. 'red man' or 'cross the road' for 'red light'; Column 6 = sentence comprehension; Column 7 = sentence expression, a *percentage* score based on the appropriateness of a response; Column 8 = functional communication. This examines functional use of communication skills and knowledge about conversation; Column 9 = B.P.V.S. age equivalent scores.

5.4. Cognition, motor functioning and vocabulary

Taking part in a co-operative problem-solving task such as the Map Task involves a number of skills beyond those associated with language comprehension and expression.

Two of these relate to social cognition (theory of mind) and motor co-ordination skills.

Social cognition describes knowledge about the self and others and how this can be used to predict or infer others' beliefs and/or actions (Flavell, 1985). This knowledge can sometimes be used to guide behaviour so that it complements that of another. One example of this is during communication (Flavell et al, 1968). Here speakers and listeners make inferences about one another's state of mind based on their common or shared beliefs and use this information to construct and interpret messages (e.g. Johnson-Laird and Garnham, 1980). So, for example, a speaker may shift from an indefinite (a) to a definite

(the) referring expression where a referent has previously been mentioned as a way of signalling to the listener that he/she has taken account of their beliefs. Listeners can make use of this information to align their own model of the discourse with what they believe to be that of speaker's. This collaboration is critical for communicative success (e.g. Clark and Brennan, 1991; Anderson and Boyle, 1994), as it increases the level of mutual understanding between speakers and listeners. However, while awareness of the differentiation between the role of self and others is important for communication (e.g. Happe, 1994), it is by no means sufficient for success (Flavell et al, 1968). Effective communication involves a number of speaker and listener skills, not least cognitive and language ability, and so awareness and understanding of the role of others is but one factor contributing to outcome or communicative success. Social cognition is investigated in the current study using a test of theory of mind.

Motor co-ordination skills are also important during the Map Task as communicative success is measured according to differences in cm^2 between the Giver route and that drawn by the Information Follower. An example of a map produced in the current study is shown in Appendix 2. It is important, therefore, to establish that the route drawn by Information Followers accurately represents the outcome of communication exchange rather than an artefact of difficulties associated with fine motor control. This is assessed using a simple drawing test. Finally, it was recognised that some of the dialogue used during the Map Task might refer to relational cues, such as left/right, up/down and over/under. The participants typically use these terms as they negotiate their position around the various landmarks featured on the map. Should uncertainty or communication difficulty occur, the interlocutors are free to collaborate with one another until each contribution is mutually accepted and information is successfully grounded (Clark and Brennan, 1991). Same and different, however, are used initially during the instructions

leading into the Map Task in relation to possible discrepant landmarks on Giver and Follower maps and not subject to this collaborative process. It is important that participants are clear in their understanding of these terms if they are to grasp the communicative challenge associated with the task and the potential for communication difficulty. Therefore, a short assessment of the participant's understanding of same/different was developed for individuals with an intellectual impairment. Assessment and outcome scores from each of these three areas are now introduced separately.

5.4.1. Test of perspective taking

When using procedures such as the Map Task it is important to establish that participants are aware that their role and position in relation to task is not the same as that of their partner. This involves assessing participants' ability to shift their mental perspective in order to differentiate among several aspects of an event, and between his/her own and other's point of view (Rubin, 1973). In the current research this was investigated in relation to theory of mind. It is unclear from previous research whether individuals with intellectual impairments are able to attribute belief states to another person (first order theory of mind) or develop a higher or second order theory of mind (e.g. Abbeduto et al, 1997). That is, that individuals are able to think about another person's thoughts about a third person's beliefs (Baron-Cohen, 1989). This may be an artefact of the observation that people with intellectual impairments have been used in general as controls during investigation of theory of mind in other population groups (Benson et al, 1993).

First order theory of mind can be assessed using a simple paradigm first described by Baron-Cohen, Leslie and Frith (1985), where participants must attribute a belief to another (a false belief) in order to pass. Second or higher order theory of mind requires processing skills at a more advanced level and captures the vagaries of social interaction. By this it is

meant that possession of second order beliefs allows interlocutors to predict and take account of other people's thoughts, and what they might think about another's thoughts and beliefs (Perner and Wimmer, 1985). Second order beliefs are important as they underpin our understanding of human society and the ways that we formulate and process certain linguistic conventions, such as implicature (Perner and Wimmer, 1985).

Baron-Cohen (1989) found that the performance of children with Down's Syndrome in a second order theory of mind test did not differ significantly from that of M/A matched typically developing children. This compares to impairment at a much greater level for children with autism. In contrast, Benson et al (1993) found that children whose learning disability were not attributable to Down's Syndrome (mean M/A 8 ys) performed significantly less successfully on second order test than typically developing children matched on M/A. Performance was also significantly poorer on the second order testing than during first order trials.

Abbeduto et al (1997) found that performance on a false-belief test was influenced by receptive language ability in children with intellectual impairments. As three out of the six Pilot Study participants (Participants 1, 4 and 5) recorded verbal receptive scores higher than the critical age of acquisition in typically developing children, i.e. 6 – 7 ys (Perner and Wimmer, 1985), it was predicted that these individuals would demonstrate higher or second order reasoning, although this is not a sophisticated measure.

Higher or second order belief was investigated in the present study using the paradigm outlined by Baron-Cohen (1989, based on Perner & Wimmer, 1985). Here participants are asked to answer a series of questions based on the attributing of belief following the presentation of a short scenario about three story characters.

5.4.1.1. Participants and materials

These were the six Pilot Study participants. Materials consisted of two model scale towns built from cardboard, and included the following characteristics:

Story 1: a swimming pool; a bowling alley; two houses; three plastic characters (Lucy, Stephen and Chris).

Story 2: a 'grassed' area referred to as the park; three plastic trees; a community centre; two houses; and three plastic characters (Sandy, Ben and Julie).

These items were placed onto a piece of card (approx.42cm x 30cm), which had previously been marked to show the positioning of buildings and roads.

5.4.1.2. Procedures

Participants were tested individually in their own Day Centre. Each participant listened to a taped recording of Story 1 animated with the materials listed previously. The tape was paused at relevant points to allow for control questions and finished with the Belief question and three control (Justification, Reality and Memory) questions. Control questions are used to ensure that individuals know the real location of the characters (reality question), have an accurate memory of his/her previous location (memory question) and can provide evidence for their reasoning in the Belief question (justification question). In the current study, the correct response to the Belief question was bowling alley (Story 1) and park (Story 2).

Procedures were then repeated with Story 2. Both of these stories are illustrated in Appendices 3a, and 3b.

5.4.1.3. Results and discussion

Responses were coded in line with those described in Baron-Cohen (1989). A lower order theory of mind was awarded in cases where respondents justified the response inconsistently or ambiguously across the two stories. This led to one participant attaining second order theory of mind (Participant 1), two participants attained first order status (Participants 2 & 4); and three participants attained zero order theory of mind i.e. were not able to demonstrate consideration of other's beliefs. These results are shown in Table 5.2. Participants responded to all other questions correctly. This indicates they were able to follow the movements of characters through the course of the story.

Participant	Level of Theory of Mind
1	2 nd
2	1 st
3	Zero
4	1 st
5	Zero
6	Zero

Table 5.2. Scores for test of Theory of Mind

These findings provide weak support for the proposal that some individuals with intellectual impairments may fail to demonstrate an ability to judge others behaviour according to a system of belief, and of those that do, even fewer go on to develop a higher or second order theory of mind (e.g. Benson et al, 1993; Ashcroft, Jarvis and Roberts, 1999). However, due to the large proportion of participants failing to secure a first order score (50%), and in order to be more confident that poorer performances were not overly

influenced by the information processing demands of the test (Tager-Flisberg and Sullivan, 1994a), it was decided that future participants attaining zero or combined zero/first order scores would be tested using the simpler First Order Theory of Mind test outlined in Baron-Cohen et al (1985). This is less demanding than the second order test for some individuals with intellectual impairments (Benson et al, 1993).

5.4.2. Investigation of motor skills

This test investigates participant's motor co-ordination skills. This is of particular importance for Information Followers as they have responsibility for drawing the route as described by the Information Giver. All individuals with intellectual impairments from the Pilot Study were asked to take part in this assessment prior to the Map Task.

5.4.2.1. Participants and materials

These were the six pilot study participants and three peer partners from Pilot Study 2. Materials were: a schematised town drawn on A3 paper (42 cm x 30 cm), featuring a College, individuals' 'own' Day Centre, other Day Centres and interconnecting roads (approximately 1 cm wide). Please see Appendix 4 for details. Characters featured in participants 'own' Centre were highlighted using various coloured pencils for added emphasis. A transparent template of the town was superimposed onto a centimetre grid. This allowed for calculation of pencil lines that extend beyond the boundaries of the road.

5.4.2.2. Procedure

Participants were tested prior to Map Task trials. Instructions were as follows:

'I've brought along a picture for you to look at. This picture is of a town called (town).

Here is (town) College (point) and these are the Day Centres around the town (point). This

is your Centre here (point). What I would like you to do is show me the best way to get from your Centre to (town) College in a minibus. Draw a line along the road you think is best’.

5.4.2.3. Results and discussion

Participants selected a variety of routes from ‘their Centre’ to the College, none of which was found to cross out with the boundaries of the road. This is reassuring in that participants have shown that they were able to co-ordinate the necessary skills to draw a line from one point to another without significant measurement of error.

5.4.3. Investigation of vocabulary use

Scripts used during the instruction phase of practise and main trials involved references to ‘same’ and ‘different’ in relation to landmark features on Information Giver and Follower maps. It was considered important, therefore, to test participants’ understanding of these concepts in relation to identifying same/different referents and same/different positioning in space. Two forced-choice tests were used to assess individuals’ understanding.

5.4.3.1. Participants and materials

Participants were the same individuals that took part in the motor skills and Theory of Mind tests. Materials consisted of ten pairs of white laminated cards (16 cm x 8 cm) onto which had been added a black and white image (approx. 3.5 cm x 3.5 cm) taken from BoardMaker for Windows (1994).

Same/Different Picture:

This test featured five pairs of cards with identical pictures and five with different pictures. Each picture was located in the top right hand corner of the card. Details of images used

for each condition are shown in Appendix 5. Care was taken to avoid pictures with semantic connections in the ‘different’ condition. Ordering of cards was randomised across trials and testing began with a practice pair of ‘same’ cards.

Same/Different Location:

Here the test featured five pairs of cards with a picture in the top right hand corner and five sets with pictures in different locations (also see Appendix 5 for details). Images were selected from those already used in the picture test and in addition, a dot was placed in the middle of each card to provide a visual anchor point. Unlike the previous test, all the pictures in location trials were the same for each pair of cards. Ordering of cards was randomised across trials and again, testing begins with a practise ‘same’ pair of cards.

5.4.3.2. Procedure

Participants were tested individually in their Day Centres. Trials began with the picture test before moving on to the location test. Individuals were instructed as follows:

‘I am going to show you some cards. These cards have a picture on them. What I would like you to do is to look at the picture on one of the cards and tell me if it’s the same as the picture on another card, or if it’s different from the picture on another card. Is that OK?

Do you have any questions?’

Participants were then asked ‘are these pictures the same or are they different’ or ‘are these pictures different or are they the same’, counterbalanced across trials. Testing then proceeded as follows:

‘Now I am going to show you some more cards. What I would like you to do this time is to look at the picture on one of the cards and tell me if it’s in the same place as it is on another card or if it’s in a different place on the other card. Do you have any questions?’ ‘Are these pictures in the same place or in a different place’ or ‘are these pictures in a different place or in the same place?’ counterbalanced to match the above.

5.4.3.3. Results and discussion

Mean percentage correct scores for participants and peer partners are shown in Table 5.3. As can be seen from this, pilot participants performed marginally less successfully during the location test than during assessment of same/different picture. Analysis of error indicated that this was due in each case to participants incorrectly identifying the pictures in set eight as being in the same place, when in fact they were in a different place.

Participant 6 made an additional error on set number one.

Incorrect responses for peer partners were a little more varied. However, two of the three partners also recorded errors for set eight during the location test. This set of cards featured pictures that were on the immediate right/left of the centre dot, as illustrated in Appendix 5. It may be that this difference in location was less salient to participants than on the other cards.

Mean Scores	Same/Different Picture	Same/Different Location
Pilot Participants	100%	96%
Peer Partners (3)	90%	90%

Table 5.3. Test of same/different picture and location

In light of the above findings it is assumed with a fair degree of confidence that participants understood and were able to discriminate between the terms same and different.

5.5. Summary and conclusion

Pre-test assessment focussed on participants' language skills, cognitive and motor functioning, and understanding of the terms same/different. The CASP scores (van der Gaag, 1988) revealed that participant scores fell, in the main, within the upper quartile range of language ability for people with an intellectual impairment. Single word receptive (age equivalent) scores (B.P.V.S, Dunn et al, 1997) ranged from 4:05 ys – 10:10 ys, reflecting a broad range of ability.

Participation in the Map Task relies heavily on individuals being aware that their role is different from their partners and on being able to shift their mental perspective towards that of another. This was measured in the current study using a test of false-belief. This indicated that participants were at least partially successful in attributing belief states, but that some difficulty was experienced beyond first order measures. This is consistent with a number of studies (e.g. Benson et al, 1993) and suggests that individuals with intellectual impairments experience particular difficulty in comprehending events according to a second order theory of mind. Surprisingly, three participants failed to consistently show that they had been able to take account of other's beliefs (zero order theory of mind) according to test procedures. It is unclear why this should have occurred since performance on this test was unrelated to other measures (receptive vocabulary scores). Tager-Flusberg and Sullivan (1994) report a similar lack of association between this type of verbal test and theory of mind in individuals with intellectual impairment. Performance was linked, however, to measures of participant's comprehension of syntactic constructs, suggesting that linguistic ability is nevertheless an important correlate of performance on

this test. Therefore, one explanation may be that the demands of these two tests are quite dissimilar, and/or that higher language skills are a necessary but not sufficient predictor of the acquisition of second order theory of mind (Baron-Cohen, 1989). Second, it is possible that the processing requirements of the test may have constrained individual's ability to integrate various pieces of information (Shatz, 1983), even though they were able to isolate key points during control questions. This might explain why participants appeared to experience little difficulty in responding to control questions and yet failed to assimilate this information towards a cohesive representation of another's beliefs. Finally, using toy characters to animate the two scenarios may have reduced the saliency of relevant task information. Using real people or videos to illustrate the stories may have increased the significance of other's actions and participant's understanding of their mental states (Ashcroft et al, 1999).

A simple assessment developed to assess dexterity found that any difficulty experienced with motor co-ordination skill was insufficient to influence performance on the Map Task. Finally, assessment of experimenter vocabulary use (same/different) indicated no problem with using these terms during testing.

5.6. The communication task

The Map Task (Brown et al, 1984) is a referential communication task where two participants work together in order that one can reproduce a route drawn on their partner's map. Materials used during the Pilot Study were drawn from maps designed for investigations into the communication skills of adults with an acquired language disorder (e.g. Anderson et al, 1997). These maps were of equal difficulty and designed to reliably elicit landmark names without written labels. The three maps that were selected from this corpus were modified as follows:

- i) All orthographic labels were removed. This was to avoid possible distraction, discomfort or distress with written material.
- ii) The single route line on the Information Givers map was replaced with two parallel lines, approx. 1 cm apart. Arrows were drawn between these lines to represent the direction of the route from start to finish. An example of these maps can be seen in Appendix 2.

Participants work in pairs to reproduce the route given on Information Givers maps on to Information Followers maps as accurately as possible. Giver and Follower maps share eight common landmarks (i.e. that are identical and in the same location on both maps) and three unique features. All Information Givers have one landmark that is duplicated on their map, once close to the route (and therefore useful in guiding the route's position) and the other some distance away. Corresponding Information Follower maps have only one copy of this feature and this is located in the position furthest away from the route. Discrepant features are included to provide an element of communicative challenge. Landmark tokens represented a mixture of high (>40 per million), medium (20 - 40 per million) and low (< 20 per million) frequency British – English words (Anderson et al, 1997), and alternate along the route between common (i.e. shared) and unique features.

Pilot Study participants were assigned to the Information Giver role throughout main Map Task trials. This was for a number of reasons. First, the Giver role has previously been shown to elicit greater amounts of dialogue than for Information Followers (e.g. Boyle & Anderson, 1994; Doherty-Sneddon & Kent, 1996). It was anticipated that designating this role to the participants might encourage them to contribute during the task. Second, a number of the studies reported earlier (please refer to Chapter 3, Section 3.4) reveal difficulties in the day-to-day communication environment of people with intellectual

impairments. Concerns have been raised over what is described as a controlling or didactic communication style in some staff members (e.g. McConkey, 1999a, b; Markova et al, 1994), leading to few opportunities for clients to contribute equally during interactions. The Map Task allows us to manipulate the communication environment so that one participant, the Information Giver, can assume a more dominant role. This is because only the Information Giver is provided with detail of the route on a map. It is only through collaborating with their communication partner that Information Followers can gain the necessary information to allow them to replicate this route accurately onto their own map. Weighting knowledge in favour of the current participants (Information Givers) allows us to examine the communication style of care providers where they can less straightforwardly assume a dominant position. It will allow us to look for evidence of specific communication strategies that might be asserted by Information Followers attempting to remove the communicative lead from Information Givers, and how these influence success. We might find, for example, that certain speech acts allow Information Followers to become more directive during interactions and that these are used differently, or at different rates, by partnership groups (carers, students and peers).

Finally, Leudar (1997) alerts us to violations that frequently occur during interactions including at least one person with an intellectual impairment. He suggests that many individuals experience constant difficulty in asserting legitimacy behind their verbal acts and that this leads to lack of credibility and questioning of the validity of the individual's point of view. This, Leudar (1997) proposes, is because people with intellectual impairments tend not to be considered as reliable sources of evidence by others around them, including care providers. The current procedures allow us to examine and compare the responses of carers, students and peers to those parts of the Map Task where information becomes available from the Information Giver. Coding dialogues according to

the communication goals of the interlocutor will allow to assess how successful Givers were in getting their message across, and the illocutionary acts used by the partnerships that made this more difficult to achieve rather than easier.

Future investigation of the communication style of carer/client interactions might include procedures that allow the participants to swap Giver and Follower roles. This would be useful in examining how carers, students and peers take account of feedback from the participants and then use this information to shape or modify further instruction. It might also provide a broader picture of the ways that conversational partners attempt to bridge the gap between speaker and listener understanding where participants have signalled (or otherwise) a breakdown in understanding. Unfortunately, this fell outwith the time scale of the current investigation.

5.6.1. Performance measures

Two approaches were used to analyse Map Task performance. The first was a deviation score (Brown et al, 1984). This is measured by placing a transparent grid superimposed with the Information Giver's route onto Follower's map and allows for a centimetre square deviation score to be calculated on the difference (cm²) between Giver and Follower routes. A low deviation score suggests a more successful communicative outcome with information being grounded more successfully between participants than where deviation scores are higher. Higher deviation scores therefore tend to indicate a less successful communicative outcome. The second method of scoring the maps was to note how many landmarks were correctly identified by Information Followers during trials (Brown et al, 1984). Each landmark is scored as being identified correctly where:

- i) The route approaches the landmark from the correct side

- ii) The route passes the landmark in the correct direction

This is similar to a third possible method for scoring the maps as described by Lamb, Bidy, Wood and Leyden (1998) in their study of children with moderate intellectual impairments. Here the number of landmarks incorrectly visited by the Information Follower was deducted from a maximum possible score of twelve, due to the large centimetre deviation scores measured between Giver and Follower routes. So in the Pilot Study, a deviation score of 290 cm², and where three landmarks are correctly visited, is considered as representing a more successful communicative outcome than where the Information Follower route deviates 457 cm² from the Giver route, and where one landmark is correctly visited. Details of deviation scores and the number of landmarks visited during the Pilot Study are shown in Table 5.4 and Table 5.6.

5.6.2. Citation naming

After completing the Map Task, Pilot Study participants were asked to name landmarks iteratively from citation cards. The purpose of citation naming was to assess how identifiable landmarks were to participants and therefore their usefulness in the task.

Pictures were compiled from Information Giver landmark tokens and laminated onto pieces of card, approx. 8 cm x 8 cm. Post-testing, cards were presented to the six individuals that took part in the Map Task trials for naming. Note was made of the landmark tokens named during citation naming and Map Task trials. This allowed for investigation to be made of the relationship between:

- i) The number of tokens named during trials and those identified during citation.
- ii) the reliability of landmark features to elicit target names
- iii) the nature of token substitution

5.6.3. Recording Materials

Interactions were recorded on a portable Aiwa digital recorder (model number HD-S1) connected to two external mono microphones and positioned in front of each participant. Video recordings were made on two Sony 8 Video Camcorders (model number CCD TR37OE), one positioned behind each participant on Han Video Tripods. One video camera was connected to two external microphones which were placed in front of each interlocutor.

5.6.4. Design

Pilot Study participants took part in the Map Task on separate occasions with each of the following communication partners: a carer, a student and a peer. Due to procedural difficulties only four participants completed trials with all three partners (Participants 1, 2, 5 & 6); one participant completed two trials (Participant 3) and one participant took part in one trial (Participant 4). This resulted in six participants completing trials with a peer, five with a carer and four with a student partner. Ordering of partners was counterbalanced across Map Task trials. Maps were counterbalanced across each of the three partnerships.

5.6.5. Procedures

Maps were reproduced on A3 size paper (42 cm x 30 cm). Participants were seated at each end of a table (approx. 180 cm x 90 cm) in a quiet, well lit room in their own Day Centre. A 25 cm x 80 cm screen was erected between participants during trials. This allowed participants to view one another's face and upper body but not each other's map. Trial times were recorded using a digital stopwatch.

5.6.6. Practise Session

Participants took part in a practise session immediately prior to the main trials. For this interlocutors were given simplified versions of Information Giver and Follower maps (see Appendix 6). These differed from main trial maps in that: 1) maps had six features and only one of these was not shared by both participants and 2) the route was shorter. Pilot Study participants were assigned to the role of Information Follower during practise sessions as it was felt that they would gain greater insight into the demands of the task if initially given responsibility for drawing the route. No performance outcome measures were analysed from these trials since they were not comparable with main trial maps.

After the practise session Giver and Follower maps were shown to each interlocutor for comparison. Information Follower routes were retraced and compared to the Giver's map using examples of commands and prompts offered by participants during interactions. Participants were given the same scripted instructions for practise and main session. This was as follows:

'Today we are going to play a game. This game is about drawing maps. I will give you each a map and tell you about them'.

Practise session

To the Instruction Giver (carer/student/peer):

'You and your partner have both got a map of the same place. Your map has a road on it. This road starts here and goes all the way to here (use finger to trace route). Your partner also has a map but his/her map doesn't have the road on it. What I would like you to do is to tell your partner all about the road so that he/she can draw it on his/her map. Most of the pictures on your partners map are the same as your, but some may be different. Don't forget to tell your partner when you reach the finish'.

To the Instruction Follower (Pilot Study Participant):

‘You and your partner have both got a map of the same place. Your partners map has a road on it. He/she is going to tell you about this road so that you can draw it on your map. This is where the road starts (point). Listen carefully to what your partner says and ask questions if there’s anything you’re not sure about. Most of the pictures on your partner’s map are the same as the ones on your map, but some may be different’.

Main Session

‘Now we’ll play the map game again. I will give you each another map and then tell you about them’.

5.6.7. Results and discussion

Table 5.4 details Map Task deviation scores for each Pilot Study participant. Trials that were not completed have been marked with a dash. Three maps could not be scored and these are marked with an asterisk. As can be seen from Table 5.4, these were all produced during interactions with a peer Information Follower. This was because:

- For Pair 2 the route measured 15 cm in a zigzag design and did not connect landmarks
- Pair 4 had several lines extending around each Information Follower landmark that did not join in a continuous line
- Pair 5 individual landmarks were circled and there was no continuous line.

Scoring according to the number of landmarks correctly visited (number in brackets) also suggests a trend towards a less successful outcome for peer partners than where the Follower was a carer or student. However, scores are low for each of the three partnership groups when measured according to this criterion. One reason for this may be that this method of scoring is less sensitive to the level of mutual understanding established

between speakers and listeners. This is because Information Follower routes frequently targeted the correct landmark feature on the map but failed to approach and/or pass it in the prescribed manner. Using the centimetre difference between Giver and Follower routes takes account of moment-to-moment changes in the levels of mutual understanding throughout interactions rather than at selected points on the map.

Participant	Partner		
	Carer	Student	Peer
1	290 (3)	333 (2)	457.5 (1)
2	435 (2)	294.5 (1)	* (1)
3	260.5 (1)	-	477.5 (1)
4	-	-	*
5	458.5 (1)	207 (3)	*
6	298 (3)	488.5 (1)	433.5 (1)
Means	348.4 (2)	330.8 (1.4)	456.2 (1)

Table 5.4. Map Task Scores (cm square) and the number of landmarks correctly visited (number in brackets) for partnerships in Pilot Study 1

It would appear then that communication is least successful when both interlocutors have an intellectual impairment in comparison to those situations where at least one partner was non-impaired. This may be because peer interlocutors were unsure about the purposes of the task and/or found it overly challenging without the support of a 'skilled' communicator. Adept communicators tend to assume greater responsibility for guiding interactions where participants are differentially skilled (Short-Meyerson and Abbeduto, 1997), by scaffolding the discourse towards a more successful outcome (Abbeduto et al, 1999). It may be that Pilot Study participants found it more difficult to construct a coherent representation of the task when this support was not available. Extract 2 illustrates a typical section of dialogue

from one of these less successful interactions (Pair 2, peer interlocutors). The Information Giver and Follower maps used by these interlocutors are illustrated in Appendix 7.

Extract 2. Pair 2: peer Follower dialogue (no deviation score; 1 landmark visited).

*TA = Information Giver (Pilot Study participant); TB = Information Follower (peer partner). # = pause; < / = overlapping speech

*TA <Em # left # left/

*TB Aye

*TA right. Right.>

*TB Left or right? Right

*TA Left again # right to again # left again # and to your # right # then left again # and no your right # then # left # that'd # me # finished.

*TB Hey. That's quick.

Here the Information Giver fails to make explicit the identity of referents that would assist her partner in replicating the route. At the same time the Follower appears to be unaware or is unable to signal to the Giver the informational dearth of the instructions, and that they are wholly inadequate in guiding her around the map. The resulting communicative event fails to get off the ground in terms of establishing any real understanding about the purpose of the interaction and leads to a comparatively poor performance for this participant.

Extract 3 illustrates a section of dialogue from a more effective interaction, but one that is nevertheless less successful for this individual (female participant, Pair 1).

Extract 3. Pair 1: peer Follower dialogue (deviation score 457.5 cm; 1 landmark visited)

*TA = Information Giver (Pilot Study participant) ; *TB = Information Follower (peer partner)

*TA Mm # em # you got a castle?

*TB Yeah # yes.

*TA Well put it to the castle

*TB Aye

*TA Right. That near the end?

*TB No

*TA Right, have you got a # s # a, no, you've not got a swan have you?

*TB No

*TA Have you got a wishing well?
*TB Yes
*TA Well put it # to the wishing well
*TB Right

Here, the Information Giver successfully isolates salient features of the task for her partner to identify, and checks his understanding of instructions through a series of checking questions and Aligns (Kowtko et al, 1991).

Overall, it would appear then that a few tentative suggestions could be drawn from the Pilot Study. These are that 1) Pilot Study participants (Information Givers) were least successful in establishing mutual understanding with their communication partner when he/she was a peer. The one exception to this was Pair 6. Here, peer interlocutors were marginally more successful than where the Information Follower was a student. This suggests that not all scaffolding was equally successful. 2) Communication was generally more effective, however, where the Information Follower was a student or a carer. This suggests that carers and students may have scaffolded task dialogues in such a way that it increased the likelihood of communicative success. This is investigated in more detail in the chapter on Conversational Games Analysis (Chapter 8). 3) Importantly, the Map Task appears to be a useful way of ‘measuring’ communication in this population.

5.7. Landmark identification

Each map (Map A, B & C) was used five times during the Map Task, leading to a possible 150 citation form naming of landmark features (5 x 10 (novel landmarks on Information Giver maps) x 3 (Maps A, B & C)). Of these, Pilot Study participants accurately named ninety-three features during citation testing and sixty-three during Map Task trials. Table 5.5 provides detail of how frequently each landmark was named in citation naming. As can be seen from this, six tokens were reliably named during citation i.e. on each citation test.

Nine tokens were named four times. Due to an error two landmarks were duplicated across maps and have therefore been counted only once; these are marked with an asterisk. Five tokens were named three times; three tokens named twice; four tokens named once, with one token not named at all during citation naming or the Map Task (flamingo)

No. named	Map A	Map B	Map C
5	Bus Car		Sheep Swan Tree House
4	Dog Wishing Well * Bench * Horse	Tent Bench * Pig	Cat Fence Caravan Wishing Well *
3		Bridge Wall White mountain Black Mountain Windmill	
2	Kennel Church		Tower
1	Cemetery Pillar Box	Volcano	Telescope
0		Flamingo	

Table 5.5. Landmark tokens correctly identified during citation naming

A number of landmarks were identified differently from the target vocabulary token. Some were features that were correctly identified but referred to by a synonym or closely related but more high frequency vocabulary, e.g. seat and summer seat for bench, home for a dog, house, dog house for kennel and mountain with clouds and mountain for volcano. With the exception of bench/seat tokens that were susceptible to these substitutions were low frequency words that appear less than 20 times per million words in British-English. This was not the case for perceptual/semantic errors. This is where landmarks were identified in

the same semantic field but incorrectly, perhaps due to some visual perceptual misidentification and/or semantic error, e.g. cow for horse, sheep for pig and dog for cat. Some participants appeared to negotiate their partners around the map without reference to any landmark features. This is illustrated in Extract 4, a section of dialogue from Pair 6, student Follower interaction.

Extract 4. Pair 6: student Follower dialogue (488.5 cm; 1 landmark visited)

*TA = Information Giver (Pilot Study participant)

*TA It starts there # it goes right round # and goes right round and right round, right round, up # up # up # up # up # up and along, and along # up # up # up # up, up # up # along, along, along # along # along # up # up, up, up # up, along, down, down, down #around, round, round, round, round, finished.

Extract 4 illustrates the entire interaction for Pair 6 during the Map Task. Pauses during the Information Giver instruction were accompanied brief gazes towards the partner's face. This suggests that the Giver may have been have been monitoring feedback from the Information Follower in the absence of any verbal contribution and that she was aware of her partner's need for instruction to complete the task. However, as the Follower fails to signal the inadequacy of her partner's instruction, the Giver is not aware that her instructions are impoverished in terms of their informational value. This contrasts with the communication style in Extract 5 and 6 where the Information Follower was a student (Extract 5) and a carer (Extract 6). Giver and Follower maps from Extract 6 are shown in Appendix 8.

Extract 5. Pair 5: student Follower dialogue (deviation score 207 cm; 3 landmarks visited). *TA = Information Giver (Pilot Study participant); *TB = Information Follower (student partner)

*TA No

*TB You've got the car at the, you just got a car at the top of your page?

*TA < Car, pillar box # a wishing well /

*TB Is that all at the top of the page?

*TA a. Yes. >
*TB Right # that, is that, do you just keep going on going to the end of the page?
*TA Yep, yes. You just keep going # and you go past a horse,
*TB Where's the horse? The horse at the top?
*TA Em. The bottom.
*TB Is it underneath the car?
*TA Underneath the wishing well.

Extract 6. Pair 3: carer Follower dialogue (deviation score 260.5 cm; 1 landmark visited). *TA = Information Giver (Pilot Study participant); *TB = Information Follower (carer partner)

*TA I got a well
*TB Well, the well I've got's down the bottom of the page.
*TA So's mine.
*TB Right, but where does the road go?
*TA To the caravans.
*TB Ah, but you start at the caravans all right, and then what direction does the road go?
*TA To there.
*TB Where's there?
*TA To there # to the cat.
*TB Right, I'm going to the cat.

These examples illustrate how some dyads successfully negotiated landmark features to co-construct mutual understanding. They also demonstrate that the Map Task was successful in eliciting spontaneous interaction between the Pilot Study participants (Information Givers) and their communication partners, but that for some individuals (Extracts 2 and 4), it required further modification to make it more accessible. More successful interactions were those where speakers and listeners adopted a system of Checks and Aligns to confirm their own and their partner's understanding instructions and demonstrated an increased commitment towards establishing shared beliefs. This type of verbal strategy has been described as adopting a communicatively cautious approach (Anderson and Boyle, 1994) towards information exchange, and has been shown to lead to better performance outcomes in typical adults than where partners fail to collaborate so effectively (Anderson and Boyle, 1994; Doherty-Sneddon et al, 1997).

In light of these findings it was decided to further modify the Map Task so that it might become more accessible to peer partners with intellectual impairments. Landmark features were modified to make them more recognisable through the use of colour, prototypical images and featured in the main high frequency tokens. Post-test comments by carer providers (DCOs) suggested that the level of difficulty between practise and main maps was too great. They indicated that practise maps were overly simplified and not representative of the complexity of main trial maps. This led to difficulty, they felt, for both communication partners. These maps were made slightly harder to bring them more into line with main trial materials.

5.8. Pilot Study 2

Modifications to the maps

It was felt that increasing the saliency of landmarks might encourage Givers to use them as a means of guiding their partner around the maps and provide more clues to Information Followers. This would lead to an increase in the number of times landmarks are mentioned across trials and more lexical items for future analysis. It was further anticipated that by using more iconic images of target items and higher frequency words there would be an increase in the reliability of referent terms. Landmarks were balanced for linguistic complexity across trials so that target tokens were of similar complexity in each of the three maps (Maps A, B and C). A description of the linguistic composition of landmarks can be found in Section 5.8.3.

5.8.1. Participants

These were the same participants from the earlier pilot study. Each took part in one Map Task trial with his or her final partner from the previous session, with the exception of Participant 1, whose peer partner chose not to continue in the study. This participant was

replaced with another male peer, (aged 33ys 9 ms), who had previously been diagnosed with Down's syndrome. He reported no difficulty with hearing or visual acuity and elected talking as his preferred means of communication. This resulted in three peer partnerships (Pairs 1, 4, & 6); two dyads with a carer Follower (Pair 2 & 3) and one dyad with a student Follower (Pair 5)

5.8.2. Materials

All recordings took place in the participant's own Day Centre approximately six months following first study trials. Sloping wooden stands were used to present maps to each participant instead of a screen (dimensions of board = 45cm x 34cm; lower height = 7cm, upper height = 22cm) because video recordings of earlier trials had shown that interlocutors tended to lean forward over their maps while exchanging information, and this led to some difficulty in transcribing tapes. It was felt that sloping wooden boards would encourage participants to remain seated in a more upright position and produce clearer recordings of each participant's face and voice. As in the previous study, these materials allowed participants to view one another's face and upper body but not each other's map. All recording equipment remained constant with earlier trials.

5.8.3. Selection of landmarks

Picture examples of each target item were produced using BoardMaker for Windows (Mayer-Johnson, 1994) and shown individually to Pilot Study participants for naming. Target items were selected to represent a variety of articulatory processes and place/manner of articulation. These were: simple monosyllabic tokens e.g. bus; complex monosyllabic tokens e.g. church; polysyllabic tokens e.g. binoculars; medial vowel contrasts e.g. goat/gate; medial vowel stress e.g. tomato; simple versus complex consonant contrasts e.g. spoon/moon; voiced/voiceless plosives e.g. pig, bike; and voiced/voiceless fricatives e.g.

flag, van. Items were removed that were misidentified on more than two occasions. The remaining tokens were manipulated to create three complete sets of landmark features for Information Giver and Follower maps, balanced for syntactic and/or phonetic complexity. Following on in principle from HCRC Map Task Corpus design procedures (courtesy of Ellen Bard, HCRC, University of Edinburgh), these were arranged to highlight features of sharedness and contrast. An example of the revised Giver and Follower maps can be seen in Appendix 9.

5.8.4. Practise maps

Landmarks now featured on the main maps were removed from practise maps. These were replaced with items from BoardMaker for Windows (1994) and represented in the main high frequency words (e.g. cap, scarf and fork). Three further tokens were added to Giver and Follower maps to bring them more into line with main trial materials. This included duplicating one landmark on Giver maps (once close to the route and the other some distance away), with only the furthest away item features on Follower maps. An example of a revised practise map can be seen in Appendix 10.

5.8.5. Results and discussion

5.8.5.1. Communicative performance

Maps A, B and C were randomly assigned to communication partners. As can be seen from Table 5.6, all of the dyads produced scoreable maps, with those partnerships that achieved a higher level of success in previous trials continuing to do so (Pairs 3 & 5). This suggests that the Map Tasks were now at a more suitable level of difficulty and that outcome measures produced by all three partnerships can be included in future trials.

Participant	Score	Partner
1	269 (1)	Peer
2	487 (1)	Carer
3	160 (2)	Carer
4	307 (3)	Peer
5	263 (3)	Student
6	366 (0)	Peer
Mean	309 (1.7)	

Table 5.6. Map Task (cm²) scores and the number of landmarks correctly visited (number in brackets) for partnerships in Pilot Study 2

Finally, if communicative success is calculated according to the number of landmarks approached from the correct side and moving in the correct direction (Table 5.6, figures in brackets), it can be seen that there is little overall change in performance outcome. The exception is Pair 4 (peer partner), whose map could not previously be scored. However, due to the near flooring effect of scoring performance according to this method, it would appear that the criteria might be too rigid to provide a useful indication of communicative success. It was decided, therefore, that in future scoring would be calculated according to the centimetre square deviation between Giver and Follower routes.

5.8.5.2. Analysis of dialogue: landmark identification and surface structure

Each map (Maps A, B & C) was used twice during proceedings, leading to a possible sixty naming of tokens across trials (2 x 10 (novel landmarks on Giver maps) x 3 (Maps A, B & C)). Of these, participants accurately named forty-nine features (81%) during map task trials. This is proportionately higher than earlier trials where 42% of items were accurately identified and would suggest that landmarks are more suited to the current participants.

Analysis of number of words and turns used by Information Givers and Followers showed

that they used on average 32% less words and 39% fewer turns were used during the second pilot study than in the last trial of Pilot Study 1. Taking into consideration other outcome measures, this suggests that interactions were much richer in terms of information value in the second phase of testing than during the earlier trial. Further, it indicates that the level of lexical demand was better targeted to people with intellectual impairments.

5.9. General Discussion

The aim of the pilot study was to: i) test the suitability of task materials to learning disabled population and ii) assess the need for investigation into participant's cognitive and motor functioning.

The six young adults who were the main participants in the study presented a broad range of communication skills and cognitive functioning. Each took part in a series of Map Task trials over two separate occasions, leading to a total of sixteen interactions. Over the course of these exchanges dyads including a carer, a student and a peer, however, due to procedural difficulties only four complete sets of data were acquired.

Early findings in Stage 1 appeared to suggest that although individuals were able to cope with the requirements of the task, acquiring performance in the range of 290 cm – 488.5 cm, there were difficulties apparent for peer partnerships. This led to the route on some peer maps becoming fragmented and unscorable. Analysis of tokens produced across interactions showed that participants were reluctant or unable to refer to landmark positions in terms of their proximity/relationship to the route. Those that were elicited tended to be inconsistently named and/or misidentified. Care providers (Day Care Officers) suggested that the level of difficulty between practise and main trial sessions was too great. They

indicated that practise maps were overly simplified and not representative of the complexity of main trial maps.

Stage two of testing followed consideration of these points. Landmark features that had been shown to be unreliable were replaced with tokens that were both recognisable and consistently named by participants. These were selected to represent a range of articulatory processes and manner/place of production. Colour was added to enhance the saliency of individual features. Practise maps were redesigned to increase levels of complexity and ambiguity i.e. more in line with main task materials.

These changes led to improved communication outcome scores for one carer Follower and all peer dyads, and produced an increase in the probability that landmarks would be named. Analysis of the dialogue showed that more successful outcomes were produced where participants collaborated sufficiently to establish mutual understanding. This involved interlocutors checking and aligning their interpretation of verbal exchanges and resolving ambiguity or misunderstanding as it arose, i.e. they adopted a communicatively cautious approach (Anderson and Boyle, 1994; Doherty-Sneddon et al, 1997). In the main, individuals were able to target and identify essential referents and communicate effectively with carer and student partners. These skills are essential for the management of everyday conversation (e.g. Rueda and Chan, 1980; van der Gaag and Dormandy, 1993; Kernan and Sabsay, 1997). Problems were apparent, however, for some participants communicating with a peer partner. This may be due in part to the poor informational value of instruction from the Information Giver and inadequate signalling of non-comprehension from Information Followers. Communication was more successful when it was scaffolded by a 'skilled' communicator, regardless of whether the Follower was a carer or student.

The Map Task was successful in eliciting spontaneous interaction between individuals with an intellectual impairment and their communication partner. Further, it appears that the task was useful in identifying specific areas of language use in this group of young adults that may influence communicative effectiveness. The task allowed participants to practice skills that are necessary to monitor and resolve potential ambiguous information, particularly challenging for this group of people (Abbeduto et al, 1997; Fujiki and Brinton, 1993) in a relaxed and friendly atmosphere.

It was decided that the Map Task and all pre-test assessments should be included in further investigations of communicative effectiveness in young adults with intellectual impairments. This is described in the following section. Chapter 6 provides detail of the individuals that took part in the research following completion of the Pilot Studies.

Chapter 7 goes on to look at global measures of communicative performance during the Map Task, including deviation scores and the structure of dialogues in terms of the number of words and turns used by interlocutors to complete the task. Communication process is described in Chapter 8. Here Conversational Games Analysis (Kowtko et al, 1991) is used to investigate the ways that interlocutors constructed interactions and attempted to establish mutual understanding. Particular focus is given to whether non-impaired (carers and students) might attempt to support ongoing conversations and how this influenced communicative success. Detailed investigation is also made of the interactions between peer participants and in particular, the ways that speakers might adapt their communication style to meet listener needs.

**Part 4: Main study: participant profiles, communication performance and dialogue
outcome measures**

Introduction

The aim of the current research is to investigate the effectiveness of communication in young adults with intellectual impairments in different partnerships. Previous chapters have outlined some of the issues most relevant to communication for this population and these include language ability and the influence of context or environment. One particularly important environmental influence on communication skills is the opportunity to practise available linguistic and non-verbal repertoires so that they might be used most effectively. Key to providing such opportunities are care providers and others in regular contact with this client group. A number of studies outlined in Chapter 3 suggest problems in the way that some care providers approach communicative episodes with the client group. Specifically, it has been claimed that carer communication style may act to constrain rather than aid communicative effectiveness and that this can lead to difficulties. The aim of the thesis is to examine and compare the communication strategies that develop during carer/client interactions with those where the communication partner is a non-impaired unfamiliar adult or a peer. The research hopes to identify those characteristics of the collaboration between speakers and listeners that are most successful in establishing mutual understanding, and how they are used by partnership groups.

Chapter 6 introduces the participants from the main phase of data collection. These participants were all recruited following completion of the Pilot Study and took part in the Map Task on three separate occasions, once with a carer, a student and a peer. All main participants and peer partners were assessed for language ability, understanding of the terms same/difference and motor co-ordination skills. The thirteen main participants also took part in assessment of theory of mind, one measure of social cognition.

Chapter 7 describes the procedures used during the main phase of the research and the outcome of analysis on Map Task scores and the structure of dialogues. Dialogue structure

was investigated by looking at the number of words, turns and words per turn used by participants to complete the task. These measures provide an early indication of the level of interaction between speakers and listeners and possible differences in the communication style of interlocutors across the partnership groups.

Chapter 8 of the thesis examines the ways that speakers and listeners used communication acts and how effective these were at establishing mutual understanding in terms of performance outcome measures (deviation scores). Interactions were coded using Conversational Games Analysis (Kowtko et al, 1991), a system for coding dialogues according to the communication style of interlocutors and in line with speaker goals. Conversational Games Analysis was first introduced in Chapter 2 and is used extensively in the current research to investigate differences in communication process across the three partnership groups. The research looks for evidence of the ways that interlocutors attempt to establish mutual understanding and how partner communication style might influence success. Investigation is made of the ways that non-impaired partners (carers and students) attempt to bridge the gap between speaker and listener understanding, and if this is equally successful in both partnership groups. Methodological procedures were identical to those used during the Pilot Study unless otherwise stated. Testing took place over the period of a year and included no individuals from the earlier study.

Chapter 6. Main study participants

6.1. Introduction

People with intellectual impairments differ from one another as much as any other population group and each has widely differing needs and characteristics (e.g. Mittler, 1979; McGrother, Hauck, Bhaumik, Thorp and Taub, 1996; Hatton, 1998). Some of these differences relate to age, gender and ethnicity but must also include diversity in the experiences of individuals (Myers et al, 1998). The young people that participated in the current research represent one small cohort from within this diversity, each bringing with them a broad range of experiences as speaker and listener. This chapter describes the participants that contributed in the main phase of research in ways that seem most appropriate to participation in the task. Each young person with an intellectual impairment took part in assessment procedures sensitive to an adult population and aimed at measuring those characteristics most relevant to the research. These were receptive and expressive language ability, social cognition, motor co-ordination and understanding of the terms same and different. Assessment procedures revealed a broad range of ability in two out of four discrete areas of processing (language and social cognition). This chapter begins with a profile of each participant group before going on to describe procedures and findings from other pre-test assessments completed by participants with intellectual impairments.

6.2. Participants

6.2.1. Main study participants

These were seven male (mean age = 27 ys) and six female (mean age = 25.05 ys) individuals in receipt of services provided for adults with learning disabilities in Central Scotland. Individuals attended one of four centres on a regular basis. These were two adult day centres funded by the local authority and two workshops co-funded by a charitable organisation and the local authority. Most of the young adults also attended a

local College of Further Education on a modular basis or participated in distance learning schemes provided by a remote educational establishment. Courses included weaving, pottery and ceramics, computing, cooking and literacy skills. A number of individuals also worked on a part-time basis (one to two days a week) for local employers or volunteered for local charitable organisations. Vocational positions related to general assisting duties, including tidying up, washing dishes and assisting other members of staff. Interests and hobbies outwith Day Centre hours centred around social and/or sports clubs provided for people with learning impairments such as swimming, drama clubs and Duke of Edinburgh award schemes, or involved support from other family members, e.g. playing Bingo. No participants had been diagnosed with Down's Syndrome or reported problems associated with hearing or visual acuity that would affect their ability to take part in the study. All participants selected speaking as their preferred means of communication.

6.2.2. Communication partners

The main participants took part in trials with each of the three communication partners: a carer; a student; and a peer with intellectual impairments. Ordering of partner was counterbalanced across Map Task trials.

Carers: carers were 12 key workers/team leaders previously assigned to main participants in their Day Centre/Workshop. One further key worker (n = 13) was based outwith these facilities but visited her partner at home on a regular basis. Eleven carers formed same sex partnerships with intellectually impaired participants while two carers formed mixed male/female dyads.

Students: student partners were thirteen undergraduate students: five 1st year and one 2nd year Speech and Language Therapy students and seven students from other disciplines

(Consumer Studies, Drama, Retail Management and Biology; mean age: male = 21.06 ys; female = 18.07 ys). All were native Scottish speakers with little or no experience of working with intellectually impaired people. Students were gender matched with their partners to form same sex dyads.

Peers: these were friends (7 males mean age = 25:02 ys; 6 females mean age = 21:09 ys) selected by main participants to take part in the study. Each formed same sex dyads with their communication partner and elected talking as their preferred means of communication. No individual reported hearing or visual difficulties that would interfere with their ability to take part in the task. Two males (Pairs 6 & 7) were diagnosed as having Down's Syndrome. Interests were similar to those listed for main participants, e.g. swimming, football and social/youth clubs provided for people with learning impairments and/or those involving support from other family member, e.g. attending football matches.

6.3. Language Profile: Participant with intellectual impairments

Participant and peer partner language skills were assessed using the Communication Assessment Profile for People with a Mental Handicap (C.A.S.P., van der Gaag, 1988) and the British Picture Vocabulary Scale (B.P.V.S., Dunn et al, 1997). The C.A.S.P. scores revealed that the majority of main participant scores fell within the upper quartile range for people with intellectual impairments, with a mean receptive language score for verbal IQ of 8:05 ys according to the criteria outlined in the B.P.V.S. Peer partners scores tended to fall below those of main participants in most of the categories tested, and in particular for B.P.V.S. - mean = 6:02 ys. Profiles for all young adults with intellectually impaired are illustrated in Tables 6.7 and 6.8. Note that peer partners were not assessed for communicative functioning as it was felt that not enough time was spent with these individuals to give an accurate account of their abilities.

Main Partic.	Sex	Age	Single Comp.	Single Express.	Sentence Comp.	Sentence Express.	Comm. Function	B.P.V.S (years)
1	Female	20.01ys	85	Approp	60	80%	80	10.02ys
2	Female	34.03ys	95	Approp	80	100%	80	5.00ys
3	Male	23.08ys	85	95% app	90	100%	90	8.05ys
4	Female	23.05ys	80	Approp	70	90%	90	8.07ys
5	Female	27.02ys	90	Approp	90	80%	90	10.10ys
6	Male	21.01ys	90	Approp	80	80%	90	8.08ys
7	Male	26.08ys	85	Approp	90	90%	90	8.05ys
8	Male	29.09ys	90	Approp	90	97%	90	12.10ys
9	Male	28.02ys	75	85% app	80	60%	60	5.10ys
10	Male	20.04ys	60	85%app	60	67%	80	6.06ys
11	Female	28.05ys	85	85% app	80	87%	80	7.09ys
12	Male	29.02ys	90	Approp	90	100%	90	9.11ys
13	Female	29.04ys	85	Approp	90	90%	80	5.10ys
Means		24.09 ys	84.2		80.8	86.2	83.8	8.05 ys

Table 6 7. C.A.S.P. profiles and B.P.V.S. age equivalent scores for main participants
Communication Assessment Profile for People with a Mental Handicap (C.A.S.P.) and British Picture Vocabulary Scale (B.P.V.S) age equivalent scores. Column 4 = vocabulary comprehension; Column 5 = vocabulary expression (approp = appropriate); Column 6 = sentence comprehension; Column 7 = sentence expression (percentage score); Column 8 functional communication; Column 9 = B.P.V.S age equivalent scores.

Peer partner	Sex	Age	Single Comp.	Single Express.	Sentence Comp.	Sentence Express.	B.P.V.S. (years)
1	Female	32.05ys	55	80% app	70	97%	4.08ys
2	Female	20.01ys	65	90% app	70	80%	5.01ys
3	Male	23.10ys	85	90% app	90	75%	5.07ys
4	Female	32.10ys	75	85% app	40	80%	7.04ys
5	Female	25.09ys	85	Approp	90	80%	6.05ys
6	Male**	20.11ys	70	75% app	60	83%	6.01ys
7	Male**	21.02ys	60	85% app	50	70%	4.03ys
8	Male	27.04ys	95	95% app	90	100%	7.00ys
9	Male	19.01ys	65	85% app	90	63%	7.03ys
10	Male	18.06ys	60	80% app	70	83%	3.06ys
11	Female	19.08ys	75	95% app	80	97%	7.01ys
12	Male	22.11ys	80	80% app	60	87%	6.09ys
13	Female	28.06ys	70	Approp	70	80%	6.05ys
Means		24.01 ys	72.3		71.5	82.7	6.02 ys

Table 6.8. C.A.S.P. profiles and B.P.V.S. age equivalent scores for peer partners

** These individuals have been diagnosed as having Down's Syndrome.

6.4. Cognition, vocabulary and motor functioning

As outlined in the Pilot Study, taking part in a co-operative problem-solving task such as the Map Task involves a number of skills besides language ability. Three of these are assessed here as part of pre-testing procedures. Communication success is an outcome of the ways that speakers and listeners collaborate to establish and maintain a level of mutual understanding during interactions (e.g. Clark, 1985; Anderson and Boyle, 1994). This is measured in the current research according to how accurately interlocutors are able to transfer task information so that Information Followers can replicate the Giver route as accurately as possible. Clearly then some measure of interlocutor's motor co-ordination skills is required so that we might be confident that the route drawn by Information

Followers accurately represents the outcome of interactions. Second, as task instructions include the words 'same' and 'different', it is important to establish that these terms are meaningful to participants so that they are fully aware of discrepancies in task materials (i.e. landmark features). Finally, participation in the Map Task requires that speakers and listeners realise some sense of separation of the self from another. That is to say, interlocutors should be aware on some level that their role and the information made available to them during the task is different from that of their partner. There needs to be awareness that information must be shared with the communication partner in order that he/she can construct a representation or model of the task (e.g. Johnson-Laird and Garnham, 1980). This is investigated in the current research according to the principles underlying one measure of social cognition, a theory of mind. This is described below.

6.4.1. Social cognition

Concerns arose following the Pilot Study that the procedures used to investigate theory of mind might not be an appropriate way of measuring individual's ability to attribute beliefs. This was in response to near flooring in this test and the suggestion from a number of authors (e.g. Tager-Flusberg and Sullivan, 1994; Abbeduto et al, 1997) that performance on second-order theory of mind tests can be influenced by a number of factors, including language ability. It was decided, therefore, to assess main study participants for lower or first-order theory of mind as well as higher-order reasoning in order to gain a more balanced account of individual's ability to reason mental states. First or lower-order theory of mind was investigated using a paradigm first outlined by Baron-Cohen and colleagues (1985). Higher or second-order reasoning was tested in accordance with procedures already described in the Pilot Study, that is based on principles outlined by Baron-Cohen (1989) and Perner and Wimmer (1985).

6.4.1.1. First-Order Theory of Mind

Participants and materials

Participants were the 13 young adults with intellectual impairments that took part in the Map Task as main participants. Materials consisted of:

Story 1 – a basket, a box, a miniature chocolate, two characters (Vicky and Claire).

Story 2 – a basket, a box, a cupboard, a football, two characters (Alistair and Mark).

Participants listened to a taped recording of Stories 1 and 2 animated with the materials listed above. Stories 1 and 2 can be found in Appendix 11. The tape was paused at relevant points for test questions. These were 1) naming question – identifies characters, 2) belief question – individuals should select the original location to indicate that they appreciate the character's false belief 3) reality question and 4) memory question – these check that individuals know the final location of items and can remember their previous location. The test involves seeing one character (Vicky/Alistair) place an item (chocolate/football) into a basket, and while he/she is away, another character (Claire/Mark) moves it somewhere else (box/cupboard). Individuals need to reason that the first character will look for the item in its original hiding place because he/she will be unaware that it has been moved elsewhere.

Results and Discussion

All participants passed the naming, memory and reality questions. This shows that individuals recognised that items had been moved from their original location once Vicky/Alistair had left. Eleven participants (85%) passed the false belief question on both stories. One individual (Participant 9) scored first-order theory of mind on Story 1 and

zero-order on Story 2. Participant 11 selected the incorrect location on both trials (zero-order).

6.4.1.2. Second-order theory of mind

Responses were scored in line with Pilot Test procedures (see page 121). This showed that two participants (Participants 5 & 7) demonstrated first-order reasoning i.e. were able to attribute belief to another person. However, the remaining eleven participants scored a zero-order rating as their responses failed to take account of the character's beliefs.

Examples of zero-order responses include (Story 1) 'to cool down' and 'to go for a swim', and for Story 2 'to listen to CDs' and ''cause she's there'. Two participants (Participants 3 & 11) also failed the memory question. This controls for individual's ability to remember the character's position at the start of the test. These participants each responded that Stephen/Julie were in the house at the beginning of the story rather than in the correct location of bowling alley (Story 1) and park (Story 2).

The vast majority of participants then were able at some level to attribute beliefs about other's behaviour according to their mental state. Only one participant appeared to be less able to infer how belief systems might influence behaviour, at least according to current testing procedures. However, as performance on the higher or second-order theory of mind test indicates, outcome on this type of task appears to be influenced by a number of factors. This might include the saliency of testing procedures, information processing load and language demands of the task. Further, it highlights the complexity of using language-based procedures to investigate underlying cognitive processes (social cognition) with individuals with multiple levels of need. Of interest is that the two participants who failed to demonstrate first-order theory of mind recorded below average scores on most (Participant 11) if not all (Participant 9) aspects of language ability assessed by C.A.S.P and the B.P.V.S, though a number of participants with similar scores were more successful.

Bearing these caveats in mind, it was decided to proceed with Map Task trials for all thirteen main participants.

6.4.2. Vocabulary use

6.4.2.1. Participants and procedures

All main participants and peer partners ($n = 26$) were assessed for understanding of the terms 'same' and 'different'. Materials and procedures were as outlined in the Pilot Study (please see Section 5.4.3.1).

6.4.2.2. Results and Discussion

As was found during pilot testing, performance was more successful on trials for same/different pictures than same/different location. One main participant (Participant 2) and one peer partner (Pair 1) performed below chance on both the picture and location test (Participant 2: picture = 60%; location = 50%; peer partner, Pair 1: picture = 60%; location 60% correct). Participant 11 scored below chance on the location test (70% correct), as did a further six peer partners (Pairs 1, 2, 7, 10, 11 and 13). Overall, the vast majority of main participants (92%) and peer partners (92%) discriminated successfully between the terms same and different when asked to do so in the picture test, while 85% of main participants and 46% of peer partners recorded scores above chance for the location cards. This difference in performance may have occurred for a number of reasons, including the following:

1. Participants may have been unclear about the purpose of the location cards. These were presented following completion of the picture test and so individuals may have been confused about the change of focus.
2. Participants may have recognised the aim of the location task but were unable/unmotivated to use this information.

3. Assessment was not undertaken on participant's understanding of the term 'place', as was used during test instructions (see Pilot Study for details). It may be that individuals were unclear about the meaning of this word and/or how to relate it to test items.
4. Comparing locations in space may be cognitively more demanding than picture identification and so it is unsurprising that this is reflected in performance scores. This is supported from the communication assessment measures, which show that peer participant language profiles fell below those of the main participants. Similarly, performance on the location task was lower for peers than for main participants. One exception to this was Participant 2. She recorded above or close to group average scores during the communication assessment profile (though below mean on B.P.V.S), and yet was largely unsuccessful on both same/different tasks. The argument here is that spatial and pictorial tasks may involve different cognitive processes and that these are not necessarily equivalent in terms of cognitive load. Evidence to support modularity comes from work with so called 'split-brain' patients (Bogen, 1969 cited Olson, 1975). Bogen suggests that pictorial, spatial and linguistic processing is dealt with separately in the brain and that each can be selectively impaired following brain injury depending on the site of the lesion. Therefore, language skills may have contributed to performance on the picture and location tests but are independent of, and hold no one-to-one relationship with, spatial or pictorial processing skills. Equally, pictorial and location tasks may tap separate and discrete cognitive processes (Bogen, cited Olson, 1975).

It would appear that the vast majority of main participants understood and were able to discriminate between the terms same and different, at least in some situations.

Reassuringly, these terms were used during Map Task instructions in much the same way

as in the picture test. It was decided, therefore, to include all participants in further analysis.

6.4.3. Motor co-ordination skills

6.4.3.1. Participants and procedures

These were main participants and peer partners (n = 26). All materials and procedures were held constant with piloting procedures (see page 125).

6.4.3.2. Results and discussion

Eleven main participants and peer partners drew routes that remained within the boundaries of road marking. Two main participants traced the direction of the roads and occasionally 'cut corners', leading to deviation scores of 11.5 cm² (Participants 10) and 6.5 cm² (Participant 11). One peer partner (Pair 1) drew her own road (parallel lines) up the centre of the page but heading towards the College, while another (Pair 10) 'visited' each Day Centre along the way, crossing road boundaries en route. It is a little unclear then if these two peer partners experienced difficulty with motor co-ordination skills or were uncertain about the purpose of the task. Communication assessment profiles would tend to suggest that receptive language ability might have been a factor in the interpretation of instructions for both these individuals. Because of this uncertainty it was decided to include these two peer partners in the Map Task on the basis that some misunderstanding may have occurred relating to task instructions rather than difficulty in volitional motor movements.

6.5. Chapter conclusion

Individuals taking part in the current research represent a sample of people with intellectual impairments within a number of broad constraints. These relate to age, location and individual's preferred means of communication. Each of these will now be discussed.

A) Age – all participants with intellectual impairments that contributed to this study fell within the age range of 18:06 ys – 34: 03 ys. The decision to focus on this cohort was because of changes in government policy in the mid- 1970's to 1980's. This led to many fewer people with intellectual impairments being admitted to institutions, and those already there were encouraged to move into smaller, community houses (Caine, Hatton and Emerson, 1998). Therefore, much of the earlier research focusing on communication in relation to deinstitutionalisation (e.g. Brinton and Fujiki, 1993) is less relevant to today's young population. As is clear from the participant profiles, many young people with intellectual impairments are actively encouraged to take up activities within the wider community and so their communicative needs, and the demands placed upon them, are quite different from those of previous populations. It is important then that we find some means of examining the experiences of young adults with intellectual impairments with a range of communication partners.

B) Location – participants were recruited onto the research from a number of different day centre facilities. It should be recognised, therefore, that the circumstances and experiences of these participants may differ from other young people with intellectual impairments who are unable, or choose not to, make use of this type of facility. This may limit how widely findings from this research may generalise to these individuals.

C) Communication style – the Map Task focuses very heavily on transactional communication, that is the transfer of propositional knowledge (Brown et al, 1984). It is important that participants have some means of encoding relevant task information so that it might be decoded by their communication partner. Given the current research design, i.e. the inclusion of individuals unfamiliar to people with intellectual impairments, it was decided that the young people invited to participate in the study should previously have been observed to use verbal means of communication on a regular basis. Therefore, findings from the current research may not necessarily generalise to individuals with a higher level of need, such as those that rely on non-verbal means of communication.

As highlighted during reporting of the language profiles, peer partners recorded lower expressive and comprehension scores on average than the main participants. This may have occurred for a number of reasons, including the following. 1) Some peer partners chose not to contribute as main participants (i.e. to take part in three separate trials) but were happy to assist with one Map Task. It is possible then that a number of peers may have felt less able or confident as communicators than the main participants. 2) Main participants were asked to invite a friend of the same gender to take part in the research. This proved quite challenging for some individuals as a) some experienced great difficulty identifying a 'friend' or b) their chosen friend declined the request to participate. This sometimes meant that peer partners were not necessarily the main participant's first choice, and less closely 'matched' for communication ability. 3) On occasion, participants were very clear about their choice of partner and it was felt important to include these young people in the research whenever possible. Some of these individuals recorded C.A.S.P. and B.P.V.S. well below the group mean for peer partners (e.g. Pair 1 and 10), but were nevertheless included in the study.

People with intellectual impairments are a diverse group and so pre-test assessment aimed to describe the young people that collaborated in the research. Two of the tests (social cognition and vocabulary use) proved challenging for at least one main participant, though no individual recorded below mean scores on more than one occasion. A number of possible explanations for these findings are discussed in the relevant section. It is important to recognise, however, that both of these assessments rely heavily on verbal comprehension skills and so it is possible that the concepts under investigation were less salient to participants than might otherwise be the case during everyday encounters. Nevertheless, these assessments were included during pre-test procedures in an effort to describe at least some of the characteristics of the young people taking part in the study. It should also be remembered that the focus of the thesis is on the ways that the main participants and their partners collaborate during the Map Task. Therefore, the dependant variable used during the analysis on map scores and dialogue measures reflects the interaction of speaker and listener contributions, and how this might influence communicative success, rather than exclusively on the offering of one or other interlocutor.

The following chapter describes the procedures used during the Map Task and begins to look at the ways that interlocutors collaborated as Information Givers and Followers. The focus of the analysis is on the level of verbal effort contributed by interlocutors in each partnership group and how this might lay the foundation for investigation of communication process and performance outcome (Map Task deviation) scores.

Chapter 7. Communication performance and dialogue structure

7.1. Introduction

The aim of this chapter is to investigate the influence of partnership on the performance of young adults with intellectual impairments during the Map Task (Brown et al, 1984). Specifically, the research looks for differences that might be found in performance outcome (deviation scores) and dialogue structure (words and turns) depending on whether the communication partner is a carer, a student or a peer. Research discussed in earlier chapters raised a number of concerns. Most salient of these to the current study is the influence of communication environment, and in particular, the role of communication partners. Here we take one measure of communicative success, performance on the Map Task, to explore differences in the communication style of partnerships and how useful these were in establishing mutual understanding.

The chapter begins by describing the materials and procedures used during this part of the research and moves on to report the outcome of performance on the Map Task and a number of dialogue measures. These measures look specifically at the structure of interactions, that is the number of word, turns and words per turn used by interlocutors to complete the task. This provides us with a preliminary indication of differences that occurred in the communication style of interlocutors in each of the three partnership groups. Conclusions are drawn on the possible relationship between dialogue measures and communicative success, and these lay the foundation for analysis of communication process in Chapter 8 using Conversational Games Analysis (Kowtko et al, 1991). All recordings took place in a studio at the Scottish Centre for Research into Speech Disability at Queen Margaret University College (QMUC), Edinburgh. This was for two main reasons. 1) Recordings taken during the Pilot Study were subject to a number of interruptions, such as tannoy messaging and Day Centre members entering the research

area. It was felt that these distracted participants during the Map Task and needed to be minimised in any future investigation. 2) Problems were encountered in securing consistency (e.g. lighting, room size) in the research environment due to variation in the types of accommodation made available to participants from each contributing Day Centres. Further, it was anticipated that consistency would become particularly difficult to maintaining throughout the entire research period (approximately one year). Greater standardisation was achievable in the recording studio at QMUC and therefore it was decided that all Main Study recordings would take place outwith the Day Centres.

Recording at QMUC as compared with Day Centres raised a number of concerns: 1) co-ordinating the transportation of participants and their carer/peer partners to and from the College. This required careful planning and was subject to many last-minute changes and delays. 2) Familiarising participants with the experimenter. A lengthy period of familiarisation was included in the research protocol in an attempt to help the participants to feel more relaxed during the study. This has been summarised in Appendix 12. 3) Familiarising participants with the recording environment. This involved helping the participants to become acquainted with the recording studio and QMUC, and is also detailed in Appendix 12.

7.2. Materials and procedures

Map tasks (practise and main trials) were identical to those outlined in the Pilot Study. Two remote control Panasonic mini-dome cameras were stationed on opposite walls of the room and connected to a microphone (AKG C414b) so that interactions could be captured on videotape (Panasonic 8700 SVHS video recorder). The microphone was positioned on the table between participants' sloping boards, along with two external microphones (Audio Technics ATM 10a) connected to a portable digital audio recorder (Tascam DA-P1). Remote cameras were controlled from a separate room and remained focused on

participant's face and upper body throughout procedures. Output from each camera was fed into a digital AV mixer (Panasonic WJ – AVE55) and this allowed for a split screen image of both participants to appear on screen simultaneously. Trial times were recorded using a digital stopwatch. Participants sat at each end of a table (approx. 120 x 60 cm) in front of two sloping wooden boards, as previously described in the Pilot Study (Chapter 5, Section 5.8.2). Individuals first took part in a practise session before moving on to the main trial. All procedures were held constant with those outlined in the Pilot Study.

Participants took part in trials with each of their three communication partners, a carer, a student and a peer. Ordering of partners was counterbalanced across trials. Maps (Map A, B and C) were counterbalanced across each of the three partnerships. Please see Appendix 9 for an example of the maps used in the Main Study. Due to a procedural oversight one main participant (Pair 5) took part in a fourth Map Task trial. This was because the same map was used twice, once with the carer partner and again with a student. The fourth trial took place seven days after the previous testing (mean latency between testing = 9 days) and involved the same student partner.

7.3 Analysis of the data in Chapters 7, 8 and 9

All of the data reported in the thesis was subjected to parametric testing in line with earlier studies involving broadly similar design procedures and numbers of participants (please see Anderson et al, 1997; Doherty-Sneddon and Kent, 1996), and following statistical advice. The analysis revealed wide variation in a number of the reported findings. This is not in itself problematic (Howell, 1992), however for the sake of completeness parallel non-parametric testing was also performed on the research data. These tests make no a priori assumptions about the shape of the sample distribution and are not influenced by extreme scores. In a few of the analyses (particularly the transformed CGA), non-parametric analysis revealed a number of differences as compared to parametric testing. It

was decided therefore to err on the side of caution and to report non-parametric findings where these did not match up to those produced during parametric testing. This can help to protect against false reporting of rejection of the null hypothesis where sample size is small (Howell, 1992). Effects that are significant with both parametric and non-parametric testing are described using parametric analysis and duly form the basis for research argument. The dual analysis is reported in the thesis as follows. Findings from parametric testing are reported in the text where these do not differ significantly from non-parametric testing. For these effects, parallel non-parametric results can be found in an accompanying appendix (as signalled in the text). Where the results from parametric and non-parametric testing differed, i.e. where findings moved from significance to non-significant or vice versa, only those revealed using non-parametric analysis are reported in the text. This led to findings being reported largely from parametric testing for Chapters 7, 8 (Section A) and 9, and from non-parametric analysis in Chapter 8, Section B.

7.4. Task performance

The map scores were analysed using a one-way analysis of variance with partnership a within-subject variable (3 levels: carer x student x peer). The rationale behind this was that main participants took part in all Map Task trials as the Information Giver. Two maps produced in peer dyads could not be scored (Pairs 1 and 10), and therefore all data including Participants 1 and 10 was excluded from the analysis of Map Task scores ($n = 11$). This is because in one instance (Pair 1) the route consisted of a series of parallel lines drawn from the left to right of the page. In the other (Pair 10), the Follower drew landmarks mentioned by the Giver that were absent from his own map and replicas of those already present. No attempt was made to join either landmarks or the participant's own drawings with a continuous line (i.e. as a route). It may be that on these occasions peer interlocutors were unsure about the purpose of the task or were perhaps less able to cope with the demands of the situation. Language profiles (C.A.S.P. and B.P.V.S.) taken

prior to Map Task trials would tend to reinforce this, as detailed in Table 6.8 on participant profiles. These show that peer partner scores in Pairs 1 and 10 fall well below group means for language skills. Further, the Information Giver in Pair 10 also scored below average measures for language and this may have made it more difficult for him to compensate for the Followers poorer language skills. Nevertheless, this participant went on to successfully complete Map Task trials with a carer and student partner. The main participant from Pair 1 had already successfully taken part in trials with a carer and a student and so it was decided to include data from these two partnerships in further analysis on dialogue measures, though not during the analysis of map scores.

7.4.1. Reliability rating

Map Task scoring was checked by having a sub-sample of 11 maps scored by an independent judge. This was an undergraduate student who was provided with training on how to score the maps and otherwise not connected with the study. These maps were taken from a mixture of carer, student and peer Follower dyads. A Pearson's correlation co-efficient showed an inter-judge reliability rating of $r = .99$, $p < .01$.

7.5. Results

Means and ranges of scores are given in Table 7.9. A high deviation score (cm^2) represents a less successful communicative outcome than where deviation scores are lower. Analysis showed that performance was most successful in dyads where the Follower was a student. There was also a trend for partnerships that included a carer to produce better performance scores than where interlocutors were peers. Please refer to Appendix 13 for findings from non-parametric testing.

	Carer	Student	Peer
Mean scores	328.2 (124.8)	242.9 (112.4)	428 (229.8)
Range	151 – 683	122 – 586.5	158 – 465.5*

Table 7.9. Mean (SD) and range of Map task scores (cm²) based on sets of scores from 11 dyads. *Range does not include the two maps that could not be scored.

Measures taken from 11 sets of maps were subjected to square root transformation and entered into analysis of variance. This revealed a significant effect for partnership condition $F(2,20) = 6.96, p < .01$. Post hoc t-test analysis showed a significant difference in the deviation scores produced by student Follower dyads and those where the Follower was a carer ($t(10) = 2.30, p < .05$)¹ or a peer ($t(10) = 3.12, p < .01$). A trend was also found towards better performance in dyads including a carer in comparison to those where interlocutors were peers ($t(10) = 1.92, p = .08$).

7.6. Discussion and conclusions

Interactions between students and main participants were most successful in terms of performance outcome measures (deviation scores). As expected, the performance of peer dyads was poorer than where partnerships included at least one individual who was not intellectually impaired. What seems a little puzzling, however, is that interlocutors produced significantly poorer outcome scores when the Information Follower was a carer rather than a student. Carers and their partners entered into the task having previously

1. When looking at differences in outcome for partnerships including a carer or a student it is possible to calculate communication performance based on all 13 sets of maps, i.e. including those from Pairs 1 and 10. Analysis on 13 Map Task scores revealed that carer Follower dyads were less successful than where the Follower was a student (means: carer = 358cm (150.3); student = 273.2cm (139.9) – $t(12) = 2.62, p < .05$). This reinforces findings from previous analysis that main participants achieved greater communicative success when interacting with a student partner rather than carers.

communicated on a regular basis and would have been familiar with one another's communication style. This compares to student participants who had no previous contact with their partner. An interactionist perspective (e.g. Clark and Wilkes-Gibbs, 1986) might predict that interlocutors would find it easier to establish shared understanding where they are previously known to each other. This is because familiar interlocutors enter into a conversation able to assume a degree of shared knowledge and this can help them to coordinate their actions and ease constraints on the establishment of mutual understanding (Boyle et al, 1994). Boyle and colleagues suggest that one reason for this may be that familiar interlocutors are better at interpreting one another's verbal and non-verbal cues and that this can influence communicative outcome.

In the current research it is unclear at this point why interactions with carers were communicatively less successful. Two possible alternative explanations are proposed. First, partnerships including a student may have done something to facilitate the co-construction of mutual understanding and this assisted main participants to communicate effectively. This is to suggest that some additional feature was present during student Follower interactions and this increased levels of mutual understanding beyond that of carer/Giver dyads. Earlier research has shown that there are a number of strategies available to interlocutors that can increase communicative effectiveness. For example, using questions to introduce new information has been shown to increase levels of interaction and mutual understanding in typically developing children and adults (e.g. Anderson et al, 1991, 1994; Anderson and Boyle, 1994). The form of question used to elicit a response can also influence communication outcome. Most helpful are those that monitor speaker and listener understanding, such as Check and Align games (Conversational Games Analysis, Kowtko et al, 1991), so that discrepancies can be identified and resolved as quickly as possible (Doherty-Sneddon, 1995; Doherty-Sneddon,

1997). Features such as these may have been used more prolifically during student Follower interactions, increasing the likelihood of communication success.

A second possibility is that the communication environment of carer/Giver dyads was distorted in some way and this made it more difficult to bridge the gap between speaker and listener understanding. This provides support to reported difficulties in the communicative exchanges of care providers and people with intellectual impairments (e.g. Purcell et al, 1999; Bradshaw, 2001b), as highlighted in previous chapters. McConkey et al (1999b) found that care provider attitude to communication orientated around a didactic or 'teaching' perspective that relied heavily on instruction and correction. It may be that carers in the current study adopted a similar communicative posture and that this made it difficult for their partners to collaborate effectively. Certain forms of questioning, such as the use of open questions, have also previously been shown to be problematic for people with intellectual impairments (e.g. Booth and Booth, 1996). It is possible that these types of question, or some other form of speech act, may have featured more widely during carer Follower interactions and that these influenced communicative success.

It should also be recognised that Information Givers may have behaved differently with each partner regardless of what the Information Follower might have done otherwise. Speakers and listeners enter into conversations with expectations based on their previous experience as a communication partner (e.g. van der Gaag and Dormandy, 1993) and this can influence the way that they respond to different communicative situations. Taking an interactionist approach makes it difficult to disentangle speaker from listener contributions in terms of how each may have influenced the other's communication style. Therefore differences in Information Giver communication style with each partnership group may also have contributed to performance on the task.

These issues are explored in the analyses of communication process. Here, the structure and content of dialogues is investigated for each partnership group, i.e. including a carer, student or peer. Dialogue structure and content are investigated according to the number of words and turns exchanges between interlocutors and using Conversational Games Analysis (Kowtko et al, 1991), a coding scheme based on the functional use of language. In particular, focus is directed towards differences in the number and use of conversational acts across partnerships and the influence of task role on communication process. Finally, communication was marginally more successful for partnerships including a carer in comparison to peers. Had it been possible to include all 13 sets of maps, however, this would undoubtedly have moved closer towards significance given that two peer maps were so poor they could not be scored. Earlier studies looking at peer interactions have observed that the level of pragmatic awareness demonstrated by adults and children with intellectual impairments can vary according to the cognitive demands of the situation (e.g. Abbeduto and Rosenberg, 1980; Rueda and Chan, 1980). Where linguistic and non-linguistic demands are kept to a minimum, such as during informal conversation, adults with mild intellectual impairments use a range of illocutionary devices and acts to initiate and maintain the structure and topic of interactions (Abbeduto and Rosenberg, 1980). This is discussed in more detail in Chapter 3. Therefore, it is possible that the processing demands of the current task may have constrained peer performance (Shatz, 1977; 1983).

Speakers design their messages to take account of the listener during peer interactions (Hoy and McKnight, 1977). These authors found that two groups of children (Group 1 = M/A 6:6 ys; IQ 47.3: Group 2 = M/A 3:7 ys; IQ 36.3) used the verbal channel alone less frequently and produced more attention getting devices (e.g. hey, look and right), repeated phrases and imperatives where the listener had a high level of need. In the current analysis, Conversational Games Analysis is used to look for modification in Information

Giver strategies according to task partner and how useful these are at eliciting listener response and establishing mutual understanding.

So in terms of performance outcome measures, dyads including a carer were more successful at establishing mutual understanding than peers but less effective than student Information Followers.

7.7. Dialogue measures: number of words, turns and words per turn.

This section reports on the number of words, turns and words per turn used by Information Givers and Followers in each of the three partnership groups. Although these measures can not in themselves provide an explanation for performance outcome measures, they do, nevertheless, indicate the level of interaction between speakers and listeners and a preliminary indication of differences in the communication style of interlocutors. There may be, for example, a minimal amount of verbal material below which interlocutors will find it more difficult to ground information. Alternatively, an exceptionally high contribution from one task partner/partnership group may indicate that these individuals adopted conversational strategies that differed from other interlocutors. A collaborative or interactionist framework would predict that fewer words may be required to establish mutual understanding where interlocutors can rely on previous communication encounters (Clark and Wilkes-Gibbs, 1986; Wilkes-Gibbs and Clark, 1992). This is because speakers and listeners can rely on previously mutually agreed linguistic structures and words that may shorten or abridge the need for lengthy exchange. Previously familiar interlocutors are also more effective at co-ordinating speaker and listener exchange of turn, leading to fewer instances of interruption and simultaneous speech than where interlocutors are unfamiliar (Boyle et al, 1994).

Analysis on the number of words, turns and words per turn during the Map Task is reported separately. By-subject analysis was used on the mean number of words and turns produced by dyads across the three partnerships (carer x student x peer). This unit of analysis was used to measure verbal performance as task outcome (deviation score) results in part from the contribution of main participants (Information Givers) in each partnership group. Therefore analysis comparing the performance of dyads is treated as a within-subject factor. Within-subject analysis is also performed on Giver scores when performance is broken down by task role. Between-subject analysis is used where task role (Information Giver x Information Follower) is compared and for Follower output measures (carer x student x peer). Analysis from non-parametric testing can be found in Appendix 13 unless otherwise stated in the test.

7.7.1. Words per dialogue

The analysis on words reported throughout the thesis refers to all tokens exchanged between speakers and listeners during the Map Task. This includes fillers (e.g. ehm), repeated words (e.g. you [/] you have a look there) and unintelligible words. Separate analysis on the number of words used by participants per dialogue excluding fillers, repeats and unintelligible words can be found in Appendix 14 and is discussed briefly below, following description of the main findings.

A two-way mixed analysis of variance was performed with role (2 levels: Information Giver x Information Follower) a between subject factor and partnership (3 levels: carer x student x peer) a within subject variable. The dependant variable was mean number of words per dialogue. A dialogue is a complete set of utterances from initiation of Map Task until it is completed by Information Givers and Followers. This revealed a difference in the number of words used by the different partners and an interaction between partnership and role. Means are given in Table 7.10.

	Carer	Student	Peer
IG	207.6 (102.2)	131.2 (93.6)	154.2 (113.9)
IF	341.1 (245.2)	189.9 (135.1)	53.3 (55.3)

Table 7.10. Mean (SD) number of words used by Information Givers and Followers

The effect of partnership was significant $F(2,48) = 12.20, p < .000$ (means: carer = 274.3 (196.2); student = 160.6 (117.7); peer = 103.7 (101.7)). This means that there were differences in the number of words exchanged between interlocutors depending on whether the Information Follower was a carer, student or a friend. Post hoc t-test analysis revealed that dyads including a carer used more words to complete that task than when the Follower was either a student ($t(12) = 2.22, p < .05$) or a peer ($t(12) = 4.3, p < .001$). No difference was found in the number of words used by students and peer interlocutors (Wilcoxon non-parametric test: $z = -1.56, p = .1$).

Task role did not have an effect on the number of words produced.

A significant interaction was found between task role and partnership, with $F(2,48) = 5.78, p < .01$. Post hoc t-test analysis on Giver and Follower words for each partnership group found a significant difference in the number of words produced by Information Givers and Followers in peer dyads ($t(17.4) = 2.87, p < .01$). So Information Givers contributed greater verbal effort towards completing the task than Information Followers in peer trials. No further differences were found. Therefore, contributions from Givers were closer to that of the Follower where he/she was a carer or a student, though here the trend was in the opposite direction.

Simple effects analysis on Information Giver number of words with partnership (3 levels: carer x student x peer) a within-subject factor revealed a significant effect for partnership $F(2,24) = 4.79, p < .05$. Post hoc t-test analysis found that Information Givers produced more words when interacting with a carer than during exchanges with student ($t(12) = 2.79, p < .05$) or peer ($t(12) = 2.07, p = .06$) partners.

Number of words used by Information Followers was also subjected to a simple effects analysis, with partnership as the between-subject variable (3 levels: carer x student x peer). This found a significant difference for partnership condition ($F(2,24) = 9.63, p < .001$). Post hoc t-test analysis showed that carers and students used more words to complete the task than peer Information Followers (carer x peer: $t(12) = 4.17, p < .001$; student x peer: $t(12) = 4.58, p < .001$). A trend was revealed for more words to be used by carers than student interlocutors (Mann-Whitney non-parametric test: $z = -1.8, p = .07$).

Analysis on the number of words used by participants minus fillers, repeats and unintelligible words revealed 1) a trend towards more Information Follower than Information Giver words during interactions with a carer ($t(15.4) = 2, p = .06$) and 2) a trend towards more carer than student Follower words, $t(24) = 1.94, p = .06$. Means can be found in Appendix 14. All other findings remain constant with those reported above. Therefore it would appear that carers used fewer fillers, repeats and unintelligible words in relation to their total word output than the Information Givers or student partners.

7.7.1.1. Discussion and conclusions

Analysis on number of words showed that partnerships including a carer used more words to complete the task than where the Follower was a student or a peer. Peer Information Followers used fewest words to complete the task suggesting that Information Givers

working with a peer would have gained little feedback from their communication partner on the progress of interactions or about how well information was being grounded. This would undoubtedly have made it more difficult for Givers to be confident that instructions were understood and provided fewer opportunities to repair communication breakdowns as they occurred.

Carers and students demonstrated greater verbal effort towards completing the task than their communication partners, though not by enough to achieve statistical significance. This trend mirrors the differences found during interactions between language impaired adult Information Givers and non-impaired task partners (Merrison et al, 1993; Anderson et al, 1997). Here it was found that the Follower took on greater responsibility for supporting interactions and contributed greater verbal effort towards establishing mutual understanding than Information Givers. Anderson and colleagues concluded that by relying on the communicative abilities of non-impaired partners, participants with language impairments were able to compensate in part for their linguistic difficulty. This suggests that carer and student Followers in the current study may also have been scaffolding the interactions. This is investigated using Conversational Games Analysis (Kowtko et al, 1991) in Chapter 8.

Of particular interest is that the increased verbal effort of Information Followers was of unequal value to Information Givers. Specifically, more words were used during interactions with a carer and yet this led to a less successful outcome. This suggests that 1) interactions were structured differently in carer and student dyads and 2) The strategies developed by student partners were more successful in establishing mutual understanding than those used by carers. Underlying this final point is that within a collaborative framework, individuals actively engage to minimise the amount of verbal effort required to successfully ground information (Clark & Wilkes-Gibbs, 1986). It might be expected,

therefore, that dyads including a carer would find it easier to establish mutual understanding and require fewer words to do so. As this was not the case it seems that students were both more efficient and effective at establishing mutual understanding with their communication partners than care providers. It would also appear that communication partners imposed differing global constraints (Boyle et al, 1994) on achieving mutual understanding and that this influenced the outcome of interactions. The pattern of contribution demonstrated by Givers and Followers during peer trials is similar to that seen in typical adult (e.g. Boyle et al, 1994) and older children's (e.g. Doherty-Sneddon, 1995) interactions. These studies found that Givers used more words to complete the task than Information Followers as they assumed responsibility for issuing instructions and gathering feedback from their communication partners that information was being grounded. In comparison, Followers checked their own understanding of previous messages and signalled to the Information Giver when breakdown had occurred. However, in the current study it would appear that communication did not get off the ground in terms of establishing speaker and listener understanding in peer interactions as the level of verbal exchange was so low. Information Givers in these trials appear to have been particularly disadvantaged by the lack of feedback from peer partners. So Information Giver instructions may have been impoverished during peer interactions and peer Followers did little to rectify this.

7.7.2. Turns per dialogue

The number of turns per dialogue provides a measure of the frequency of speaker and listener exchange of turn during an entire interaction. In the current analysis this corresponds to one Map Task dialogue. Data on the mean number of turns was entered into an analysis of variance with partnership (3 levels: carer x student x peer) a within-subject factor (see Table 7.11 for means). This revealed a significant difference for partnership group.

Carer	Student	Peer
38.7 (16.1)	24.9 (15)	14.8 (11.8)

Table 7.11. Mean (SD) number of turns for carer, student and peer partnerships

Partnership had a significant effect on the number of turns, with $F(2,48) = 19.94, p < .000$. Post hoc t-test analysis found that dyads that included a carer used more turns to complete the task than where the Follower was a student ($t(25) = 2.99, p < .01$) or a peer ($t(25) = 6.89, p < .000$) partner. Student Follower partnerships also exchanged more conversational turns than peer partners ($t(25) = 3.488, p < .01$).

Simple effects analysis on Giver number of turns found differences between partnership conditions (3 levels: carer x student x peer), means: carer = 38.8 (16.6); student = 24.9 (15.1); peer = 15.2 (12.4), with $F(2,24) = 9.83, p < .001$. Post hoc t-tests showed that Givers used marginally more conversational turns interacting with a carer than with a student partner ($t(12) = 2.11, p = .06$). Givers in partnership with a carer and a student also used more turns to complete the task than when working with a peer (carer x peer $t(12) = 4.71, p < .001$; student x peer $t(12) = 2.32, p < .05$).

Data on Followers number of turns was entered into a simple effects analysis (3 levels: carer x student x peer), and this revealed a significant difference between partnership conditions, $F(2,24) = 10.11, p < .001$; means: carer = 38.5 (16.3); student = 24.9 (15.1); peer = 14.4 (11.7). Post hoc t-tests with partnership a between-subject factor showed that carers ($t(12) = 8.4, p < .000$) and students ($t(12) = 2.51, p < .05$) used more turns to complete the task than peer Information Followers. Again, the difference between carers and students neared significance ($t(12) = 2.04, p = .06$).

7.7.2.1. Discussion and conclusions

Dyads including a carer or a student partner used more turns to exchange information than peer pairings. This reflects the overall higher number of words exchanged during these partnerships. Similarly, dyads including a carer used marginally more conversational turns than where the Follower was a student. What is a little puzzling, however, is that peers should have required fewer turns to complete the task as they used a similar number of words as student dyads. This suggests that turns were comparatively long during peer interactions and may have been less collaborative than where the Information Follower was a student or a carer.

This was examined in more detail by separating Giver and Follower output. Analysis showed that Information Givers in peer dyads used fewer conversational turns to exchange a similar number of words as Givers in student interactions. Peer Followers used fewer turns than their student counterparts but this was because they produced fewer words in the first place. So turn length must have increased for Information Givers collaborating with a peer in comparison to interactions with a student partner. This suggests that Givers may have altered their communication style in some way when interacting with different partners and/or adopted different strategies to complete the task. Turn length is examined more closely in the following section by looking at the number of words used by interlocutors during each conversational turn. This can highlight differences in the structure of interactions by providing an accurate measure of the length of participant turns in each partnership group.

7.7.3. Words per turn

Number of words per turn was calculated by dividing the number of words produced by interlocutors by the number of turns produced by each of them per dialogue. This provides

an accurate measure of the length of participant utterances and an indication of differences in communication style of interactions including a carer, student or peer.

Mean number of words per turn for Information Givers and Followers in each partnership are outlined below in Table 7.12. A mixed analysis of variance performed on this data with partnership (3 levels: carer x student x peer) a within-subject factor and role (2 levels: Information Giver x Information Follower) as between-subject variable revealed no main effect for partnership or task role.

	Carer	Student	Peer
IG	5.4 (2.3)	6 (3.9)	14.4 (13.1)
IF	10.3 (11.9)	7.2 (4.1)	3.6 (2.3)

Table 7.12. Mean (SD) words per turn for Information Givers (IG) and Followers (IF)

However, a significant interaction was found between partnership and task role, $F(2,48) = 8.65, p < .001$ (means: carer = 7.8 (8.8); student = 6.6 (4); peer = 9 (10.7); Giver = 8.6 (4.6); Follower = 7 (5.4)). Independent post hoc t-tests on Giver and Follower turn length in each partnership found a significant effect for role in peer dyads ($t(12.94) = 2.94, p < .01$). Information Givers used longer turns to complete the task than peer Information Followers.

Simple effects analysis on Giver number of words per turn with partnership (3 levels: carer x student x peer) a within-subject factor found a significant effect for partnership condition, $F(2,24) = 5.093, p < .01$. Post hoc t-tests revealed Information Giver turn length was longer interacting with a peer than with carers ($t(12) = 2.49, p < .05$) or students ($t(12)$

= 2.16, $p < .05$). Significance was not reached for the difference in turn length for Information Givers where the Follower was a carer or a student, with $t(12) = 0.51$, $p = 0.6$.

Simple effects analysis on Follower turn length with partnership a between-subject variable (3 levels: carer x student x peer) revealed a difference for partnership condition, with $F(2,24) = 3.95$, $p < .05$. Post hoc analysis showed that carers ($t(12) = 2.23$, $p < .05$) and students ($t(12) = 3.76$, $p < .01$) used longer turns to exchange information than peer Information Followers – a reversal of the pattern demonstrated by Information Givers. So Information Giver utterances were longer during interactions with a peer, while peer partner turns were short in comparison to students and carers. The difference between carer and student turn length failed to reach significance, with $t(12) = 1.14$, $p = 0.3$.

7.7.3.1. Discussion and conclusions

Number of words per turn did not vary for carer and student dyads. So although partnerships including a carer used more words to complete the task than where the Follower was a student, the length of turns was the same. Information Givers interacting with a peer used fewer, longer turns to exchange the same amount of words as when interacting including a student partner, and longer turns than with carers. This suggests that the communication style of peer interlocutors differed in some way from the other two groups, and that this was somehow less successful at co-constructing understanding between speakers and listeners. Peer Followers contributed fewer words in short, infrequent turns when compared to carer and student partners, highlighting once again that peer interactions differed in structure from the other two groups.

Therefore, two main differences can be identified in the communication style of peer interlocutors in comparison to where the Information Follower was a carer or a student.

These relate to the level of interaction between speakers and listeners and the distribution of verbal effort. 1) Peer interlocutors were less interactive than other partnership groups. This is reflected in the low level of turn exchange between peer speakers and listeners. This suggests that peers adopted a less collaborative approach during the Map Task and may have not benefited from verbal checking mechanisms as frequently as the other two partnership groups. 2) Information Givers used significantly more words during the Map Task than peer Information Followers. Although this is not in itself problematic, and may reflect the proportioning of responsibility typically seen during Map Task interactions (e.g. Boyle et al, 1994), on this occasion it also highlights the low level of verbal effort offered by peer Information Followers. It is unclear from the current analysis why peer Follower effort was so low, however it is apparent from this data that less information was made available to the Information Giver during peer interactions. What is also unknown at this point is whether increases in the number of words used by peer Information Followers would have necessarily led to greater communicative success.

7.8. Summary and overview

1. Performance outcome: dyads including a student were more successful (i.e. produced lower deviation scores) than where the partner was a carer or peer. Carers were marginally more successful than peer interlocutors.
2. Number of words: a) Information Givers and Followers in dyads including a carer produced more words than where the Follower was a student or peer. b) Partnerships including a peer used a similar number of words as student dyads. This is interesting as these partnership groups produced the least and most successful Map Task scores. Simple effects analysis revealed that peer Followers produced fewer words than carers and students.

3. Number of turns: a) dyads involving a student Follower produced fewer turns than where the Follower was a carer. This was because Givers and Followers in student dyads used marginally fewer turns to complete the task than those including a carer. b) Peer partners exchanged the least number of turns overall as both Givers and Followers used fewer turns to complete the task than where interactions included a carer or student.
4. Words per turn: Information Givers used longer turns than Followers in peer dyads. Giver turns were also longer during interactions with a peer than where the partner was a carer or student. Peer partners used shorter turns than Information Followers in the other two groups.

So interactions were structured differently depending on whether the Information Follower was a carer, student or peer. The following section focuses in more detail on the content of interactions and investigates if the differences reported above occurred as a result of the strategies that developed between speakers and listeners, and how this may have influenced communicative success.

7.9. Chapter conclusion

Adults with intellectual impairments communicate most successfully where the interlocutor is non-impaired. This appears to be due in part to non-impaired partners providing more verbal material to support interactions than peer Information Followers. However, mere increase in the level of verbal input from communication partners does not in itself secure parity of outcome. This is reflected in differences in the communicative effectiveness of dyads including a carer or a student. Boyle et al (1994) suggests that being familiar with the communication partner may encourage interlocutors to say more. It is proposed that performance in the current research is related to the form of support or

scaffolding provided to people with intellectual impairments rather than the absolute volume of verbal material made available. This is supported from research looking at communicative success in adults with an acquired language disorder (Anderson et al, 1997). Here it was found that sensitive scaffolding from a non-impaired Information Follower was successful in overcoming the communication difficulties of individuals with aphasia, and that this allowed them to use their linguistic and non-linguistic resources most effectively. In the current study, less successful scaffolding was associated with increased verbal effort from Information Givers, as was found during interactions with a care provider. This could be explained in one of two ways: a) Information Givers initiated more and/or longer communication acts with carers than with student partners, or b) Information Givers responded at a higher rate and/or for longer to Follower initiations where he/she was a carer and not a student. This latter point could be explained where care providers used more questions to elicit information from the Giver, especially those requiring more than a simple one or two word response, i.e. open questions. This would account for increases in Information Giver number of words and poorer performance in carer Follower dyads, since previous research has shown that this form of question is particularly problematic for people with intellectual impairments (e.g. Sigelman et al, 1982; Booth and Booth, 1996; Prosser and Bromley, 1998). It is predicted, therefore, that open questions will feature as one factor that contributed to differences in performance outcome for carer and student Follower dyads.

The majority of peers (85%) entered into collaborative sequences with their communication partner that were at least partly successful in establishing mutual understanding. Most noticeable from the dialogue measures is the low level of verbal material produced by peer Information Followers. This suggests that they were reticent at initiating communication acts and/or responded the Information Giver at a lower rate than other Information Followers. Either of these situations could have arisen where

interlocutors experienced difficulty, or were inconsistent, in monitoring their own level of comprehension. Consistency of comprehension monitoring has previously been shown to vary according to the context of interactions, as highlighted in previous chapters (Abbeduto et al, 1997). Shatz (1977) makes the distinction between two kinds of understanding in communication; what she terms 'social understanding' and 'understanding of message content'. Social understanding refers to the obligation on speakers and listeners to co-operate and respond to other initiations in line with Gricean (1975) principles of co-operations. These lay out sufficient and necessary conditions for the appropriateness of speaker contributions according to four maxims. These relate to the quality, quantity, relevance and manner of speaker contributions. Awareness of the social obligations of communication does not, however, necessarily guarantee understanding of what information a listener needs to be encoded by speakers (Shatz, 1977). Shatz suggests that discriminating and disambiguating information from possible distracting features requires considerable cognitive effort. So where cognitive demands are already high, such as during complex interactions, particular skills like discerning referents and monitoring levels of self-understanding may be used less consistently and effectively than where the processing load is lower. Therefore it is possible in the current research that the lower level of contribution from peer Information Followers may reflect more global constraints on communication ability for some individuals, especially in relation to comprehension monitoring.

Levels of comprehension monitoring and other speaker and listeners skills are looked at in detail in the following chapter. Conversational Games Analysis looks at how differences in dialogue structure relate to performance on the Map Task and suggest a number of explanations for why communication outcome was less successful for care provider than with student partners. Games Analysis is also used to look at communication process in

peer partnership so that clearer understanding might be gained of the ways that speakers and listeners attempted to establish mutual understanding during interactions.

Chapter 8. Conversational Games Analysis

8.1. Introduction

Dialogues produced during the Map Task were transcribed and coded using Conversational Games Analysis (CGA) (Kowtko et al, 1991). CGA is one of a family of coding schemes based on the functional use of language. The system was developed to capture the types of dialogue structures typically seen in the Map Task by categorising them into units called conversational games. A conversational game is a complete set of utterances initiated by a speaker and encompassing all dialogue between interlocutors until the purpose of the game has been achieved or abandoned. There are six types of conversational game and these are assigned to utterances according to their purpose within the dialogue. Four codes are assigned to question initiations depending on the type of information requested by speakers, e.g. where he/she checks their interpretation of a previous message (Check) or asks for a simple yes/no response (Query y/n) about some thing unrelated to a previous utterance. Where an open question is used to introduce new information into a conversation this is coded as a Query-W question. These do not check interpretation of a previous message and require more than a simple yes/no response. The six types of game are Instruct, Align, Explain, Query y/n, Query-W and Check. These are described in more detail in Table 8.13, below. Games are made up from a series of moves, which are the different types of initiation and response sequences used by speakers and listeners, and are classified according to their function. There are twelve conversational moves and these are Instruct, Align, Explain, Query y/n, Query-W and Check (initiation moves) and Clarify, Reply y/n, Reply-W, Acknowledge and Ready (response moves).

Conversational Games Analysis			
Type of Move		Type of Move	
Initiation		Response	
Instruct	A direct or indirect request to carry out action	Clarify	Clarifies what has been said in a message
Align	Checks understanding or accomplishment of a goal	Reply-y/n	Yes/no response to an Align, Check or Query-w
Explain	Freely offered information not elicited by partner	Reply-w	Reply requiring more than a yes/no response
Query-y/n	A closed question that requires a yes/no response	Acknowledge	Shows that listener has heard/understood
Query-w	An open question that asks for new information	Ready	Indicates readiness to continue with a move
Check	Checks self-understanding of a previous message		

Table 8.13. Initiation and response moves as described in Conversational Games Analysis (Kowtko, Isard and Doherty-Sneddon, 1991)

CGA makes use of the observation that initiations, such as questions, are often the first part of an adjacency pair sequence (Schegloff and Sacks, 1973). This is useful as it helps to predict the types of response that may be considered appropriate from listening partners, and signals to interlocutors themselves that a response is required. So CGA takes account of the types of speech acts used to ground information in the pursuit of conversational goals. These goals can be local (transactional), such as when interlocutors discuss discrete pieces of information, or more global (interactional) in terms of the overall approach taken to the exchange (Carletta, Isard, Isard, Kowtko, Doherty-Sneddon and Anderson, 1997). Interactional goals tend to provide a context for upcoming sections of dialogue that go on to describe a part of the map in more detail. Greater emphasis is placed on maintaining

transactional coherence and on the transfer of propositional knowledge during more localised sections of dialogue. For example, a speaker may choose to outline the purpose of an interaction (e.g. that they are about to describe the route to a museum), before going on to describe specific landmarks along the way. An illustration of how interlocutors might adopt a global approach is shown below in an extract of dialogue from the current study (Extract 7). This type of communication strategy was fairly atypical of those observed during the research described in the thesis. More commonly speakers initiated dialogues with a sequence of task instructions, such as ‘go down, start, you start the, where the point is’ rather than listing the referents that will later feature in instructions to the communication partner.

Extract 7. Pair 6: Global approach towards establishing mutual understanding

Game 1 Align

Information Giver:

Right. There's some pictures in front of you # there then # and there's like a p(iano) piano, cat, a Great Britain # the church, minibus, telephone # star # car # a jumper, and a minibus and then a kite.

Move: Align

End Game 1

Game 2 – Instruct

Information Giver:

Follow [/] follow the road round to the [/] the [/] cat and then underneath the <Great Britain scarf> [//] the Great Britain flag.

Move: Instruct.

End Game 2

Communication goals may be achieved fairly smoothly from the initiation move through to completion of the act. Otherwise, interlocutors may find it necessary to embed one or more sub-game within a game sequence so that communication goals can be grounded.

This term is used by Clark (e.g. Clark and Brennan, 1991) to describe information that has been mutually accepted by speakers and listeners as being part of their shared or common understanding. This can be illustrated with an example from everyday conversation, e.g.:

Extract 8. Example of dialogue from everyday interaction

Game 1: Instruct

Speaker 1: Could you please pass me my books.

Move: Instruct

Game 2 Check (embedded)

Speaker 2: All of them?

Move: Check

Speaker 1: Yes.

Move: Reply y/n

Speaker 2: Ok (passes books).

Move: Acknowledge.

End Game 2

End Game 1

CGA takes account of the words exchanged between speakers and listeners but also intonation, syntax and prosodic features, and on occasion non-verbal aspects of utterances (e.g. gaze). Game type is assigned according to the predicted communication goals of speakers and so codes are not fixed to any particular linguistic form. For example, an Instruct may be assertive as in 'and then you're towards the umbrella', or take the interrogative form, such as 'up to the, tree?'. This latter example may be used where a speaker is unsure that his/her listener is able to perform the act i.e. that he/she has a tree. CGA is particularly useful for looking at incomplete verbal and non-verbal forms as it focuses on the function of contributions rather than their form (Merrison et al, 1994). It has been used extensively with a number of different groups including undergraduate student (e.g. Doherty-Sneddon et al, 1997), children (e.g. Doherty-Sneddon, 1995) and adults with acquired language disorders (e.g. Merrison et al, 1994; Anderson et al, 1997), though to date this does not include adults with intellectual impairments.

The data is reported here in two ways. First, findings are presented from analysis on the mean number of games produced by interlocutors in each of the three partnership conditions. Secondly, as dialogues varied in length, the data was transformed by dividing the number of conversational games by the total number of words used by Givers and

Followers, and multiplying by 100. This provides a measure of the frequency of conversational games per 100 words and a more accurate indication of how conversations may have differed in terms of the composition of speaker and listener exchanges. Consistent with previous analysis, all data generated by Information Givers (main participants) was treated to within-subject analysis while that produced by Information Followers (carer x student x peer) was analysed as an independent between-subject variable. Between-subject analysis was performed on all data looking at differences in task role (Information Giver x Information Follower). All of the data on CGA was subjected to parametric and non-parametric testing in line with procedures outlined in Chapter 7. This was because of wide variation in a number of games used by the participants. Again, a number of discrepancies emerged between research findings produced as a result of parametric and non-parametric testing and these are dealt with as follows. Findings are reported from parametric testing in the main throughout Section A since little difference was revealed as compared to non-parametric testing. Those that did emerge are reported in the text as non-parametric findings. Please refer to Appendix 15 for the remaining parallel non-parametric analysis on this section. Substantial differences were revealed, however, following parametric and non-parametric testing for the main research points in Section B (transformed data) and so here analysis is reported from non-parametric analysis as a precautionary measure.

The following sections (Sections A and B) make occasional reference to the use of one non-verbal signal, gaze. The analysis of gaze was performed on video recordings of the participant interactions. All materials and procedures used to record and analyse non-verbal signals are described fully in Part 5, Study 2 of the thesis on non-verbal communication in adults with intellectual impairments.

8.2. Reliability rating

Six dialogues were coded independently by an expert with more than 10 years of experience working with CGA. The dialogues were taken from a mixture of carer, student and peer interactions. A total of 174 games were initiated during these six sets of dialogue and a reliability rating of 91% was reached between the expert coder and the current author. Disagreement in the assigning games codes on one or more occasion are as outlined below.

Expert coder	Current author
Check	Query-w; Explain; Query y/n
Query y/n (x2)	Check (x2)
Reply-w; Query-w	Check
Game not coded	Check

This shows that differences arose from the way codes were assigned to a) the function of the speech act and b) whether the act was part of an initiation of a response sequence.

These differences tended to occur where dialogues progressed in non-linear fashion and where several games were embedded within one another. A Cohen's kappa coefficient (Cohen, 1960) was used as a second measure of interjudge reliability on the way that conversational games codes were assigned. This formula corrects for agreement that might occur through chance on the designation of game codes. The Cohen's kappa formula is as follows, where $\sum f_o$ represents the sum of the observed frequency of each conversational game and $\sum f_e$ is the frequency that might be expected through chance.

$$k = \frac{\sum f_o - \sum f_e}{N - \sum f_e}$$

A kappa value of 0.91 was reached on interjudge reliability corrected for chance. Coding agreement by expert and novice coders using this formula has previously been demonstrated at 0.86 (Kowtko et al, 1991) and 0.71 (Anderson et al, 1997).

Section A: Conversational games used by partnerships.

8.3. Dialogue measures: Conversational Games Analysis

Previous research (e.g. Doherty-Sneddon 1995; Doherty-Sneddon et al, 1997; Anderson et al, 1997) has shown that some conversational games tend to be used more often by Information Givers while others are more frequent initiated by Information Followers. For example, Information Givers are primarily responsible for negotiating their partner around the various landmarks on the map and so tend to initiate the majority of games aimed at issuing directions (Instruct). However, instruct games are seldom sufficient at enabling participants to be confident that information has been mutually understood and so often require further collaboration to meet grounding criterion (Clark & Wilkes-Gibbs, 1986). This can take a number of forms but certain types of conversational game aimed at establishing mutual understanding tend to be used more frequently by one or the other task role. For example, games aimed at checking self-understanding of previous utterances (Check) are usually initiated by the Information Follower while those designed to elicit feedback about another's understanding (Align) are more frequently used by Information Givers. Interlocutors use these games to gain evidence of the level of understanding and to provide a basis on which to design further utterances.

The effect of task role was investigated in the current analysis to find out if Information Givers and Followers differed in the way they negotiated and co-constructed mutual understanding in each partnership group, and how this related to performance outcome measures i.e. Map Task scores. A number of predictions are made in light of previous analysis on the number of words exchanged by interlocutors, Map Task scores and earlier research (e.g. Doherty-Sneddon et al, 1997). These are as follows:

1. Differences will be found in the types of games initiated by Information Givers and Followers.

2. Carer and student Followers will initiate more conversational games than the Information Giver and these will be used to scaffold interactions.
3. In contrast, peer Followers will initiate fewer games than the Information Giver and these may be less effective at establishing mutual understanding than those produced by carers and students.
4. Differences will be found in the games used by carers and students to scaffold interactions and these will not be equally successful in allowing main participants (Givers) to communicate effectively. Specifically, it is proposed that a) sensitive scaffolding will be characterised by the use of checking mechanisms that link understanding of the current message to previous utterances (Check and Align games).
b) A less successful outcome is predicted where communication partners use a high number of open questions to elicit feedback from the Information Giver (Query-w games), other than those used to monitor self-understanding (i.e. Checks).

Table 8.14 outlines the total number of Giver and Follower games across the three partnership groups. This shows that Information Followers produced more games than the main participants in carer (77%) and student (57%) Follower partnerships. Anderson et al (1994) revealed a similar pattern of distribution in adults with an acquired language disorder and non-impaired Information Followers. They found that Followers initiated more than two thirds of all conversational games produced during interactions in an attempt to adjust to the difficulties experienced by their communication partners. This trend is reversed for peer interlocutors. Peer Followers contributed less verbal effort than Information Givers (46%), a pattern of verbal exchange seen in previous research involving typical adults (e.g. Doherty-Sneddon, 1995). Therefore predictions that non-impaired partners would attempt to scaffold interactions are supported in the current analysis. The expected switch in the proportional ratio of games initiated by Givers and Followers was also observed during interactions including a peer partner.

	Carer	Student	Peer	Total
IG	94	115	155	364
IF	403	268	72	743
Total	497	383	227	

Table 8.14. Total number of games in each role across partnerships

Data from each conversational game (Align, Instruct, Explain, Query y/n, Query-W and Check) was entered independently into a mixed design analysis of variance with partnership (3 levels: carer x student x peer) as within-subject factor and role (2 levels: Instruction Giver x Instruction Follower) as between-subject variable. This found a significant main effect for partnership for Explain, Query-W and Check games. The effect of role reached significance for Instruct, Explain, Query-W and Check games and neared significance for Query y/n games. A significant interaction was also found between partnership and role for Align, Explain, Query y/n, Query-W and Check games. Means and the range of scores in each partnership by role group are outlined in Table 8.15.

	Align		Instruct		Explain		Query y/n		Query-w		Check	
	IG	IF	IG	IF	IG	IF	IG	IF	IG	IF	IG	IF
Carer	0.5 (0.7)	0.7 (1.4)	4.5 (2.2)	0.2 (0.4)	0.5 (0.7)	6.7 (5.1)	1.6 (2.4)	7.2 (6.7)	.08 (0.3)	7.3 (4.9)	.08 (0.3)	9 (4.5)
(range)	0-2	0-5	0-7	0-1	0-2	2-20	0-8	1-20	0-1	2-16	0-1	3-18
Student	0.2 (0.4)	0.7 (1.5)	5.6 (2.8)	.00 (00)	0.9 (1.1)	6 (4.8)	2 (2.6)	4.2 (3.4)	.00 (00)	2.6 (3)	0.2 (0.4)	7.2 (4.7)
(range)	0-1	0-3	0-9	0	0-4	0-17	0-7	0-11	0	0-10	0-1	0-17
Peer	1.2 (2)	.08 (0.3)	6.2 (2.7)	.08 (0.3)	0.7 (0.6)	1.9 (3.3)	3.5 (5.1)	0.6 (1.2)	0.2 (0.4)	1.1 (1.6)	.00 (00)	1.8 (2.1)
(range)	0-7	0-1	2-11	0-1	0-2	0-12	0-14	0-4	0-1	0-5	0	0-7

Table 8.15. Mean (S.D.) number and range of Giver and Follower games for each partnership.

Analysis revealed differences in the use of conversational games across partnerships.

Significance was reached for the number of Check ($F(2,48) = 12.34, p < .001$), Explain ($F(2,48) = 4.75, p < .05$) and Query-w ($F(2,48) = 12.71, p < .001$) games used by participants.

Post hoc t-test analysis found that partnerships including a carer produced more Query-w games than where the Follower was a student ($t(25) = 2.74, p = .01$) or a peer ($t(25) = 3.31, p < .01$). Analysis also revealed that carer and student Follower partnerships used more 1) Check games (carer x peer: $t(25) = 3.69, p < .001$; student x peer: $t(25) = 3.79, p < .001$) and 2) Explain games (carer x peer: $t(25) = 2.31, p < .05$; student x peer $t(25) = 3.51, p < .01$) than peer interlocutors.

Significance was reached for task role for Instruct ($F(1,24) = 105.8, p < .000$), Explain ($F(1,24) = 26.09, p < .000$), Query-W ($F(1,24) = 41.6, p < .000$) and Check ($F(1,24) = 83.44, p < .000$) games. Therefore Information Givers and Followers used these types of games at

different rates. Post hoc t-test showed that Information Givers produced significantly more Instruct games than Information Followers (means: Givers = 16.31 (5.62); Followers = 0.23 (0.44); $t(24) = 10.29, p < .000$) to complete the task. In contrast, Followers initiated more Explain (means: Givers = 2.01 (1.44); Followers 14.61 (8.73): $t(24) = 5.11, p < .001$), Check (means: Givers = 0.23 (0.44); Followers = 17.92 (7.0): $t(24) = 9.13, p < .001$) and Query-w games (means: Givers = 0.31 (0.48); Followers = 11 (6.0): $t(24) = 6.45, p < .001$) than Information Givers. A tendency was also revealed for more Query y/n game use in Information Followers (means: Givers = 7.15 (7.9); Followers 11.92 (6.8): Mann Whitney non-parametric test: $z = -1.85, p = 0.06$).

The prediction that interlocutors would differ in the types of games used in collaboration with their partner is supported in the current research. Unsurprisingly, Givers issued more games aimed at directing their partner around the map than their task partner. Information Followers explained (Explain) more information and asked more open questions aimed at checking their own understanding of previous messages (Check) and eliciting new information (Query-w). This suggests that Followers used these types of speech acts in their attempt to scaffold interactions and as a means of grounding information.

Finally, a significant interaction was also found between partnership and task role for Align ($F(2,48) = 3.46, p < .05$), Explain ($F(2,48) = 4.98, p < .01$), Query y/n ($F(2,48) = 7.8, p < .001$), Query W ($F(2,48) = 13.5, p < .000$) and Check ($F(2,48) = 11.64, p < .000$) games. Simple effects analysis revealed no further effects for Information Givers.

Simple effects analysis on Follower games revealed differences in the number of games produced by partnerships. Follower games were subjected to an ANOVA with partnership (3 levels: carer x student x peer) as the between-subject factor. This revealed differences in the number of Query-w ($F(2,38) = 12.62, p < .000$), Check ($F(2,38) = 11.8, p < .000$), Explain ($F(2,38) = 4.33, p < .05$) and Query y/n ($F(2,38) = 7.2, p < .01$) games initiated by

Information Followers. Post hoc independent t-test analysis found that: 1) carers initiated more Query-w games than students ($t(24) = 3.08, p < .01$) or peers ($t(14.71) = 4.64, p < .000$), and 2) carers and students used more Check (carers: $t(24) = 5.28, p < .000$; students: $t(21.2) = 2.51, p < .05$), Explain (Mann Whitney non-parametric test: carers: $z = -3.4, p < .001$; students: $z = -2.5, p = 0.01$) and Query y/n games (carers: $t(12.8) = 3.46, p < .01$; students: $t(14.9) = 3.55, p < .01$) than peer Information Followers. So Information Followers used these conversational acts at different rates.

The results from analysis on the number of conversational games used by interlocutors will now be compared and discussed separately for carer and student interactions, and carer/student and peer interactions.

8.3.1. Carer versus student interactions

Interlocutors used games at different rates depending on whether the Information Follower was a carer, student or a peer. Dyads including a carer used Query-W questions more frequently than either student or peer Follower partnerships. No further differences were found between these two groups. This is particularly interesting given that performance was less successful (higher deviation score) for partnerships including a carer in comparison to where the Information Follower was a student, even though the surface structure of dialogues was similar. It would appear then that this type of speech act might have been partly responsible for the less successful outcome during interactions with a carer, and/or interfered with the ability of main participants to communicate effectively. One way of investigating this is to look for an association between the use of Query-w games and communication success (Map Task deviation scores). A Pearson's correlation coefficient on the number of Query-w games produced during dialogues and communication outcome measures (deviation scores) revealed a relationship between these two factors ($n = 26$), $r(24) = 0.424, p < .05$ (means: Query-w questions = 4.54 (4.5), Map

Task scores (square root transformation) = 17.2 cm² (3.9)). So more frequent use of this type of open questions was associated with higher deviation scores i.e. a less successful communicative outcome.

Further analysis on the communication style of interlocutors revealed that dyads including a carer initiated Query-w questions more prolifically (92% of all conversations) than those including a student (69%), suggesting that this type of open question features fairly robustly in the conversational repertoire of carer/client interactions. Further, these questions were managed less efficiently during interactions with a carer. Partnerships including a carer required more words (means words per Query-w: carer = 28.15 (24.08); student = 13.23 (12.28), $t(24) = 1.99$, $p = .06$) and turns (means turns per Query-w: carer = 2.65 (1.56); student = 1.48 (1.17), $t(24) = 2.16$, $p < .05$) to achieve the purpose of the game than during interactions with a student partner. A Pearson's correlation coefficient was used to look at the relationship between the length of Query-w questions (number of words) and communicative success (deviation scores). This revealed that longer Query-w games co-occurred with higher deviation scores, $r(24) = 0.525$ ($n = 26$), $p < .01$. So more successful communicative outcomes were associated with shorter Query-w games, as used by student partners. However, although this analysis reveals a relationship between Query-w questions and their use by care providers, it does not allow us to assume a direction of cause. Query-w questions may have been used in this way as a result of strategies adopted by the care provider or as a result of the communication style of main participants. Carers may have used a higher number of Query-w games in an effort to elicit task information from their partner where he/she was less forthcoming.

Extracts 9 and 10 illustrate the communicative posture typically adopted by carers and students during this type of conversational game. Immediately apparent are differences in the length of Query-w questions initiated by Information Followers in the two partnership

groups. Extract 10 (student Follower dialogue) illustrates how this type of question can be used effectively and efficiently to resolve potential breakdowns in communication. Here the Follower assumes a proactive role in initiating interactions without compromising her partner's ability to collaborate effectively during the exchange. The Information Follower establishes mutual understanding through a combination of short closed questions that break instruction down into smaller discrete units and those that check listener understanding. Breaking requests for information into smaller parts can be useful at eliciting a response from what might otherwise be a more complex open question (Biklen and Mosley, 1988; Booth and Booth, 1996). Finally, by volunteering her new position on the map (Game 10), the Follower signals to the Information Giver 1) that the instruction to move down has been grounded and 2) her willingness to continue with the next stage of the interaction. Giver and Follower maps for these interactions are shown in Appendix 16 (Extract 9) and Appendix 17 (Extract 10).

Extract 9. Pair 5: Query-w question: carer Follower dialogue (deviation score 274 cm). Key: +//. = self-interrupt; < > = overlapping speech or utterances about to be repeated/modified; [/] = utterance repeat; [//] = utterance modified; # = pause

Game 35 Query-w

Information Follower: which direction do I go?

Move: Query-w

Game 36 Query y/n (embedded)

Information Follower: do I go up the page?

Move: Query-y/n

Information Giver: no you +//. from the van or <whatever> [>1] it is # <em # you> go down and make a curve # go # down # then make another curve <going towards the kite> [>2].

Move: Reply-w/Clarify

Information Follower: <mhm> [<1]

Move: Acknowledge

End Game 36

Game 37 Query-w (embedded)

Instruction Follower: <right just [/] just give> me the down first [<2]?

Move: Query-w

Information Giver: right. You go down.

Move: Ready/Acknowledge

Game 38 Check (embedded/embedded)

Instruction Follower: towards the cat?

Move: Check

Information Giver: towards # well on mine I've got a pink s(weater) sweater.

Move: Clarify

Game 39 Explain (embedded/embedded/embedded)

Instruction Follower: forget the sweater. I haven't got it.

Move: Explain

End Game 39

Game 38 (cont.)

Information Follower: do I go all the way to the cat?

Move: Check

Game 40 Check (embedded/embedded/embedded)

Information Follower: do I go half way down?

Move: Check

Game 41 Check (embedded/embedded/embedded/embedded)

Information Follower: do I go quarter of the way?

Move: Check

Information Giver: quarter

Move: Clarify

Information Follower: about quarter. Ok.

Move: Acknowledge

End Game 41, 40, 38, 37, 35

Extract 10. Pair 13 Query-w question: student Follower dialogue (deviation score 194 cm)**Game 4 Query-w**

Information Follower: where do I go from there?

Move: Query-w

Information Giver: ehm. Down.

Move: Reply-w

Game 5 Check (embedded)

Information Follower: down?

Move: Check

Game 6 Query y/n (embedded/embedded)

Information Follower: to the bike?

Move Query y/n

End Game 6

Game 7 Query y/n (embedded/embedded)

Information Follower: have you got <a [/] # a yellow bike [>]?

Move: Query y/n

Information Giver: <I haven't [/] I haven't [/] I haven't> got a bike.

Move Reply y/n

End Game 7

Game 8 Query y/n (embedded/embedded)

Information Follower: have you got a shop?

Move: Query y/n

Information Giver: I've got a shop, yes.

Move: Reply y/n

Information Follower: right.

Move: acknowledge

End Game 8.

Game 9 Query y/n (embedded/embedded)

Instruction Follower: shall I go down to the shop?

Move: Query y/n

Information Giver: yes.

Move: Reply y/n

End Game 5

End Game 9

Game 10 Explain (embedded)

Information Follower: right. I'm at the shop.

Move: Explain

End Game 4

End Game 10

It might be expected that Query-w questions would be more complex in interactions including a carer in light of the length of these games. One way of investigating this is to look at the number of acts or games embedded/nesting within each Query-w question. Embedding occurs when sub-games are introduced to assist with the progress of conversational acts and aim to increase listener understanding, such as when a Follower requests clarification of Giver instructions. These are fairly typical of everyday interactions (Carletta et al, 1997) and illustrate how conversations often progress along more than one discourse level depending on the communication goals of speakers and listeners. What I am suggesting here, however, is that successive nesting may overcomplicate matters for some individuals and make it more difficult for them to ground information. For example, Information Givers (main participants) may find it easier to track the progress of interactions and to establish mutual understanding where speech acts progress in a more or less linear fashion. Backtracking and diverting the course of discourse, even when aimed at increasing listener understanding, may be less helpful in some situations and even make it more difficult for individuals to process incoming

information and integrate it with previous knowledge. Simple and complex open questions have previously been shown to elicit differing responses from adults with intellectual impairments (Brinton and Fujiki, 1994). These authors found that adults (mean C/A 28.3 yrs; IQ 61) responded more appropriately and informatively to simple wh- questions, e.g. ‘what is your name?’, than to syntactically more complex ones, such as ‘why do you want to work on this project?’. Questioning style can therefore influence how effectively some individuals are able to provide answers to more complex open questions. Extract 11 demonstrates the complexity of one Query-w question initiated by a carer partner.

Extract 11. Pair 6 Query-w question: carer Follower dialogue (deviation score 499.5 cm)

Game 2 Explain (embedded)

Information Follower: I/m [/] I’m right down underneath the moon in the bottom right hand corner now.

Move: Explain

End Game 1

End Game 2

Game 3 Query-w

Instruction Follower: where do I go from here?

Move: Query-w

Instruction Giver: then you’re going towards <to the> [//] to a boat.

Reply-w

Game 4 Query-w (embedded)

Information Follower: em # can you give me directions for that?

Move: Query-w

Game 5 Explain (embedded/embedded)

Instruction Follower: I’ve got a boat on mine but it’s on the left hand side. It’s over the other side.

Move: Explain

End Game 5

Game 4 (cont.)

Instruction Follower: how do I get there?

Move: Query-w

Game 6 Query y/n (embedded/embedded)

Instruction Follower: is it the same +// <is our> [//] are our boats in the same place?

Move: Query y/n

Instruction Giver: my boat’s over this side.

Move: Reply y/n

End Game 6

Game 7 Explain (embedded/embedded)

Instruction Follower: so's mine.

Instruction Giver: mhm.

Move: Acknowledge.

End Game 4

End Game 7

Game 8 Align (embedded)

Information Follower: so I'm underneath the moon.

Move: Align

End Game 8

Game 3 (cont.)

Information Follower: can you tell me which way the road goes from underneath the moon?

Move: Query-w

Game 9 Query y/n (embedded)

Instruction Follower: does it go

Move: Query y/n

Instruction Giver: it comes.

Move: Reply-w

Instruction Follower: down the way?

Move: Query y/n

Instruction Giver: it comes down underneath the moon.

Move: Reply-w

Instruction Follower: yes.

Move: Acknowledge

Instruction Giver: and then it goes # over the pig which I've not got and then it comes down # and then # it comes to the finish line.

Move: Reply-w

Instruction Follower: ok.

Move: Acknowledge

End Game 9

Game 10 Explain (embedded)

Instruction Follower: well my road ended up at the moment right down the bottom right hand corner underneath the moon.

Move: Explain

End Game 10

Game 11 Query y/n (embedded)

Instruction Follower: So <does it> [//] does the road underneath the moon does it then go down again <and> [>] then across?

Move: Query y/n

Instruction Giver: yes, and then curves round.

Move: Reply y/n

End Game 11

Game 12 Query y/n (embedded/embedded)

Instruction Follower: does it?

Move: Query y/n
Instruction Giver: mhm
Move: Reply y/n
End Game 12

Game 3 was finally resolved following the exchange of a further sixty words. Noticeable from Extracts 11 is that the carer failed to resolve the query without returning to it at later stage (Game 8) in the interaction. This was seldom observed during exchanges with a student partner and highlights the non-linearity of carer communication style. Of interest also is the Follower response 'does it?' (Game 12) to 'yes, and then curves round' in Game 11. This appears to question the validity of the Giver contribution and violates conversational maxims that assume truthfulness in speaker offerings (Grice, 1975), an assumption that would be unacceptable in other situations. Leudar (1997) suggests that this can occur as some non-impaired partners question the legitimacy of assertions made by individuals with intellectual impairments as this may conflict with manifestations about what it means to intellectually impaired. He proposes that the pattern of response represented in Games 11 and 12 is typical of interactions where asymmetry exists in the authority/status of contributors.

In light of the length of questioning in carer Follower dyads it was predicted that Query-w questions would be more complex during these interactions in comparison to where the Follower was a student. This failed to reach significance when analysed using non-parametric testing, with $z = -1.22$, $p = 0.1$ (1 tailed) means: carer = 2.2 (2.2); student = 0.8 (0.7). However, as a final measure of the seeming overuse of this type of conversational act, it was observed that over 60% of words produced during conversations with a carer were devoted to Query-w questions. This is significantly higher than the equivalent ratio for student Follower interactions (25%), with $t(24) = 2.25$, $p < .05$. So dyads including a

carer used more questions aimed at introducing new information into the task than those including students. These were longer than during interactions with a student partner.

Why then might this lead to less effective communication? One explanation might be that using Query-w questions at such a high rate distracted main participants and/or increased the processing demands of the task. This is because interactions with a carer involved processing and responding to complex open questions aimed at eliciting new information as well as maintaining an up to the moment representation of their current position in the task. Information Givers must also select and describe salient features along the route and co-ordinate some form of plan about how they intend to negotiate the task. These may have combined to act as a constraint on the Giver's ability to comprehend and integrate different sources of information (Shatz, 1983), and their overall accomplishment on the task.

A second reason may be that carers used Query-w questions in an attempt to establish a more dominant role in the exchange of information and in doing so provided Givers with fewer opportunities to initiate interactions or introduce salient task information. This would concur with the reported overuse of a directive or didactic communication style in staff working in a residential/day service for adults with intellectual impairments (e.g. McConkey et al, 1999a, b). Here it was found that clients were provided with few opportunities to communicate on an equal basis with care providers or to initiate interactions. In the current study it is proposed that carers may have relied on complex open questions as a means of maintaining control during interactions and that this imposed additional constraints on the ability of main participants to communicate effectively. Students in comparison seemed more willing to allow the Information Giver to take the communicative lead during interactions and monitor the progress of the conversation by checking their own understanding of previous messages. In other words students took

account of the Giver's mental model of discourse (Johnson-Laird & Garnham, 1980) and attempted to align their own representation of the discourse so that it overlapped with their partners. Students structured their contributions on the basis of what they believed to be the Giver's current mental model of discourse. This allowed them to exploit the level of mutual understanding already established with their communication partner and to use this as a framework for shaping future utterances and grounding information (e.g. Clark & Marshall, 1981; Clark & Schaeffer, 1989; Anderson & Boyle, 1994). This model was then adjusted in light of changes in speaker and listener knowledge and where it became apparent that breakdown had occurred, as illustrated in Extract 10. Co-ordinating contributions in this way then increased the likelihood that listeners would recognise speaker meaning and reduced the potential for misunderstanding (Clark, 1985).

By implication it is proposed that mutual understanding was not established in this way during interactions with a carer, or at least not to the same extent as with student partners. Here I am suggesting that carers may have attempted to align their partner's mental model so that it might be brought more into line with their own. They did so by seeking to maintain control of interactions through the use of complex open questions aimed at eliciting task information from their communication partner. This was less successful at establishing mutual understanding because 1) only the Givers had access to the precise location of the route and so were in a better position to guide their partner around the map. 2) Forcing the Giver to assume a more passive role means that he/she loses the initiative to select the most salient pieces of information that might help to bridge the gap between Giver and Follower knowledge. 3) Although carers may have elicited more new information than student partners this was not necessarily grounded. This is because speakers and listeners in dyads including a carer did not check that contributions had been mutually understood any more frequently than partnerships including a student. This suggests the following point: a) carers entered into conversations with the expectation that

they would assume a more dominant role in the task and/or b) they assumed a higher level of mutual understanding during interactions than was in fact the case.

Extracts 12 and 13 illustrate the communication posture typically adopted by carer and student Followers. In Extract 12 the carer attempts to align the Information Giver towards his own representation of the task using a question designed to introduce new information into the dialogue (Query-w) (Game 34). This fails to resolve the communication difficulty and rather than provide the Giver with an opportunity to reformulate their instruction, the carer then uses a closed question (Query y/n) to introduce another landmark featured on his map (Game 37). This contrasts with the student's communication style, as demonstrated in Extract 13 (please see Appendix 18 for the Information Follower map). Here the Follower first signals to the Information Giver that misunderstanding may have occurred in Game 8 (Explain game) before going on to provide him with an opportunity to accept or reject the Follower's interpretation of task instructions (Game 9, Check game). This enables the Information Giver to re-design his previous message or accept the Follower's contribution as suitable for current purposes (Clark and Schaefer, 1989).

Extract 12. Pair 7: Information Follower carer centred approach (deviation score 272.5 cm)

Game 33 Instruct

Information Giver: and then go past the # [/] the pig. Right round, bend and then # bend and bend again and then up

Move: Instruct

Information Follower: ok

Move: Acknowledge

Game 34 Query-w (embedded)

Information Follower: do I go towards the fish or the rabbit?

Move: Query-w

Information Giver: just towards the # just

Move: Reply-w

Game 35 Explain (embedded/embedded)

Information Giver: I've not got the

Move: Explain

End Game 35

Game 36 Query y/n (embedded/embedded)

Information Follower: you've not got a fish or a rabbit?
Move: Query y/n
Information Giver: no
Move: Reply y/n
End Game 34
End Game 36

Game 37 Query y/n (embedded)

Information Follower: have you got a boat?
Move: Query y/n
Information Giver: yes
Move: Reply y/n
End Game 37

Game 33 Instruct (cont.)

Information Giver: go to the boat
Move: Instruct
End Game 33

Extract 13. Pair 6: Information Giver student centred approach (deviation score 122 cm)**Game 6 Instruct**

Information Giver: and then you're coming down
Move: Instruct
Information Follower: aha
Move: Acknowledge
Information Giver: towards the watch
Move: Instruct (cont.)
Information Follower: oh right
Move: Reply-w
End Game 6

Game 7 Instruct

Information Giver: and then you're going up to a tree
Move: Instruct
Information Follower: oh right
Move: Acknowledge

Game 8 Explain (embedded)

Information Follower: don't have a tree
Move: Explain
End Game 8

Game 9 Check (embedded)

Information Follower: sort of inside the watch and heading up the way?
Move: Check
Information Giver: aha
Move: Reply y/n
Information Follower: right
Move: Acknowledge
End Game 7

8.3.2. Carer/student versus peer interactions

Focusing on differences that emerged between interactions including a carer or student and those involving peers, it was revealed that the former two groups checked their own understanding of previous messages (Check) and offered more non-elicited information (Explain) than peer Follower dyads. Check games are particularly helpful in establishing levels of shared understanding as they allow listeners to monitor their own understanding of previous messages and monitor the degree to which their own beliefs co-ordinate with those of the speaker. Adopting this communication style tends to make it easier for speakers and listeners to establish mutual understanding than where interlocutors are unable to base their contribution against a level of common ground (e.g. Clark and Wilkes-Gibbs, 1986). The following two extracts (Extracts 14 & 15) illustrate the level of success achieved by two peer interlocutors where speakers were able to design their utterances based on knowledge established with their communication partner. However, these extracts of dialogue represent a level of interaction that was not typical for peer dyads. In the majority of peer interactions the Information Givers experienced great difficulty in assessing listener understanding. For example, in Extract 16 the Giver attempts to resolve uncertainty about the level of shared understanding by seeking positive evidence from her partner that the previous instructions have been grounded (Game 7, Align). When her partner fails to respond to this elicitation, the Giver appears unable or unwilling to develop suitable communication strategies that will allow her to disambiguate the situation. Section B looks in more detail at the use of Align games in peer dyads. Here analysis on data transformed for dialogue length revealed that Givers used this type of game more frequently with peers than for the other two partnership groups. Of interest is that the request for feedback in Extract 16 appears to elicit a non-verbal response (gaze) from the

Information Follower (Game 8). It may be that the Follower was aware of some obligation to respond to this form of request, but that this went unnoticed by the Information Giver.

Extract 14. Pair 8 Check game: peer Follower dialogue (deviation score 365 cm)

Game 10 Instruct

Information Giver: then go right down.

Move: Instruct

Game 11 Check (embedded)

Information Follower: <down what way> [>]?

Move: Check

Information Giver: <right there's a > [<] <like a C> [/] like a C go # all the way down towards a # giraffe

Move: Reply-w

Information Follower: right.

Move: Acknowledge

End Game 10

End Game 11

Extract 15. Pair 3 Check game: peer Follower dialogue (deviation score 352.5 cm)

Game 6 Instruct

Information Giver: and round and right up round to the star # *** # up to the star.

Move: Instruct

Game 7 Check

Information Follower: you mean the kite?

Move: Check

Information Giver: the kite comes later. The star.

Move: Reply-w

Information Follower: right.

Move: Acknowledge

End Game 6

End Game 7

Extract 16 Align game: Pair 11 peer Follower dialogue (391 cm).

() denotes Follower gaze

Game 4 Instruct

Information Giver: and down here is a cow

Move: Instruct

End Game 4

Game 5 Instruct

Information Giver: and then here is a sheep

Move: Instruct

End Game 5

Game 6 Instruct

Instruction Giver: and up here is a banana

Move: Instruct

End Game 6

Game 7 Align

Instruction Giver: mhm?

Move: Align

End Game 7

Game 8 Instruct

Information Giver: and down (here <is a >/) is a house.

Move: Instruct

End Game 8

The extract illustrates, nevertheless, that participants with intellectual impairments attempted to monitor their own and/or their partner's level of understanding at least on some occasions. This is important as it demonstrates that these types of conversational act/game featured as part of their communication repertoire. It would appear, however, that peer interlocutors were less able to exploit the communication value of checking mechanisms than carer and student partners, even though where they were used appropriately during interactions. Earlier research with younger typically developing children has shown that they are also less effective at using self-checking mechanisms to establish mutual understanding (Doherty-Sneddon, 1995). This author found that Check games were unrelated to communicative success for typically developing six year olds, compared to a negative correlation (number of check games and deviation scores) between these two variables in adult interlocutors. So adult Information Followers using a higher number of self-checking games (Check) also achieved a higher level of communicative success. Doherty-Sneddon suggests that although children make use of a variety conversational structures they may not necessarily possess the verbal skills required to use them effectively. In the current study, peers used verbal checking mechanisms less frequently than carers and students, and where they did so, these were also less effective at establishing mutual understanding.

One way of investigating how mutual understanding is maintained is to focus on those parts of the dialogue where differences exist in the level of information available to speakers and listeners. For example, in the Map Task this occurs where landmarks are featured on the Giver or Follower map but not shared with the communication partner. On these occasions interlocutors must collaborate if they are to avoid a breakdown in understanding and maintain belief that information has been sufficiently grounded. Extracts 17 and 18 demonstrate how discrepant features were tackled by one Information Giver and his student and peer partners. On both of these occasions the discrepant landmark (tree/flag) was present on the Giver but not the Follower's map.

Extract 17. Pair 6: discrepant landmark: student Follower dialogue (deviation score 122 cm)

Game 12 Instruct

Information Giver: and then you're going up to the **tree**

Move: Instruct

Information Follower: oh right.

Move: Acknowledge

Game 13 Explain (embedded)

Information Follower: don't have a **tree**

Move: Explain

End Game 13

Game 14 Check (embedded)

Information Follower: sort of inside the watch and heading up the way?

Move: Check

Information Giver: aha.

Move: Reply y/n

Information Follower: right.

Move: Acknowledge

End Game 12

End Game 14

Extract 18. Pair 6: discrepant landmark: peer Follower dialogue (deviation score 410 cm)

Game 4 Instruct

Information Giver: and then go underneath the <Great Britain scarf> [//] **Great Britain flag.**

Move: Instruct

Game 5 Align (embedded)

Information Giver: you got that ***?

Move: Align

Information Follower: say it again.

Move Reply-w

End Game 5

Game 4 (cont.)

Information Giver: go underneath the **Great Britain # flag**.

Move: Instruct

Information Follower: oh aye.

Move: Reply y/n

End Game 4

In Extract 17 the Follower manages to avoid communication breakdown by checking with the Information Giver that his interpretation of the previous message was sufficient for current purposes. This also provided the Giver with an opportunity to redesign his instruction should it have been apparent that misinterpretation had occurred. This compares to Extract 18, as here the Giver is unaware of any difficulties in listener understanding since the Follower fails to signal clearly that the discrepant feature (flag) is not present on his map. On this occasion the Giver believes that he and the Follower have established a common understanding about the location of the route and that his partner also believed this to be so. The fact that the Follower asks for a repetition of the previous instruction indicates that he may have detected some problem with his own level of understanding (Game 5), even though he was unable to resolve the situation. It may be that he lacked flexibility to deal with ambiguity beyond a single exchange of turn or was unable to implement an alternative course of action when faced with continued uncertainty. Whatever the circumstance, it seems that 'oh aye' on this occasion cannot be taken as an indication of understanding on the part of the Follower or that information was grounded, even though this might not have been clear to the Information Giver. Abbeduto et al (1991) suggests that some individuals with intellectual impairments may select referents at random where the context fails to clarify ambiguous messages. This can be because they

lack suitable alternative strategies for gaining additional information where the original message is unclear.

Extract 18 may also reflect the distinction between interactional and transactional coherence (Brown and Yule, 1983). Interactional functions of language serve to maintain social relationships (e.g. greetings) and so tend not to carry a heavy informational load. Transactional communication refers more specifically to those situations where the focus is on information exchange and therefore more emphasis is placed on interlocutors having a clear understanding of one another's language use and the topic of conversation. Communication typically contains elements of both types of functions and focus may shift from one to the other during the course of a conversation (van der Gaag and Dormandy, 1993). Garrod and Doherty (1995) propose that transactional and interactional communication requires co-ordination of language processing systems at different levels. Transactional coherence takes place at a deeper language processing level, where interlocutors must use their communication repertoires in a flexible way to resolve and disambiguate information. For transactional coherence to be maintained it is not sufficient, for example, to respond in the affirmative when the content of a message has not been understood, as demonstrated in Extract 18. What this example appears to show is more competent use of the interactional functions of language, i.e. where coherence is maintained on a more peripheral or surface level. This is not to suggest, however, that this participant was unaware of the need for further clarification. Requesting further information from the Information Giver necessarily infers that the Follower is unsure about some part of the message, and that he/she ascribes this knowledge to his communication partner. Individuals with low self-esteem, such as those with intellectual impairments, can sometimes be reluctant to formulate questions as this can be interpreted by others as an admission of inferiority or dependence (van der Gaag and Dormandy, 1993). Therefore, although the interlocutor in Extract 18 failed to successfully disambiguate the speaker

message it is unclear whether this was due to difficulty co-ordinating transactional coherence or for some other factor.

Negotiating interactions in this way would undoubtedly have affected the level of mutual understanding established between peer speakers and listeners and the amount of information that could be successfully grounded. Evidence to support this comes from Map Task scores, which demonstrate that peers communicated less successfully than the other two partnership groups. Greater effort was devoted towards establishing mutual understanding where dyads included a carer or a student and this helped interlocutors to achieve a higher level of communicative success. In other words, peers adopted a less cautious communicative approach (Anderson and Boyle, 1994).

One way of examining the level of information made available to peer speakers and listeners is to look at how many landmarks were introduced during the Map Task. Giver and Follower maps each had a number of novel (4) and shared (7) landmarks and it might be expected that Information Givers would be primarily responsible for introducing the majority of these since their role is to describe the location of the route. This is supported from analysis on the number of landmarks first introduced by Information Givers and Followers. A mixed analysis of variance with role as a between subject-variable (2 levels: Information Giver x Information Follower) and partnership (3 levels: carer x student x peer) as the within-subject factor revealed significant main effects for role, $F(1,24) = 59.85, p < .000$ (means: Information Giver = 7.36 (2.4); Information Follower = 1.9 (0.9) and partnership, $F(2,48) = 4.56, p < .05$ (means: carer = 4.96 (3.4); student = 5.27 (3.4); peer = 3.7 (4.2)). The dependant variable was the number of landmarks mentioned by interlocutors. Post hoc t-tests found that carer and student Follower dyads introduced more landmarks into the Map Task than peer interlocutors (carer x peer = $t(25) = 2.4, p < .05$; student x peer = $t(25) = 2.7, p = .01$; means: carer = 5.0 (3.4); student = 5.3 (3.4); peer =

3.7 (4.2)). Therefore, less task information was made available during peer interactions than where the Information Follower was a carer or a student.

First mention of a landmark, however, does not necessarily mean that this was part of an initiation sequence (e.g. Instruct), as new information may also be introduced in response to a request from the communication partner e.g. in reply to a Query-w question. This is important because the linguistic form used to introduce new information can have an influence on the collaborative sequences that develop between speakers and listeners (e.g. Anderson & Boyle, 1994; Anderson 1995). Therefore focusing on the form of landmark first mentions by Information Givers may help us to determine how actively Givers and Followers contributed new information to interactions. Landmarks introduced during an initiation sequence are taken here to represent the traditionally dominant role of Information Givers in describing the route. Those mentioned in response to a Follower enquiry are seen as being more in line with the Information Follower's model of the task and therefore outwith the planning of Information Givers. This was investigated as follows.

Data on landmarks first mentioned by Information Givers revealed that two main participants did not introduce any new features during at least one Map Task trial (Pairs 2 & 13), and so were removed from analysis. Two one way analyses of variance were performed on the remaining eleven sets of scores, with partnership (3 levels: carer x student x peer) a within-subject variable. The analysis of variance was used to investigate the number of landmarks first introduced as part of a) an initiation sequence by Information Givers (Type 1), and b) in response to an initiation by the Information Follower (Type 2). The dependant variable was the form of introduction as a percentage of the total number of introductions made by the Information Giver. This revealed a significant effect for partnership for Type 1 introductions ($F(2,20) = 3.45, p < .05$; means:

carer = 72.87 (36.4); student = 86.64 (30.5); peer = 99.0 (3.3). This means that Information Givers initiated the introduction of new landmarks at different rates depending on whether their partner was a carer, a student or a peer. Post hoc t-test analysis found that this was because Information Givers introduced more landmarks during initiation sequences with a peer Follower than with carers, $t(10) = 2.36, p < .05$. No further differences were revealed for Type 1 introductions.

Analysis on the number of landmarks introduced in response to Follower initiations (Type 2) reached significance, $F(2,20) = 5.81, p < .01$; means: carer = 48.5 (43.7); student = 31.55 (45.1); peer 1.0 (3.3). So the level of task information made available as a result of Follower initiations varied across the three partnership groups. This was because more landmarks were introduced by the Information Giver in response to carer ($t(10) = 3.66, p < .05$) and student initiations ($t(10) = 2.2, p < .05$), than to peer Follower initiations. This is important as it suggests that the higher number of landmarks introduced during the Map Task in these two partnership groups were as a result of the communication strategy adopted by carers and students. Where greater communicative burden was placed on the Information Giver, i.e. during peer interactions, the interlocutors mentioned fewer landmarks. McTear (1985) suggests that parents can help to reduce cognitive demands placed upon younger typically developing children by asking questions and providing prompts aimed at structuring interactions. He proposes that parents and other adults compensate for younger children's conversational deficits by providing a framework that allows them to contribute during conversations but restricts their choice of response. It is possible therefore that carer and student communication style provided the Information Giver with conversational structures in which to embed task relevant information and maintain the coherence of interactions. This is supported in the previous analysis. The analysis revealed that carers and students initiated more games aimed at eliciting a

response from the Information Givers (Checks and Query y/n games) than peer Information Followers.

The findings support the suggestion that peer speakers and listeners established co-ordination at the interactional rather than transactional level. For transactional coherence to be maintained we would expect to find processing at a deeper level than would have been sustainable from the level of information made available to the majority of peer interlocutors (Garrod and Doherty, 1995). It is more likely therefore that communication was co-ordinated interactionally between peer speakers and listeners and that this maintained the structure of interactions.

8.4. Discussion and conclusions

Analysis on the number of conversational games produced by participants revealed a number of findings. First was the surprisingly high level of open questions used by carers to introduce new information into the task as compared with several other studies where Check and Align games were used most frequently (e.g. Doherty-Sneddon et al, 1997). This is of particular interest and suggests that overusing this type of open question may account for poorer performance outcome (deviation scores) in carer Follower partnerships. It would appear then that frequently querying information not already shared between speakers and listeners was less successful at grounding (Clark, 1996) information for this sample of young adults with intellectual impairments than working through what had already been made available. Students were less inclined to introduce new information and paid greater attention to ensuring that what had already been mentioned by the Information Giver was more fully grounded. In other words they assumed a lower level of shared knowledge.

Implications for the level of scaffolding provided to main participants is clear. By assuming a more communicatively cautious approach, students were able to provide scaffolding that was led by the needs of main participants and this allowed them to communicate more effectively. This framework may have assisted individuals to achieve a higher level of success than where less sensitive scaffolding was available. For example, it might be that adopting this communication style allowed students to facilitate communication within the main participants' zone of proximal development (Vygotsky, 1978), and that this assisted them to communicate more effectively. By relying more heavily on self-checking mechanisms that linked back to previous utterances (Check games), students may have helped their partner to maintain dialogue cohesion and plan further moves. The proposal here is that students provided a framework that structured interactions, but one that nevertheless maintained Information Giver autonomy and control. In contrast, where the flow of information was directed by the Information Follower rather than the Information Giver, establishing shared understanding was difficult to achieve rather than easier.

A second point relates directly to the questioning style adopted by carers. Open-ended questions are acknowledged as problematic for people with intellectual impairments (e.g. Sigelman et al, 1982; Biklen and Mosley, 1988; Booth and Booth, 1996), and frequently provide answers that contain very little information. Therefore, simply using a high proportion of this type of question can cause difficulties for some Information Givers. However, what is also noticeable from a closer look at carer dialogues is the diffuse style of questioning. This is particularly noticeable in the extract of dialogue from Pair 6 (Extract 11), where each successive carer question appears to broaden the parameters of the discourse further away from the original target question 'where do I go from there?'. It is proposed that this style of questioning leads to confusion for Information Givers and

makes it more difficult for them to formulate a response as requested by their communication partner.

Using questions to introduce new information is an effective means for increasing collaboration between speakers and listeners (Anderson & Boyle, 1994). However, it would appear that overusing questions that introduce new information into a conversation was problematic for the young people contributing to the study. It seems that a more effective strategy for establishing mutual understanding is for listeners to request confirmation that their interpretation of the previous message is correct (Check games) as this allows the speaker to maintain control over the direction of discourse while listeners can monitor levels of shared understanding.

Moving away from the dynamics of carer/student interactions it was revealed that peers initiated fewer speech acts aimed at establishing mutual knowledge. In particular, peer Followers were poor at monitoring their own understanding of previous messages or at best failed to signal to their communication partner where misunderstanding had occurred. This may be explained in a number of ways. First, peers may have lacked the necessary linguistic repertoire to monitor self-understanding. The Communication Assessment Profile for Adults with a Mental Handicap (C.A.S.P.) (see Table 6.8) shows that on average, peer partner language scores fell below those of the Information Givers (Table 6.7), though were broadly within the upper two thirds range of language ability for people with intellectual impairments. However, no assessment was made of peer participant's functional use of language since less time was spent with these individuals and fewer opportunities were available to make accurate judgements of their everyday language use. Therefore, in this thesis assessment of peer partner communication skills is less multi-dimensional (van der Gaag and Dormandy, 1993) than for the main participants. A closer look at the use of conversational games by peer partners reveals that although each game

was used at least once during peer interactions, almost fifty percent of individuals failed to initiate those more typically associated with the Follower role, i.e. excluding Aligns and Instruct games, in two out of the four remaining categories (Explain, Query y/n, Query-w and Checks). A Pearson's correlation coefficient revealed no association between the number of conversational games initiated by peer Information Followers and Map Task scores, $r(11) = -.31, p = .3$ (mean number of conversational games = 1.91 (1.4)). Nevertheless, language ability may have influenced how effectively peer partners were able to formulate questions aimed at eliciting feedback from his/her communication partner.

Second, peer Followers may have been unable to use their existing communication repertoire to clarify speaker messages. This is to suggest that peers may have possessed the necessary language skills to initiate games aimed at checking self-understanding, but were unsure about when or how to use them during interactions, and/or about how much information they shared with their partner (Brinton and Fujiki, 1994). Peers may have been unaware that the outcome of communication can also be affected by the quality of speaker messages, even where they accurately judge that a message may be inadequate (Robinson and Robinson, 1978). Awareness of the separation of message and meaning develops only gradually in typically developing children (Lloyd et al, 1992) and so may have influence communication process in some individuals.

Third, peer Followers may have failed to detect ambiguity in speaker messages and the need to clarify information (Fujiki and Brinton, 1993; Abbeduto et al, 1997). Information Givers may have experienced difficulty in uniquely identifying (Whitehurst and Sonnenschein, 1985) landmarks for Information Followers so that they might select them unambiguously from others on their map. Perceptual comparisons can be particularly challenging for some speakers with intellectual impairments (Brownell and Whiteley,

1992) and therefore Information Followers may have failed to detect disparity in levels of shared understanding where Information Giver instructions did not refer uniquely to the target referent and alternative features on the map. This is not unique to individuals with intellectual impairments as younger typically developing children also experience difficulty in appraising the adequacy of messages where information is ambiguous (Patterson and Kister, 1981).

Fourth, Followers may have been unaware of the need to signal non-comprehension during periods of communication difficulty. This is unlikely (e.g. Abbeduto and Rosenberg, 1980), but at least should be considered. Peer partner language scores fell below that of main participants and so it is possible that these individuals may have been less pragmatically aware than their communication partners. It is possible, for example, that peer Followers may have been less aware of the need to collaborate with their partner where misunderstanding occurred and that this led to the lower level of Check games reported in these partnerships. This is to say that peer Information Followers may have been less aware of interactional aspects of communication and the need to collaborate with communication partners to establish mutual understanding (e.g. Anderson and Boyle, 1994; Anderson, 1995). Lower levels of interaction have previously been reported in younger typically developing children (6 ys), where communication outcome was less successful than for older (11 ys) children (Doherty-Sneddon, 1995).

Fifth, in line with earlier research (Beveridge et al, 1979), peer Followers may have assumed responsibility for communication difficulty as listeners and therefore were less inclined to seek clarification of speaker messages. This tendency towards listener blame can also be seen in younger typically developing children, though by 7 years of age responsibility for inadequate messages is more usually located with the speaker (Robinson and Robinson, 1980). By this age, children come to realise that messages must refer

uniquely to the referent if they are to be successful. Information Followers more inclined to blame themselves as listeners for misunderstanding may therefore be less likely to request clarification of previous messages for the Information Giver.

Finally, peers may have experienced difficulty in detecting inconsistency in their own level of understanding due to constraints of the task. Although the Map Task was modified to bring it more into line with participant's needs, it may nevertheless have interfered with the ability to integrate information and self-monitor understanding (Shatz, 1983).

Peer Followers also initiated fewer closed questions aimed at eliciting feedback from their partner than carers and students. Information Givers collaborating with a peer would therefore have been less aware from verbal cues where misunderstanding had occurred, and as a result, less able to repair communication breakdowns. Analysis on the number of landmarks mentioned during the Map Task also revealed that peers introduced fewer features than dyads including a carer or a student. So less information was made available during interactions with a peer and this was less sufficiently grounded by speakers and listeners.

8.4.1. Information Givers versus Information Followers

Carers and students initiated a higher proportion of conversational games during interactions with the Information Giver. In this way these interactions were similar to those produced by adults with an acquired language disorder and their non-impaired partner (Merrison et al, 1993; Anderson et al, 1997). In the current research Information Followers assumed an active role in scaffolding interactions with the main participants and this resulted in a more successful communicative outcome than where this level of support was not available, i.e. during peer interactions.

Dialogues produced during Map Task procedures tend to vary in length as a result of the unique way in which individuals interact while completing the task. The following section examines the production of conversational acts in direct proportion to the number of words exchanged between speakers and listeners during Map Task trials. This allows us to look at qualitative differences in the composition of speaker utterances across partnership groups. This method of analysis has previously been used to look at communication in typically developing children and adult speakers and listeners (e.g. Doherty-Sneddon, 1995).

Section B: Conversational Games transformed for dialogue length

8.5. Dialogue measures: Conversational Games Analysis: proportional data

Conversational games data were transformed by dividing the number of games used by Information Givers and Followers by the total number of words used by interlocutors to complete the task. This figure was then multiplied by 100 to produce a proportional ratio of conversational games per one hundred words of dialogue. The dependant variable in the analysis was therefore the mean number of games produced per 100 words of dialogue. It was predicted that partnerships would differ in the proportional relationship of conversational games to word production and that these differences will be reflected in performance outcome measures (Map Task deviation scores). Specifically, conversational games aimed at establishing levels of mutual understanding (Check and Align games) would feature at a proportionally higher rate where communication was most successful (lower deviation score).

Data from one partnership (Pair 4) was removed from the analysis, and this will be discussed first before proceeding to the other data. Pair 4 was removed because subjecting data from this dyad to transformation results in distortions that appear dysfunctional and

unrepresentative of the ways participants negotiated the task in general. During trials with a student partner the Information Giver used only 18 words to complete the task while her partner did not speak at all (range of words for student Followers minus Pair 4 = 148 – 764). These 18 tokens were used to initiate nine sets of instruction (Instruct) and one Explain game. Subjecting this to transformation (dividing the number of games by number of words x 100) results in a disproportional high score being awarded to Instruct games (50 per 100 words; Explain = 5.6 per 100 words) in comparison to other student dyads. The means for all other games are shown in Table 8.15. Instruct game range excluding Pair 4: carer group = 0.1 – 2.4; student group = 0 – 5.4; peer group = 0.7 – 11.7. Excluding Pair 4 from the analysis removes any distortion that may occur as a result of this atypical data and provides us with a fairer description of conversational strategies that developed between speakers and listeners across partnership groups. The entire dialogue for Participant 4 and her student partner is illustrated below in Extract 19.

Extract 19. Dialogue from Pair 4: Student Follower dialogue

Game 1 Instruct

Instruction Giver: I have got a # piano.

Move: Instruct

End Game 1

Game 2 Instruct

Instruction Giver: a cat.

Move: Instruct

End Game 2

Game 3 Instruct

Instruction Giver: flag.

Move: Instruct

End Game 3

Game 4 Instruct

Instruction Giver: telephone.

Move: Instruct

End Game 4

Game 5 Instruct

Instruction Giver: a bus.

Move: Instruct

End Game 5

Game 6 Instruct

Instruction Giver: star.

Move: Instruct

End Game 6

Game 7 Instruct

Instruction Giver: car

Move: Instruct

End Game 7

Game 8 Instruct

Instruction Giver: jumper.

Move: Instruct

End Game 8

Game 9 Instruct

Instruction Giver: and a kite.

Move: Instruct

End Game 9

Game 10 Explain.

Instruction Giver: finished.

Move: Explain

End Game 10

As can be seen from this extract, no attempt was made by the Information Follower to verbally respond to Giver instructions. So although the verbal contributions of Pair 4 were included in previous analysis as an accurate representation of the way this dyad negotiated the task, it was decided to remove them from all analysis looking at the proportional relationship of games to number of words produced. Findings from non-parametric analysis are reported for all main findings throughout Section B. Measures taken from partnerships (Information Giver + Follower) and Information Givers was subjected to Friedman and Wilcoxon testing. Data generated by Information Followers and where attention focused on role (Information Givers x Followers) was examined using Kruskal Wallis and Mann Whitney tests.

Mean number of conversational games transformed for dialogue length is shown in Table 8.16. Data was entered separately into six x Friedman tests with partnership (3 levels:

carer x student x peer) a within-subject variable. This revealed a significant effect of partnership for Instruct, Query-w and Check games. Six x Mann Whitney tests were performed on task role (Align, Instruct, Explain, Query y/n, Query-w and Check). This revealed differences for Explain, Instruct, Query-w and Check games.

	Align		Instruct		Explain		Query-y/n		Query-W		Check	
	IG	IF	IG	IF	IG	IF	IG	IF	IG	IF	IG	IF
Carer	0.09 (0.1)	0.04 (0.1)	1.08 (0.7)	0.02 (0.05)	0.07 (0.1)	1.24 (0.5)	0.33 (0.39)	1.11 (0.8)	0.02 (0.07)	1.32 (0.7)	0.02 (0.1)	1.6 (0.6)
Student	0.05 (0.1)	0.1 (0.3)	1.85 (1.4)	0.08 (0.2)	0.29 (0.4)	1.83 (1)	0.78 (1.2)	1.4 (0.9)	0 (0)	0.92 (1.3)	0.06 (0.1)	2.29 (0.7)
Peer	0.47 (0.6)	0.04 (0.1)	4.39 (3.6)	0.03 (0.09)	0.58 (0.7)	0.59 (0.7)	1.36 (2.1)	0.32 (0.5)	0.08 (0.1)	0.62 (0.80)	0 (0)	1.2 (1.9)

Table 8.16. Mean (SD) number of games for Information Givers and Followers balanced for length (\div total words).

Analysis revealed differences in the number of Instruct ($X^2(2) = 12.17, p < .01$), Query-w ($X^2(2) = 8.35, p = .01$) and Check ($X^2(2) = 8.17, p < .05$) games depending on whether the Follower was a carer, a student or a peer. This was because: 1) Peer partnerships used more Instructs than student ($z = -2.04, p < .05$) and carer ($z = -3.06, p < .01$) Followers dyads. 2) Student Follower dyads initiated more Check games than carer ($z = -2.2, p < .05$) and peer Follower dyads, $z = -2.04, p < .05$. 3) A trend was found towards more Check games in carer Follower dyads than peer Followers dyads ($z = -1.8, p = .07$). 4) Dyads including a carer initiated more Query-w games than peer Follower dyads, with $z = -2.5, p = .01$.

Predictions were partly supported in that interactions including a student Follower used more Check games than the other two partnership groups and also communicated most successfully during the Map Task.

Task role reached significance for a number of games. These were: Instruct (means: Giver = 7.32 (4); Follower = 0.13 (0.3), $z = -4.27$, $p < .000$), Explain (means: Giver = 0.9 (0.7); Follower = 3.66 (1.3), $z = -3.98$, $p < .000$), Query-w (means: Giver = 0.09 (0.2); Follower = 2.86 (1.9), $z = -4.24$, $p < .000$), and Check (means: Giver = 0.08 (0.1); Follower = 5.16 (2.5), $z = -4.27$, $p < .000$) games. So differences revealed during previous analysis on the types of speech acts initiated by Information Givers and Followers continue to hold once dialogue length has been taken into account.

Simple effects analyses on Information Givers games revealed differences according to whether the partner was a carer, student or friend. Significance was reached for the number of Align ($X^2(2) = 5.79$, $p = .05$), Instruct ($X^2(2) = 11.62$, $p < .01$) and neared significance for Explain ($X^2(2) = 5.6$, $p = .06$) games initiated by Information Givers. This was because Information Givers working with a peer partner produced more 1) Align and Instruct games than during interactions with a carer or student (Align: carer x peer $z = -2.03$, $p < .05$; student x peer $z = -2.2$, $p < .05$; Instruct: carer x peer $z = -3.06$, $p < .01$; student x peer $z = -1.88$, $p = .06$, and 2) more Explain games than with carers, with $z = -2.19$, $p < .05$. 3) Information Givers initiated more Explain games when interacting with a student as compared to carers ($z = -2.1$, $p < .05$). So Givers volunteered the least amount of information overall to care providers.

Significance was reached for the number of conversational acts initiated by Information Followers. Simple main effects on the mean number of games produced by Information Followers found that partnerships differed in their production of Explain ($X^2(2) = 12.61$, $p < .01$), Query y/n ($X^2(2) = 11.86$, $p < .01$), Query-w ($X^2(2) = 6.76$, $p < .05$) and Check ($X^2(2) = 9.23$, $p < .01$) games. This was because 1) students and carers used more Explain (student x peer $z = -3.02$, $p < .01$; carer x peer $z = -2.96$, $p < .01$) and Query y/n games (student x peer $z = -3$, $p < .01$; carer x peer $z = -2.94$, $p < .01$) than peers. 2) Carers initiated more Query-w

games than students and peers (carer x student $z = -2.08$, $p < .05$; carer x peer $z = -2.32$, $p < .05$) and 3) students initiated more Check games than carers ($z = -2.19$, $p < .05$) and peers, with $z = -2.55$, $p < .01$.

A number of points emerge from the analysis on data transformed for dialogue length and these will be discussed separately before a summary is given for differences in student and carer Follower dyads, and carer/student and peer partnerships.

- 1). Differences noted in the production of Query-w questions by carers and students continue to hold one dialogue length has been taken into account. This strengthens the suggestion that Query-w questions featured robustly in the communication style of care providers and that less linguistic space was available to main participants to initiate interactions during these partnerships.
- 2). Students checked (Check) their own understanding of previous messages more frequently than carers or peers. This complements the conclusion drawn previously that students adopted a more communicatively cautious posture towards establishing mutual understanding (Anderson & Boyle, 1994; Doherty-Sneddon et al, 1997) than the other two groups. This means that interactions with students would have benefited from higher levels of listener feedback and more opportunities to monitor mutual understanding. Alternatively, it could be argued that partnerships including a carer were more confident that mutual understanding was established because Information Giver messages were clearer during these interactions and therefore required less clarification. This is to suggest that Information Giver's communication style more closely matched the needs of care providers and led to fewer occasions of communication difficulty. This is entirely possible as main participants and carers entered into the task having communicated on a regular basis and with an accumulation of knowledge about another's communication repertoire. Speakers and listeners can then use this background information as evidence on which to design further messages (Clark and Wilkes-Gibbs, 1986). Nevertheless, communication

measures (deviation scores) demonstrate that carer Follower dyads were less effective at establishing mutual understanding than student Follower dyads and therefore it is proposed that monitoring of mutual understanding was low during interactions with a carer.

Of interest is that little difference was found in the proportional use of Check games in dyads including carers and peers once dialogue length was taken into account. Further analysis revealed that carer monitored their own understanding of Giver messages no more frequently as a proportion of words use than peer partners. This is surprising. However, the analysis does in itself indicate how much overall verbal effort was directed towards self-understanding in these two groups. This is because the findings reported here are for the frequency of Check games rather than the number of words used to monitor self-understanding. So although peer interlocutors elicited feedback at an equivalent rate to carers this does not necessarily mean that this involved a similar number of words. This was investigated by looking at the number of words used to check self-understanding (Checks) in dyads including carers and peers, divided by the number of words exchanged between interlocutors in these two groups. This was then multiplied by 100 to produce a measure of the number of Check words per one hundred words of dialogue. Analysis revealed that dyads including a carer used proportionally more Check words than peer interlocutors, with $z = -2.55$, $p = .01$; means: carer = 20.25 (10.2); peer = 10.35 (16.2). The high standard deviation reported in both partnership groups suggests that Check games varied in length within and/or between participants.

Another way of investigating differences in communication style is to look for a relationship between the proportion of words used to check self-understanding and communicative success. This would help to indicate the usefulness of this type of game in establishing mutual understanding in these two groups. A Pearson's correlation coefficient analysis was performed on the number of Check words and Map Task scores. This

revealed a negative relationship for dyads including a carer, $r(10) = -0.76, p < .01$.

Significance was not reached for peer dyads ($r(10) = 0.04, p = 0.9$; range of scores = 0 – 6.7 Check games per 100 words of dialogue). Therefore, increases in the proportion of words used to monitoring self-understanding (Checks) co-occurred with better performance in dyads including a carer i.e. a more successful communicative outcome. No such relationship was found in peer dyads.

The correlation between performance scores and the proportional number of check words failed to reach significance for partnerships including a student Follower ($r(10) = -0.35, p = 0.3$; mean Check words per 100 words of dialogue = 22.5 (9.7), range of score = 8 – 37). This might be explained as follows. Carers and students adopted different communication styles in an attempt to establish mutual understanding. One difference related to the way that questions were broken down into smaller parts during interactions with a student in comparison to exchanges with a carer. An example of this approach was illustrated in Extract 10, page 202 in relation to Query-w questions. It was suggested that combining short closed questions with those that checked listener understanding was an effective means of establishing mutual understanding. This is supported from previous research (e.g. Bicklen and Mosley, 1988). Therefore, the frequency of checking may be what is important here rather than the total number of words used to monitor levels of mutual understanding. In other words, a more efficient way of establishing mutual understanding may be to break information down into smaller component parts so that focus can be placed on specific areas of difficulty (e.g. Wong, Clare, Gunn and Holland, 1999). These can then be targeted using questions that require a short response and/or those that monitor understanding (Checks/Aligns). Extracts 20 and 21 illustrate these points. Here student Information Followers use multiple Check games and clarifying questions as a means of eliciting feedback from the Information Giver.

Extract 20. Pair 8 Check game: student Follower dialogue (deviation score 135 cm)

Game 16 Check (embedded)

Information Follower: is [/] <is the > is the road travelling straight across the page or is it going up?

Move: Check

Information Giver: straight across the page

Move: Clarify

End Game 16

Game 17 Check (embedded)

Information Follower: straight across so [/] so uhm underneath the key or?

Move: Check

Information Giver: underneath the key.

Move: Clarify

Information Follower: right

Move: Acknowledge.

End Game 17

Game 18 Check (embedded)

Information Follower: a lot underneath the key # or quite a distance?

Move: Check

Information Giver: quite a distance. Well, a wee distance

Move: Clarify

Information Follower: aha.

Move: Acknowledge

End Game 18

End Game 16

Extract 21. Pair 3 Check game: student Follower dialogue (deviation score 194 cm)

Game 32 Check (embedded)

Information Follower: underneath the moon?

Move: Check

Information Giver: down underneath the moon

Move: Clarify

Information Follower: right

Move: Acknowledge

End Game 32

Game 30 Instruct (cont.)

Information Giver: and along to the pig

Move: Instruct

Game 33 Query y/n (embedded)

Information Giver: have you got a pig?

Move: Query y/n

Information Follower: no

Move: Reply y/n

End Game 33

Game 34 Explain (embedded)

Information Follower: I've got a rabbit

Move: Explain

Information Giver: oh

Move: Acknowledge

End Game 34

Game 35 Check (embedded)

Information Follower: but <is it> [/] is it +/-.

Move: Check

Game 36 Align (embedded/embedded)

Information Follower: see where the boat is *****?

Move: Align

Information Giver: yes [<]

Move: Reply y/n

End Game 36

Game 35 Check (cont.)

Information Follower: <is> [>] it underneath the boat # but it's to the right a little bit?

Move: Check

Information Giver: yes

Move: Reply y/n

End Game 35

Game 37 Query-w (embedded)

Information Follower: is [/] is the pig near [//] nearer the moon or the boat?

Move: Query-w

Information Giver: nearer the moon

Move: Explain

Information Follower: nearer the moon

Move: Acknowledge

End Game 37

Game 38 Explain (embedded)

Information Follower: I don't have one I'll just pretend there is one there again

Move: Explain

End Game 38

Game 39 Align (embedded)

Information Follower: ok?

Move: Align

End Game 39

Game 40 Check

Information Follower: I'm [/] I'm underneath the pig, yes?

Move: Check

Information Giver: yes

Move: Reply y/n

Information Follower: right

Move: Acknowledge

End Game 40

Game 41 Check (embedded)

Information Follower: and along?

Move: Check

Information Giver:

and # round and along and round again to the # boat and that's the finish

Move: Reply-w

End Game 41

End Game 30

So breaking information down into smaller parts that required simple yes/no or short responses and/or monitored levels of understanding was efficient and effective at establishing mutual understanding for main participants and their student partners.

Why then was no association found for peer interlocutors and performance measures given that they collaborated at an equivalent rate to care providers? One explanation comes from a closer look at the ways that Check games were used by peer interlocutors. Check games were seldom used by peer Information Followers beyond a single turn or initiation (as illustrated in Extract 18, page 214), and therefore may have been less effective at maintaining mutual understanding than where interlocutors collaborated throughout conversational games. Evidence to support this comes from the observation that two out the three observed instances of multiple checking within a single game occurred where communication was most successful for peer interlocutors, Pair 5; Map Task deviation score = 158 cm². Performance scores for this dyad was well below the group mean for peer interlocutors and other partnership groups (means: carer = 328.2 cm² (124.8); student = 242.9 cm² (112.4); peer 428 cm² (229.8)). So checking the interpretation of previous information throughout conversational games was effective at maintaining mutual understanding for these peer interlocutors. Extract 22 and 23 illustrate how Checks were used by Pair 5 (peer dyad) beyond a single initiation.

Extract 22. Pair 5: Multiple use of Checks during an Instruct game: Peer dyad xxx denotes unintelligible words (spoken very quietly)

Game 5 Check (embedded)

Instruction Follower:

a straight road?

Move: Check
Instruction Giver: and takes a curve under a key.
Move: Clarify
Instruction Follower: xxx xxx xxx
End Game 5

Game 6 Check (embedded)

Instruction Follower: under?
Move: Check
Instruction Giver: mhm.
Move: Clarify
Instruction Follower: right.
Move: Acknowledge
End Game 6
End Game 4

Extract 23. Pair 5: Multiple use of Checks during an Instruct game: Peer dyad

Game 8 Check (embedded)

Information Follower: to the right? That way?
Move: Check
Information Giver: that way.
Move: Clarify
End Game 8

Game 9 Check

Information Follower: That way?
Move: Check
Information Giver: head nod (non-verbal signal)
Move: Reply y/n
Information Follower: Right.
End Game 9
End Game 7

Second, although peers elicited feedback from the Giver at a similar proportional rate to carers, they appear less effective at exploiting the communicative advantage this provides in establish mutual understanding. The two extracts (Extracts 24 and 25) detailed below illustrate the following points. 1) Peer Followers failed to use Checks as a means of highlighting inadequacies in the speaker message and so Givers were unaware of problems in the quality of their instruction. 2) Many of the queries addressed to the Giver were general in form and failed to identify the specific source of difficulty. 3) Followers seemed generally unaware that the communication breakdown was largely unresolved following initiation of the Check game and/or lacked strategies to pursue misunderstanding beyond a

limited number of turns. Each of these points can lead to less effective communication as they do not signal to Information Givers that breakdown has occurred or that he/she can no longer assume mutual understanding.

Extract 24. Pair 13: Check game: peer Follower dialogue (deviation score 429 cm)

Game 1 Instruct

Information Giver: We. Draw a road.
Move: Instruct

Game 2 Check (embedded)

Information Follower: draw the road?
Move: Check
Information Giver: aye.
Move: Reply y/n
End Game 2

Game 3 Query-w (embedded)

Instruction Follower: w(hat) what will wh(at)?
Move: Query-w abandoned
End Game 3

Game 1 Instruct (cont.)

Instruction Giver: you go round # on the road.
Move: Instruct

Game 4 Check (embedded)

Instruction Follower: round?
Move: Check
Instruction Giver: yes. Right round again.
Move: Reply y/n
Instruction Follower: right.
Move: Acknowledge
End Game 4

Extract 25. Pair 2: Check game: peer Follower dialogue (deviation score 443 cm)

Game 3 Instruct

Instruction Giver: go straight # down the bottom then. Along that bottom here.
You finish at the bottom here.
Move: Instruct

Game 4 Check (embedded)

Instruction Follower: finish at the <bottom>?
Move: Check
Instruction Giver: <mhm>. Finish right at the bottom ***. Here.
Move: Reply y/n – w
End Game 4

Game 5 Check (embedded)

Instruction Follower: just there?
Move: Check
Instruction Follower: aha. There.
Move: Reply y/n
End Game 5

Extract 26. Pair 6: Check game: peer Follower dialogue (deviation score 365 cm)**Game 4 Instruct**

Information Giver: then keep going down. Then you should have a [/] a torch and a fish on either side.
Move: Instruct

Game 5 Check (embedded)

Information Follower: a fish?
Move: Check
Instruction Giver: a fish # and a torch on each side.
Move: Clarify
Instruction Follower: right.
Move: Acknowledge
End Game 5

Game 6 Explain (embedded)

Information Follower: right. I've not got the fish.
Move: Explain
Instruction Giver: then.
Move: Reply-w
End Game 6

Game 7 Query-y/n (embedded)

Instruction Giver: you got a torch?
Move: Query-y/n
Instruction Follower: aye.
Move: Reply y/n
End Game 7

Game 4 Instruct (cont.)

Instruction Giver: go round that.
Move: Instruct
Instruction Follower: right.
Move: Acknowledge
End Game 4

Extract 26 illustrates how effectively one peer dyad used Check games to maintain mutual understanding. Here discussion surrounded a landmark not featured on the Follower's map, a fish. The Follower first alerts his partner to the problem with the interrogative 'a fish?' before going on to state explicitly where the difficulty lay, with 'right, I've not got a

fish'. This provided the Information Giver with a) a clear indication that misunderstanding had occurred, b) where it had occurred and c) the source of the problem. This allowed the Giver to implement alternative strategies for guiding his partner around the route while at the same time maintaining mutual understanding. So communication took place on two levels. First, the interlocutors isolated and identified the source of the problem and second, they then collaborated to ground information and re-establish mutual understanding. Dealing with the problem in this way increased the collaborative effort required of speakers and listeners in that more words and turns were required to resolve the difficulty. However, separating the discrepancy from grounding procedures was effective at providing interlocutors with a clear understanding of where and how the misunderstanding had occurred, and a greater level of confidence that the communication difficulty was now resolved (Anderson & Boyle, 1994).

3) Information Givers instructed and elicited feedback from their partner proportionally most frequently when he/she was a peer. This was not predicted from Map Task scores, as communication was least successful in this partnership group. They also offered more task relevant information to peers than to carers. Therefore, peer dialogues focused on Giver instructions and attempts at confirming that these had been grounded by Information Followers. This is interesting as it suggests that main participants were aware that simply issuing instruction to their partners was not sufficient to allow them to assume mutual understanding but that this would require a level of collaboration with the Information Follower. So main participants actively engaged their peer partner in order to ground information.

Why then might Align games have been used more frequent during interactions with a peer? One reason may be that Givers were less sure about the progress of interactions in these dyads since their partners were less inclined to check their own understanding of instructions (Check games) than carers and students, as highlighted in the raw data in

Section A. Givers would have been provided with fewer clues from the content of dialogues about levels of mutual understanding and may have compensate for this by attempting to elicit feedback from Information Followers. A closer look at the use of Giver Aligns, however, suggests that they were not entirely successful in achieving this. Only 18% of Aligns games elicited a verbal response from Followers, while 82% were followed by an Information Giver game. The location of Aligns in peer dialogues is outlined below in Figure 8.2. Although no comparison is offered here of the way that other partnerships may have used these games, Figure 8.2 illustrates that the majority of Align games occurred before and after instruction from the Givers and prior to yes/no type questions. Doherty-Sneddon (1995) reports a similar association between the location of Aligns and Instructs in the dialogue of typical adults. This author also found a temporal relationship between Align and Clarify moves.

Figure 8.2. Position of Giver Aligns during interactions with a peer.

* Denotes response made by Information Followers.

Previous move/game		Following move/game	
Instruct	(70%)	Instruct	(47%)
Query y/n	(6%)	Query y/n	(35%)
Query-w	(6%)	*Reply y/n	(12%)
Ready	(6%)	*Explain	(6%)
Check	(6%)		

It is possible, however, that Givers might also have gathered feedback through non-verbal cues. For example, Doherty-Sneddon (1995) has shown gaze can serve some of the same functions as verbal feedback mechanisms and tends to be preferred by interlocutors where visual signals are available. It seems plausible then that gazing behaviour may have been associated with Align games and that this was used by interlocutors to help establish mutual understanding (Clark and Brennan, 1991) (see also Part 5 of the thesis). In other

words, Align games may have elicited gaze from Information Followers and acted as an elicitor of gaze in Information Givers.

Extracts 27, 28 and 29 illustrate the use of gaze during Giver Aligns with peer partners. The first extract demonstrates how gaze may have been used by the Giver to gather feedback from the Information Follower. Here the Information Giver uses an Align as a means of establishing if the Information Follower shares the landmark, a jumper, mentioned in the preceding Instruct game (Game 9). The Instruction Giver embeds the request for feedback within the instruction giving and, in using a yes/no question, places a high obligation on the Follower to respond (Schegloff and Sacks, 1973). Gazing towards his partner then places the Information Giver in a position to supplement any verbal response with additional non-verbal information on the referring phrase 'jumper on the map?'. This provides the Giver with two potential sources of feedback about whether his partner can locate the landmark before continuing with task instructions. In glancing again towards his partner's face (Game 9 continued), the Giver is more able to assess how successfully he and his partner have maintained a level of mutual understanding i.e. if the Follower is drawing the route. The second Extract is an example of where an Align game elicits gaze in the Information Follower. This again occurs as part of an adjacency turn sequence (Query y/n) and appears to focus the Follower's attention onto the Information Giver's next set of instructions. So again, although the Align did not elicit a verbal response, it appears to produce a signal from the Information Follower that he is ready to proceed with the task. The third extract illustrates simultaneous gaze in the Information Giver and Follower and demonstrates how individuals capitalised on the availability of verbal and non-verbal signals during task negotiations.

Extract 27. Pair 3. Align game: peer Follower dialogue (deviation score 352.5 cm)
___ denotes Giver gaze; () denotes Follower gaze.

Game 9 Instruct

Information Giver: (down) and round to the jumper.
Move: Instruct

Game 10 Align (embedded)

Instruction Giver: you see the jumper on the map?
Move: Align
End Game 10

Game 9 Instruct (cont.)

Instruction Giver: round t(o) from the car to the jumper.
Move: Instruct
End Game 9

Extract 28. Pair 9 Align game: peer Follower dialogue (deviation score 781 cm)
() denotes Follower gaze

Game 5 Instruct

Information Giver: <there's> [<] the road.
Move: Instruct

Game 6 Align (embedded)

Information Giver: right?
Move: Align
End Game 6

Game 5 Instruct (cont.)

Instruction Giver: (to there # to here # to there # beside there.)
Move: Instruct

Extract 29. Pair 7 Align game: peer Follower dialogue (deviation score 260 cm)
___ denotes Giver gaze; () denotes Follower gaze.; *()* denotes mutual gaze

Game 32 Align (embedded)

Instruction Giver: <did> [<] you hear *(what I said?)*
Move: Align
Instruction Follower: oh right.
Move: Reply y/n
Instruction Giver: listen to what I'm going to say *(again)*.
Move: Align
Instruction Follower: (mhm).
Move: Acknowledge
End Game 32

A detailed analysis of patterns of gaze associated with Aligns revealed that 38% of games were accompanied by Giver gaze and that 44% elicited gaze in Information Followers.

Twenty five percent of Aligns were associated with both Giver and Follower gaze. This

suggests that non-verbal signals were accessed during Align games. Givers appear to have capitalised on the availability of the non-verbal channel and used gaze as an additional resource to help establish mutual understanding. Align games may also have served as an attention getting device to Information Followers by signalling that the Giver was about to issue new information or ask a question.

Similar analysis on speech acts encoded using CGA revealed that peers varied their level of gaze according to the function of the game. Table 8.17 illustrates the mean number of games (percentage) associated with gaze for peer participants. This reveals that Information Givers and Followers gazed towards one another's face at a relatively high rate during illocutionary acts aimed at monitoring listener understanding (Check games). This is interesting as it suggests that the interlocutors may have accessed non-verbal information at the same dialogue locations as listeners explicitly signalled communication difficulty. Boyle et al (1994) propose that this can occur as speakers and listeners attempt to ease constraints on establishing mutual understanding.

	Align	Instruct	Query y/n	Query w	Check	Explain
IG	38%	49%	72%	57%	72%	45%
IF	44%	46%	35%	43%	56%	23%
Mutual gaze	25%	18%	18%	29%	44%	13%

Table 8.17. Percentage of conversational games associated with gaze and mutual gaze for Information Givers and Followers in peer dyads

Peer patterns of gaze may have developed as a result of the low level of interaction between speakers and listeners and in particular, the very limited use of Follower Check game during the Map Task, as highlighted in the raw data. Information Givers may have

used gaze in an attempt to access feedback information on their partner's progress in the task and as a means of compensating for the low level of verbal contributions from Information Followers. Patterns of gaze in each partnership group are investigated more globally in Part 5 of the thesis on non-verbal communication.

4). Carers and students commented (Explain) and used closed yes/no questions (Query y/n) proportionally more frequently than peer Followers, supporting finding from analysis reported previously on non-transformed data (Section A). Information Givers commented least during interactions with a care provider. It is proposed that volunteering information that is not explicitly requested by the communication partner may be one way that interlocutors can support interactions with people with intellectual impairments without necessarily increasing the cognitive load on speakers. This is because commenting on a previous utterance can alert speakers to possible discrepancies in the level of information that is shared with communication partner and the potential for breakdown to occur. Two extracts taken from the current study illustrate these points (Extracts 30 and 31).

Extract 30. Explain game: Carer Follower dyad

Game 5 Instruct

Information Giver: up # to the # left and round to the right <to the sh(irt)> [>] to the shirt

Move: Instruct

Game 6 Explain (embedded)

Information Follower: I've not got a shirt

Move: Explain

End Game 6

Game 7 Explain (embedded)

Information Follower: I'll tell you what I've got here. I've got a # ehm a caterpillar or a window # or a watch

Move: Explain

End Game 7

Game 5 Instruct (cont)

Information Giver: we(ll) draw it right down to the watch

Move: Instruct

Information Follower: right

Move: Acknowledge

End Game 5

Extract 31. Explain game: Student Follower dyad

Game 12 Instruct

Information Giver: like a # like a wee circle and then you're going towards # a
[/] a house and there's a key

Move: Instruct

Information Follower: right

Move: Acknowledge

Game 13 Explain (embedded)

Information Follower: I have the key

Move: Explain

Game 14 Explain (embedded/embedded)

Information Follower: I don't have the house

Move: Explain

End Game 14

End Game 13

Providing the Information Giver with additional information helped to avert communication breakdown for three main reasons. First, commenting on the content of the previous utterance immediately signalled to the Information Givers that breakdown had occurred in the level of shared or mutual understanding. Second, these comments also provided the speaker (Giver) with explicit information about the source of potential difficulty and possible alternative referents. Third, through combining points one and two, the Information Follower helped to maintain discourse coherence by providing a framework that assisted the Information Giver to bridge the gap between what had previously been mentioned and listener understanding. So providing additional information at those points in the discourse where misunderstanding might occur provided the interlocutors with a cognitively uncomplicated system for aligning speaker messages with listener needs.

8.6. Summary and discussion

8.6.1. Carer versus student interactions

Taking account of dialogue length revealed differences in the composition of carer and student interactions and a possible further explanation for performance differences in these two dyads. Conversations differed not only in the manner that listeners introduced new information into the task (Query-w questions) but also in terms of the proportional ratio of verbal effort committed to self-monitoring understanding (Check games). Student interlocutors developed an effective communication partnership with the main participants and this facilitated a more successful outcome than where the interlocutor was a care provider or a peer.

8.6.2. Carer/student versus peer interactions

Main participants aligned peer Followers more frequently than carer and student partners. This is of particular interest given the function of this type of conversational game. Align games are used by Information Givers to elicit feedback from their partner and to confirm listener understanding of a previous message. This suggests that main participants may have been aware of the differing requirements of peer listeners in comparison to carer partners and that they adapted their communication style to take account of these needs. By doing so, main participants would have been in a better position to maintain the coherence of peer interactions and to increase the probability of a more success communicative outcome. So it appears that this group of young adults with intellectual impairments was aware of the differing requirements of communication partners and able to adapt their communication style in order to meet these needs.

An alternative argument might be that Information Givers found it necessary to elicit more feedback from their partners as they were less inclined to monitor their own understanding of previous utterances. This takes little planning but requires that Information Givers are

able to detect where misunderstanding has occurred. Nevertheless, this does show that main participants were aware of the collaborative requirements of establishing mutual understanding and used this type of game in an attempt to gain feedback from their communication partner. Main participants also instructed their peer partners more frequently than carers and students. This suggests that peer interlocutors relied more heavily than carers and students on direct instruction as a means of transferring information, and less on probing one another's level of understanding. Finally, carers and students commented (Explain) at a higher rate than peers during the Map Task suggesting that more task relevant information was available to interlocutors in these partnership groups.

8.6.3. Information Givers versus Information Followers

Information Givers initiated more Instruct games than Information Followers. This is consistent with previous analysis and suggests that even though carers and students assumed a more dominant role during trials in terms of number of words and games exchanges between participants, main participants were, nevertheless, principally responsible for issuing direct instruction. Followers initiated proportionally more open questions that introduced new or previously unmentioned material into a conversation (Query-w), and checked their own understanding of a previous message (Check). Finally, they also volunteered more task relevant information (Explain) than Information Givers.

8.7. Part 4: Conclusion

Part 4 looked at the performance of young adults with intellectual impairments and their communication partners in a co-operative problem-solving task. The task required individuals to identify salient referents from a selection of landmarks located around Information Giver and Follower maps. Performance was measured by calculating how

accurately information about the route was transferred between speakers and listeners so that Followers could draw it on their map. Outcome measures (deviation scores) showed that communication was most effective where the Information Follower was a student and least successful where both interlocutors were intellectually impaired. Two peer dyads produced maps that could not be scored and these were removed from the analysis on Map Task scores.

Analysis of the dialogues revealed a number of differences in the ways that participants collaborated during interactions. First were apparent differences in the number of words and turns required to complete the task depending on whether the Information Follower was a carer, a student or a peer. This was because dyads including a carer took more words and turns to complete the task than where the Follower was a student or a peer. Peer interlocutors used the least number of words or turns overall. Differences were noticed in the communication style of Givers and Followers across partnership conditions. For example, Information Givers collaborating with a carer used more words and turns to complete the task than during interactions with a student or peer partner. In comparison, interactions with a peer tended to be brief but required longer turns to transfer task information than where the partner was a student. Differences were also found in the level of verbal effort required of Information Followers. Carers and students used more words and turns during the task than peer Information Followers. This suggested that carer and students scaffolded interactions in an attempt to bridge the gap between speaker and listener understanding.

Conversational Games Analysis was used to examine this in more detail. Analysis of the number and types of conversation games used by interlocutors revealed three major findings. These related to a) the number of Conversational Games produced by Information Givers and Followers, b) the ways that carers and students attempted to

support or scaffold interactions, and c) the level of verbal effort dedicated to monitoring self-understanding by peer interlocutors in comparison to dyads including a carer or student. Each of these main findings will now be discussed separately.

8.7.1. Number of games produced by Information Givers and Information Followers

Analysis revealed that carers and students produced more Conversational Games than their task partner, while peer Followers contributed less than half the number of games initiated by Information Givers. This supported claims that carers and students attempted to support or scaffold interactions with main participants during the Map Task, even though they relied on their partner to provide salient information about the route. Where this level of support was not available, i.e. during peer interactions, communication was less successful in terms of performance outcome measures (Map Task deviation scores). Why then might increases in the number of Conversational Games used by carers and students have led to a more successful communicative outcome?

The most obvious explanation is that scaffolding created a linguistic framework that allowed Information Givers to embed contributions and communicate more effectively than might otherwise be predicted (e.g. Shatz, 1983; Anderson et al, 1997; Ninio and Snow, 1997). However, much depended on the form of support offered to main participants. Mere increases in the quantity of Conversational Games were not in themselves sufficient to predict the success of scaffolding procedures. This is discussed more fully below. First, carers and students checked their own understanding of Giver instructions more frequently than peer Information Followers and this made it easier for them to assess how effectively information was being grounded. Check games are particularly useful at establishing mutual understanding as they allow individuals to align their mental model of discourse to that of their partner. Explicitly questioning the interpretation of previous messages alerts both Givers and Followers to discrepancies in

listener understanding and potential sources of communication difficulty. Second, carers and students also increased collaboration with their communication partner by eliciting responses to closed questions (Query y/n) more frequently than peer Information Followers. These types of question are useful at gaining a simple yes/no response to targeted task related problems and are cognitively and communicatively less demanding than open questions (Prosser and Bromley, 1998) such as Query-w questions. Abbeduto et al (1999) suggests that requests are more effective at disambiguating utterances as they make the obligation to respond more explicit (e.g. Anderson and Boyle, 1994) than statements of non-comprehension. Specific requests for clarification also reduce the cognitive load on listening partners as they make it clear that a) a response is required and b) highlight the exact nature of the difficulty (Shatz and O'Reilly, 1990). So using this form of question enabled carers and students to elicit feedback on highly specific points of interest/communicative difficulty without overly increasing the cognitive demands of the task. Combining these with questions that checked the level of shared understanding between speakers and listeners helped to ensure that information was more successfully grounded during carer and student Follower interactions

8.7.2. Carer and student scaffolding

The second main finding to come from Conversational Games Analysis was that carers and students differed in the types of games used to scaffold interactions. Further investigation revealed that 1) carers initiated more open questions aimed at introducing new information into the task (Query-w games), and that these were longer and more complex than those produced by student partners, and 2) students monitored self-understanding (Check games) at a higher proportional rate than care providers. It was proposed that these differences in communication style contributed to the effectiveness of communication in Information Givers.

High levels of wh-questions were also reported in less successful communicative outcomes between individuals with an acquired language disorder and non-impaired Information Followers (Anderson et al, 1997). Anderson et al (1997) found that communication was more effective where Givers initiated a relatively high number of task instructions and attempted to ensure that these were sufficiently grounded by Information Followers. A more successful outcome was also more likely where Followers frequently responded to Giver requests and signalled their readiness to continue with the conversation.

It was proposed that carer communication style represented an attempt to exert a dominant role in the task and the expectation that a) they would be required to take charge of the dialogue and b) they could assume a higher level of shared knowledge than was in fact the case. This contrasts with student communication style. Student partnerships contributed more verbal effort towards checking their interpretation of previously given messages and ensuring that information was sufficiently grounded. Adopting this communication strategy allowed Information Givers to assume a more active role in deciding how best to approach the task and the manner in which to introduce new landmark items. This resulted in a communicative outcome that was more effective and efficient at establishing mutual understanding and therefore in line with principles of Minimal Collaborative Effort (Clark and Wilkes-Gibbs, 1986).

Underpinning student communication style was a more cautious communicative posture (Anderson and Boyle, 1994) towards assessing how much information was shared with their communication partner and how best this might be used to help bridge the gap between speaker and listener understanding. Students seemed to devote greater effort towards interpreting instructions on the basis of what they believed to be the Giver's current mental model (e.g. Johnson-Laird and Garnham, 1980) of the task and how this might influence speaker intentions. Where speaker meaning was unclear, students

attempted to re-align their representation of the discourse towards that of their communication partner by explicitly requesting confirmation that their interpretation of the previous message was correct. This provided Givers with an opportunity to reformulate task instructions so that they might be mutually accepted by both speakers and listeners (Clark and Marshall, 1981; Clark and Schaefer, 1987).

8.7.3. Monitoring of understanding in peer dyads

Interactions including peer participants were impoverished in terms of the amount of information made available to speakers and listeners and the level of verbal effort dedicated to establishing mutual understanding. Dialogues tended to focus on instruction giving by main participants (Instruct games) and attempts at establishing how meaningful these were to Information Followers (Align games). Further, peer participants appeared to struggle with how effectively they were able to exploit the communicative value of actions aimed at establishing mutual understanding (Check and Align games). For example, Information Givers were largely unsuccessful at eliciting verbal feedback from peer partners about how well they were able to comprehend task instructions or their readiness to continue with the task. This is not unique to individuals with intellectual impairments as research has shown that younger typically developing children also sometimes fail to respond adequately to requests for clarification, even when able to do so (Shatz and O'Reilly, 1990). Information Followers may have been unsure about how to meet speaker needs and therefore reluctant to offer clarifying information and/or lacked available linguistic resources to resolve specific communication difficulties.

It is suggested, however, that participants may have accessed some feedback information from their partner through the non-verbal channel and that this was used to help establish mutual understanding (Clark and Brennan, 1991). This comes from evidence of gazing patterns that were observed in speakers and listeners during and after Giver Align games.

It is proposed that individuals may have used non-verbal information as a means of gauging their partner's ability to ground information, such as changes in facial expression, and preparedness to continue with the discourse, e.g. continued attention and head nods. Therefore, interlocutors adopted a multi-modal approach towards establish mutual understanding (Clark and Brennan, 1991; Boyle et al, 1994).

Responsiveness to requests for clarification from the Information Giver may have varied as a function of the Follower's level of ability (Longhurst and Berry, 1975). Language assessment scores were on average lower (comprehension and expression) for peer partners than for main participants and this may have influenced communicative success. The cognitive processing demands of the task may also have influenced how successfully Followers were able to respond to Giver requests for clarification and attempts at monitoring understanding (Shatz, 1983), while maintaining a current model of the task.

Attempts at monitoring self-understanding by peer Information Followers (Check games) were largely non-specific and often failed to resolve misunderstanding. Givers were frequently not alerted to inadequacies in the quality of their messages and therefore unaware that mutual understanding could not be assumed. Information Giver response in return often simply repeated sections of the previous utterance or consisted of a yes/no reply. So Follower attempts at establishing the level of mutual understanding incurred a double penalty during peer interactions. First, checking mechanisms were ineffectual at explicitly identifying the source of communication difficulty for Information Givers and were therefore less likely to resolve difficulties. Second, they also seldom elicited a response from the Information Giver that rephrased the problem utterance or provided feedback beyond one or two words. Less helpful at maintaining mutual understanding was that Information Followers also seldom pursued communication difficulty beyond a single exchange of turn. Most typically Followers accepted repetitions and/or yes/no responses,

leading Information Givers to believe that the source of misunderstanding had been identified and resolved (Clark and Schaefer, 1989), even where this was not the case. This would have implications for how readily Information Givers were able to maintain mutual understanding during the ongoing exchange and to resolve further difficulties based on shared or common knowledge (Clark and Wilkes-Gibbs, 1992).

Anderson and colleagues (Anderson et al, 1991; 1994; Anderson, 1995; Anderson and Boyle, 1995) demonstrate that the form of a response is intimately tied to the initiation sequence presented to listening partners and that effective collaborative sequences develop only gradually in typically developing children and adults. It seems reasonable to suggest then that the specific style of question used to elicit feedback from the Information Giver (Check games) may influence the form of the response. Non-specific requests for feedback information are therefore more likely to elicit a generally non-specific response.

Analysis revealed that self-checking mechanisms were unrelated to Map Task deviation scores during peer interactions. In other words, communicative success was unaffected by the number of words used to self-monitor understanding by peer Information Followers. This contrasts with the finding that increases in the proportion of words devoted to monitoring understanding co-occurred with a more successful outcome in dyads including a carer, and that Checks were used most frequently where communication was most successful i.e. during interactions with a student partner. Therefore, not only was the overall level of verbal effort devoted to monitoring understanding lower in peers partnerships, but where interlocutors attempted to assess their own or their partner's level of understanding, this was largely unsuccessful in generating clarifying information or establishing shared knowledge.

These findings support previous suggestions that individuals with intellectual impairments fail to consistently self-monitor understanding and/or experience difficulty engaging the means by which to elicit appropriate feedback from their communication partner (e.g. Abbeduto et al, 1991; Fujiki and Brinton, 1993). This may have occurred for a number of reasons. For example, Information Followers may have assumed responsibility for communication breakdown due to previous difficulties as a communication partner (Abbeduto et al, 1997) or as the receiver/listener of task instructions (Beveridge et al, 1979). Research is replete with evidence to demonstrate that individuals with intellectual impairments are influenced by their experiences as communicators and the expectations placed upon them by communication partners (e.g. Owings and Guyette, 1982; Shaw and Budd, 1982; Leudar and Fraser, 1985; Linsay, 1986; van der Gaag and Dormandy, 1993). The opportunities made available to peer participants to practise and develop strategies aimed at resolving misunderstanding may therefore have influenced the frequency with which they attempted to elicit feedback from their communication partner. Individuals may also have found it more difficult to resolve ambiguous instructions (Abbeduto et al, 1991; Fujiki and Brinton, 1993) where Information Giver instructions failed to uniquely describe the target referent landmarks (Whitehurst and Sonnenschein, 1985).

The apparent high use of Align games during peer interactions may signal attempts by the Information Giver to increase collaborative sequences with their communication partner and to gain positive evidence (Clark, 1985) that information was being added to their common ground. It also suggests that main participants may have adapted their communication style to meet the needs of their partner in an attempt to increase the likelihood of a successful communicative outcome. Extract 32 below, illustrates the entire task dialogue for participant six and his peer partner. Here the Giver approaches the Map Task assuming a low level of mutual understanding and aligns his partner to each landmark feature before going on to describe detail of the route. The Giver then uses Align games

on two more occasions, once to check the Follower's readiness to continue with the dialogue (Game 4) and again to align him to his own mental model of the task (Game 7). This compensates in part for the low level of interaction from the Information Follower and provides the Giver with a tentative measure of how effectively his partner is able to follow the progress of task instructions.

Extract 32. Pair 6: peer Follower dialogue (deviation score 410 cm)

__ denotes Giver gaze; () denotes Follower gaze; *(-)* denotes mutual gaze

Game 1 Align

Information Giver: (Right. There's) some pictures in front of you # there (then) and there's like a (p(iano) piano), cat, a Great Britain # the church, minibus, telephone # star # car # a jumper, and a minibus and then a kite.

Move: Align

End Game 1

Game 2 Instruct

Information Giver: follow [/] follow the road round to the [/] the [/] the cat.

Move: Instruct

End Game 2

Game 3 Instruct

Information Giver: and then underneath the <Great Britain scarf> [//] Great Britain flag

Move Instruct

Game 4 Align (embedded)

Information Giver: (you got that) ***?

Move: Align

Information Follower: say it again

Move: Reply-w

End Game 4

Game 3 Instruct (cont.)

Information Giver: go underneath the Great Britain # flag

Move: Instruct

Information Follower: oh aye

Move: Reply y/n

End Game 3

Game 5 Instruct

Information Giver: and then up and (then) (round) up thro(ugh) up past the church

Move: Instruct

Information Follower: *(done it)*

Move: Explain

Game 6 Align (embedded)

Information Giver: (I'm not finished yet) ***

Move: Align

Information Follower: ok. Sure

Move: Acknowledge

End Game 6

Game 5 Instruct (cont.)

Information Giver: and then up round # up underneath the minibus

Move: Instruct

End Game 5

Game 7 Instruct

Information Giver: and then it +//. down underneath the telephone

Move: Instruct

End Game 7

Game 8 Instruct

Information Giver: and then right up to the [/] the [/] *(the star)*

Move: Instruct

End Game 8

Game 9 Instruct

Information Giver: and then up # (over) the car

Move: Instruct

End Game 9

Game 10 Instruct

Information Giver: and then [/] # then over (the jumper)

)Move: Instruct

End Game 10

Game 11 Instruct

Information Giver: <and then to the fini(sh)> [//] and then there's a kite and
(just) (at the front) of you where it says finish and then put
where you've finished it.

a cross

Move: Instruct

End Game 11

Game 12 Explain

Information Giver: right. That's us.

Move: Explain

End Game 12

Using this top-down approach in an effort to maintain dialogue coherence was atypical in the present study and during earlier research with typically developing children and adults (Anderson and Boyle, 1994; Anderson, 1995). Anderson and colleagues suggest that this is because it represents a 'trade-off' between the collaborative effort required to establish

mutual understanding and unnecessary verbal effort (Clark and Wilkes-Gibbs, 1986). In the current example it appears that the additional effort required to align speaker and listener mental models was relatively successful at securing a degree of coherence during Map Task procedures, despite the low level of collaboration from the Information Follower. However, communicative effectiveness is equally influenced by the contributions of listening partners (e.g. Clark and Schaefer, 1989; Anderson and Boyle, 1994), and so the potential for communicative success was also influenced by the low level of collaboration from the peer Information Follower. The resulting deviation score (410 cm^2) fell just below the group mean for peer interactions (mean: 428 cm^2), and so represents a relatively successful interaction. Of considerable interest is that performance measures for these two young people was more successful (lower deviation score) than where the Information Follower was a carer. Here, performance measures were not only higher than the group mean (Pair 6 carer dyad = 499.5 cm^2 group mean = 328.5 cm^2) but also second highest overall for interactions including a carer (range for carer dyads = 151 – 683 cm^2). The relatively high level of verbal effort devoted to aligning the Information Follower appears to have been an effective strategy for maintaining mutual understanding for these peer participants.

8.8. Research points raised through the current research.

Difficulty was encountered in comparing findings from the current research to earlier studies because of the way that individuals were previously described and/or assigned to control group participants. Many earlier studies take measures of M/A or IQ as a means of matching experimental and control group participants, even where research questions clearly focus on aspects of communication and/or use test material that rely heavily on expressive/comprehensive language skills. Therefore little is known of the ways that individuals with intellectual impairments were able to access or respond to test materials based on language ability. This makes interpretation of earlier research findings extremely

difficult. Further, matching individuals on M/A and/or IQ measures assumes some parity in participant's performance based on their level of cognitive functioning. A number of authors question this assumption and find no one-to-one correspondence between response patterns on test materials and measures of cognitive functioning, such as mental age (e.g. Rondal and Edwards, 1997). They view as naïve the proposal that individuals matched on cognitive measures will function at the precise level indicated during formal testing and suggest that much will depend on the nature of assessment procedures. In particular, comparing individuals with intellectual impairments to mental age matched typically developing children may hold little communicative relevance beyond that of the experimental situation.

Comparison to typically developing children raises a separate though not unrelated point. A number of studies highlighted in earlier parts of the thesis have shown that communication in people with intellectual impairments is influenced by an array of factors, not least previous experience as speakers and listeners (e.g. Leudar and Fraser, 1985; Lindsay, 1986; van der Gaag, 1989b). For some individuals this can result in a long history of negative feedback as a communication partner (van der Gaag and Dormandy, 1993) and reluctance or reticence to commit to ongoing exchange (e.g. Booth and Booth, 1996). This is unlike the experience of typically developing children (e.g. Ninio and Snow, 1997). However, formal testing takes no account of communication history and therefore can not accurately reflect that way in which the individual is able to use his/her available linguistic repertoire. Matching people with intellectual impairments to typically developing children on linguistic characteristics (e.g. MLU) fails to accommodate differences in the ways that communication skills may be used during everyday encounters but also the purpose for interacting. Adults with intellectual impairments are not like typically developing children and communicate for very different reasons. Therefore, though some similarity can be found in the ways that these two groups acquire language

skills (e.g. Rosenberg, 1982), little useful purpose is served by comparing performance on communication based tasks when matched on specific measures of linguistic ability, such as MLU (Rondal and Edwards, 1997).

No formal record was made of the socio-economic grouping or educational background of care providers and students. Therefore it is possible that differences may have occurred in the composition of the two groups based on these criteria and that this influenced communication style. However, a search of the literature on the types of conversational acts investigated in the thesis revealed no evidence of difference based on socio-economic groupings or education level and therefore it is suggested that this did not overly influence communication outcome.

Part 5: Non-verbal communication in adults with intellectual impairments

Chapter 9. Non-verbal communication in adults with intellectual impairments

9.1. Introduction

A truly multi-dimensional approach to communication takes account of the context of interactions and ways that information is made available to speakers and listeners (Clark, 1996). This can involve accessing the linguistic and non-linguistic cues associated with speech as well as a vast array of information made available through the non-verbal channel (e.g. Argyle, 1988; Kendon, 2000). The previous section of the thesis (Part 4) focused on pragmatic language use during the Map Task and in particular on the ways that speakers and listeners attempted to establish mutual understanding. Interpreting the finding from dialogue analysis, however, also took account of non-verbal signals. It was proposed that the interlocutors used the non-verbal channel to gather feedback information that was in addition to that encoded in speech, and that this was used to ease constraints on grounding information (Clark and Brennan, 1991; Boyle et al, 1994; Doherty-Sneddon, 1995). For example, it was suggested that one non-verbal signal, gaze, was used by Information Givers as means for monitoring levels of shared understanding with their peer interlocutor.

Part 5 of the thesis presents procedures and findings from three short studies that focused specifically on aspects of non-verbal communication. Interest here was on the ways that non-verbal signals were used by Information Givers and Followers during the Map Task and how they might have contributed to task outcome as part of a multi-channel system of communication. The findings from Conversational Games Analysis (see Chapter 8) and earlier research suggest a number of points relating to non-verbal signals in people with intellectual impairments. These will be discussed more fully throughout this section but are outlined briefly here.

Communication involves not only the words that are exchanged during interactions but also a vast array of other verbal and non-verbal signals, such as paralinguistics, lip movement, gaze, gesture and changes in facial expression (e.g. Ekman and Friesen, 1971; Duncan, 1972; McGurk and MacDonald, 1976; McNeill, 1985; Goldin-Meadow et al, 1992). Traditionally, these non-verbal cues have been thought to reflect the expression of emotions, communicate interpersonal attitudes and to support and accompany speech (Argyle, 1988). As listeners we are sensitive to the information carried in the non-verbal channel and can use it in a number of ways. For example, gaze has been associated with the regulation of turns and for gathering feedback information from communication partners (Kendon, 1967; Exline and Fehr, 1982). Although some of these assumptions have since been challenged (e.g. Beattie, 1981), it is clear, nevertheless, that gaze plays an important role in maintaining coherence during interactions and how efficiently individuals can establish and maintain mutual understanding (e.g. Boyle et al, 1994; Doherty-Sneddon, 1995). This will be discussed more fully in Study 2.

The role of gestures in communication has generated a great deal of research (e.g. Ekman and Friesen, 1971; McNeill, 1985; Feyerseisen and deLannoy, 1991), although to date there appears no clear consensus about the types of information they convey. The distinction between different forms of gesture tends to focus around whether they rely on the linguistic form for definition or can be understood in isolation from speech (Feyerseisen and deLannoy, 1991). A number of studies have shown that one function may be to carry semantic information (e.g. Kendon, 1983), though meaning may be less accurately assigned where affiliated to object names and descriptions rather than actions and location (Krauss, Morrel-Samuels and Colasante, 1991). These authors suggest that the relationship between gestures and speech is neither precise nor reliable and that there is little evidence to support the informational importance of gestures in communication.

Krauss et al (1991) propose that gestures may be used by speakers to aid access of lexical items and convey paralinguistic information (e.g. syllable stress) as well as some semantic information. An alternative viewpoint is put forward by McNeill (1985). He suggests a close semantic and pragmatic connection between certain types of gesture and accompanying speech, and that gestures and speech share the same computational space and are part of the same psychological structure. McNeill finds evidence to support this with findings that illustrative gestures 1) occur only during speech, 2) share the same pragmatic and semantic functions as speech, 3) are synchronized with speech 4) may be lost together with speech during aphasia and 5) develop together with speech in typically developing children. Therefore gestures and speech can be said to form one unified communication system.

A multi-system communication approach is supported from developmental studies. For example, Butcher and Goldin-Meadow (2000) suggest that gestures and speech combine to carry a single coherent message, though are formed in separate modalities (e.g. Goldin-Meadow et al, 1992). Butcher and Goldin-Meadow (2000) investigated the use of communicative gestures in young typically developing children's one-word utterances. Communication gestures were defined as those a) directed towards another and involving eye contact or joint attention, b) that did not directly manipulate another object or person or c) formed part of a ritual act (e.g. blowing a kiss) or game, and d) did not imitate an interlocutor's previous gesture. Butcher and Goldin-Meadow (2000) found that gestures and speech converge only after an initial period early in the child's production of one word utterances, where gestures are produced independently or asynchronously with speech and are combined with meaningless words. They propose that the eventual development of communicatively symbolic gestures and speech allow children to produce

a single message in the dual modalities, and by the onset of two word speech, novel combinations where gestures convey different but related information to speech.

Further evidence of the close computational link between speech and gestures can be seen from studies focusing on older children's use of gesturing (e.g. Church and Goldin-Meadow, 1986; Goldin-Meadow et al, 1992). These Goldin-Meadow studies found evidence of transitional knowledge in the gestures of children and suggest that when taken in collaboration with speech, can provide insight into potential (implicit) as well as realised (explicit) problem-solving strategies adopted by typically developing children. Patterson and Kister (1981) suggest that non-verbal measures can provide an early indication of younger children's development of comprehension monitoring. Therefore a multi-system approach to communication can provide valuable information about the ability to manipulate knowledge, even where it is not articulated more formally in speech.

Anderson et al (1997) investigated the role of gestures in adults with aphasia. They were interested in the ways that individuals used gestures during a co-operative problem-solving task with age-matched peers. Gestures were coded according to iconicity (i.e. had a clear semantic content) and whether they were 1) speaker orientated – only visible to the speaker or 2) listener orientated – clearly visible to listeners. Gestures made in clear view of the listener were seen as signaling/indicating communicative intent and different in kind from those not visible to partners. These authors found that individuals with aphasia used twice as many gestures as age matched peers and that these were largely communicative and intentional. Anderson et al (1997) propose that gestures conveying clear semantic content (iconic) can assist individuals with aphasia to achieve communicative success when used as part of their available communicative repertoire.

So some gestures can relate directly to the referent through similarity or spatial contiguity and therefore may be less arbitrary or conventional than the linguistic code. In Chapter 2 it was argued that language represents permissible combinations of items (Sperber and Wilson, 1986) that allow us to assign form to meaning or content according to social and cultural norms in an arbitrary and yet systematic manner. Kendon (2000) argues that speakers can use gestures to add clarity and precision to this arbitrary system by differentiating between alternative meanings of lexical forms. He found that hand movements associated with the sentence verb differed in form during story telling according to the supporting contextual information. So gestures carry propositional knowledge that can supplement that made available through the verbal channel (Kendon, 2000), and this can help listeners to ground information (Clark and Brennan, 1991).

One way to investigate the role of non-verbal signals is to look at communication outcome where interlocutors cannot see one another. This takes as its premise that visual signals count, and that access provides an additional channel through which speakers and listeners can establish mutual understanding and gather feedback from their partner (e.g. Clark and Brennan, 1991; Boyle et al, 1994; Doherty-Sneddon and Kent, 1996). Findings from a number of studies suggest that 1) typically developing children communicate more effectively when visual signals are available (Doherty-Sneddon 1995; Doherty-Sneddon & Kent, 1996). This may be because non-verbal information is easier to encode and decode than verbal information. Feyerseisen and deLannoy (1991) find that by the time children produce single word utterances they already have a repertoire of gestures that can be used to signify meaning, such as waving goodbye. Further, younger typically developing children can use these gestures as a simplified means for contextualising verbal utterances beyond that represented in speech. These authors stress, however, that this does not imply that younger children demonstrate expertise beyond their years in

linking the verbal and gestural domains. It simply reflects that many of children's early production are grounded in the here and now of language use and therefore depend on context for utterance meaning. 2) Restricting access to visual signals alters the structure and content of dialogue for child and adult communicators in comparison to where signals are available. For example, communication is less efficient and contains more verbal feedback mechanisms in the absence of non-verbal cues (Boyle et al, 1994; Doherty-Sneddon 1995; Doherty-Sneddon et al, 1997). These authors conclude that visual signals provide speakers and listeners with an additional resource through which to establish mutual understanding as part of a multi-channel system of communication.

A number of studies have looked at the use of non-verbal acts in people with intellectual impairments (e.g. Hardwood, Hall and Shinkfield, 1999; Purcell et al, 1999). These have found that individuals use non-verbal signals appropriately as part of their total communicative repertoire. Most frequently reported communication acts include the use of gestures, touch, changes in facial expression, head movements, signed communication and posture (e.g. Rojanh, Lederer and Tasse, 1995; Chatterton, 1998; McConkey et al, 1999a, b; Bradshaw, 2001). Much of this research has focused on staff awareness of non-verbal signals as part of an added value or global approach to the client's communication repertoires. For example, Remington (1998) proposes that a pragmatic attitude should be taken to communication and identifying individual's communicative needs in relation to challenging behaviour (Hastings and Remington, 1994). He stresses that communicative behavior, such as gesturing, should be identified where they occur and with a view to supporting the introduction of new skills if individuals are to be provided with a communication environment most suited to their needs.

People with intellectual impairments may rely more heavily on non-verbal signals than typical adults, especially those who use non-verbal signals as their primary means of communication or have limited access to speech (McConkey et al 1999b). These authors suggest that non-verbal signals can play an important role in facilitating the expression of personal choice and preference in those relying more heavily on non-verbal means and should therefore be recognised as communicatively significant and responsive to client needs. Therefore, non-verbal signals can provide individuals with particularly valuable systems for signaling and decoding speaker messages that is a cognitively less complex than a linguistic means of representation (Feyerseisen and deLannoy, 1991). As highlighted in Chapter 3, however, a number of studies have shown that care providers experience difficulty predicting and recognising non-verbal acts in their own and their client's communicative behaviours (e.g. van der Gaag and Dormandy, 1993; McConkey et al, 1999a, b; Bradshaw, 2001a, b). For example, Bradshaw (2001b) reports that care staff underestimate their own use of verbal communication and overestimate how frequently they use non-verbal signals. She found a large discrepancy in the proportion of non-verbal acts reportedly used by care staff (38% of communication acts) and those observed during video analysis (7%). Bradshaw (2001b) revealed that overall, more than 40% of communicative acts performed by care staff were outside the reported comprehension abilities of individuals. The current research aims to investigate the use of non-verbal signals in the thirteen main participants from the Map Task and their three communication partners, including care providers.

Study 1 investigates face-processing skills and focuses on those features of facial information that are particularly relevant to interpersonal communication i.e. facial expression, identity matching, facial speech and gaze. Analysis revealed that individuals displayed an array of processing strengths across each of the four test categories.

Study 2 aimed to look at the use of non-verbal signals during interactions between main participants and their three communication partners (carers, student and peers). In the event, observations taken from the videotaped dialogues revealed little gestural movement during the task. Therefore the analysis focuses here on the use of one non-verbal signal, gaze, as a means of communicating and exchanging non-verbal information. I was interested to find out if gazing patterns were influenced by changes in the communicative context of interactions (partnership) and how this related to communicative success. Analysis revealed that gazing was highest in dyads including a carer and student partner but that this was not clearly related to other outcome measures (deviation scores and number of words).

Finally, Study 3 attempts to isolate non-verbal signals from interactions between main participants and student Information Followers. This involved third party or bystander analysis of the information made available through the verbal and/or visual channel. Current procedures were unable to establish conclusively the presence of non-verbal signals during these trials and a number of explanations are given that may account for this.

Data gathered from Studies 2 and 3 (Sections 9.3 and 9.4) of the thesis was subjected to parametric testing. This revealed wide variation in the participant scores and so parallel non-parametric analysis was also performed on the data as a precautionary measure. In the event, no significant differences were revealed in the research findings from the dual sets of analysis and therefore findings reported throughout Chapter 9 are from parametric testing. Supporting non-parametric analysis can be found in an accompanying appendix (Appendix 19), in line with earlier reporting protocol (see Chapter 8).

9.2. Study 1. Face processing

Neuropsychological and experimental evidence from the past 10-15 years clearly indicates that as adults, we decode the various forms of information available to us in the face (expression, recognition, lip movement and gazing behaviour) via different information processing pathways (e.g. Bruce and Young, 1986; Young, 1992; Campbell, Landis and Regard, 1986). Studies focusing on developmental aspects of skill acquisition support a gradual improvement in children's ability to decode faces from early childhood through to adult years (for a review of research see Chung and Thompson, 1995). This represents a shift towards configural processing of facial information from encoding of isolated features (Carey and Diamond, 1977; Carey, 1992), and the ability to deal with facial transformations such as changes in expression, pose and paraphernalia (e.g. beards and hats) (Ellis, 1992). Ellis (1992) suggests that the ability to discern invariance despite changes in appearance is learned through experience with faces and becomes fully developed by around 10 - 11 years of age in typically developing children (Carey, 1992).

As highlighted by Bruce, Campbell, Doherty-Sneddon, Import, Langton, MacAuley and Wright (2000), however, developmental studies of this kind rarely investigate aspects of facial information that are used during interpersonal communication. For example, expression, facial speech and the direction of gaze are important sources of information used by speakers and listeners to decode and co-ordinate verbal communication (e.g. Sacks et al, 1974; McGurk and Macdonald, 1976; Kleinke, 1986; Summerfield, 1992). Baron-Cohen (1995) suggests that gaze may also be used as a means of discerning judgements about another's mental state, such as what a listener is attending to, and therefore relevant in discussions on social cognition, i.e. a theory of mind.

A similar picture emerges from research looking at face processing in people with intellectual impairments. Although a number of studies have investigated recognition of facial expressions of emotion (e.g. Hobson, Outsen and Lee, 1989; Rojahn, Robald and Schneider, 1995) and identity (Davies, Bishop, Manstead and Tantam, 1994), very few have looked at other sources of information available from the face that relate to interpersonal communication. Therefore, I will begin by discussing recent research looking at the recognition of emotion since this represents by far the largest body of research, before moving on to other areas.

The ability to decode and respond appropriately to facial expressions of emotion has been recognised as a key feature of effective interpersonal communication, and as problematic for people with intellectual impairments (e.g. Stewart and Singh, 1995). Difficulties have been observed in both static (e.g. Hobson et al, 1989; Rojahn et al 1995) and moving representations of emotional expressions (Harwood et al, 1999) when compared to typical adults and children. The majority of studies looking at facial affect have used static representations of human faces similar to Ekman's Picture of Facial Affect (PFA, Ekman, 1976) (Rojahn et al, 1995). This contains black and white facial images representing happiness, sadness, anger, fear, surprise and disgust. Rojahn and colleagues (Rojahn et al, 1995a, b) propose that difficulties experienced by individuals with intellectual impairments in decoding expressed emotion represents a specific deficit in face processing skills. They found that performance on a static facial discrimination task (happy, sad, neutral) fell below that predicted from M/A scores in comparison to typically developing children and adults.

This view receives support from work looking at movement enhanced expressed emotions (Harwood et al, 1999). Here it was proposed that moving images would facilitate the

discrimination of facial emotions by contextualising them within the dynamics of everyday expressions. Twelve participants (C/A range 19 – 54 ys; mean = 39 ys: IQ range 56 – 73; mean = 62.58) were asked to match names of emotions to colour pictures and video images of six expressed emotions (as outlined above). These authors found that overall, participants identified emotions more successfully from video playback than photographs and in particular for displays of sadness and anger. Happiness and sadness were most easily recognised from the moving display while no difference was found for photographs. A main effect for group also showed that typical adults were more successful at identifying emotions across both contexts. Harwood et al (1999) suggest that visual-perceptual limitations, such as those associated with discriminating movement cues associated with expressions, may also have influenced task performance and/or difficulty in focusing on the entire face and associated movements.

Decoding facial expressions of affect has also been found to vary as a function of level of impairment (Rojahn et al, 1995), and for particular emotional expressions, such as surprise (Baron-Cohen et al, 1993) and anger (Harwood et al, 1999). Identification of surprise has also found to be more difficult for children with autism (Baron-Cohen, 1995).

Face perception also includes a number of other skills. One of these is the ability to discriminate one face from another. This involves encoding a representation of the face and then matching it against some stored representation (recognition). Typically developing children under the age of 10 years experience particular difficulty at the encoding stage of this process, particularly where appearance is transformed through the use of paraphernalia or changes in expression (Carey and Diamond, 1977; Carey, 1992). Identity matching in adolescents with intellectual impairments has been investigated as part of a wider study looking at face processing skills in people with autism (Davies et al,

1994). These authors designed a number of tests to distinguish between emotion-specific/face specific deficits and perceptual processing difficulties. These were as follows:

1. Matching face identity despite a) changes in orientation of the face and b) changes in emotional expression.
2. Matching emotional expression despite changes in identity
3. Matching a pattern of symbols despite changes to its configuration.

Test item 1a was designed to investigate the use of configural matching of aspects of the face, while Item 3 isolated configural pattern matching in a non-facial task. Davies et al (1994) found that individuals with intellectual impairments matched on non-verbal M/A and verbal scores were more successful at matching faces in all test categories than 'high ability' adolescents with autism (Group 1; IQ<75) and equally well as 'low ability' adolescents (Group 2; IQ>75). Analysis of test-type revealed that matching identity with expression change was easiest for Group 1 and that pattern matching was most difficult for Group 2. No further differences were reported. These authors propose that this represents specific face processing deficits in adolescents with autism rather than a selective disorder relating to recognition of facial expressions of emotion, and that difficulties may relate to encoding configural information as opposed to making use of isolated facial features. Findings from this study suggest that information presented in the face should be accessible to the thirteen main participants in the current work.

Finally, Bell and Espie (2000a, b) report that some individuals with intellectual impairments may experience difficulty in judging the age of another from their appearance, including facial cues. They suggest that describing a person by age had little meaning for participants their study (C/A range 25 – 65; IQ 50 – 74) but that individuals

could discriminate at a gross level, e.g. between children and adults. Predictors of age recognition include IQ (with improvement around 60 –65), time spent in long-term hospital, level of social adaptive behaviour and age.

Focus for the current study was to investigate face processing in participants from the Map Task trials. As outlined above, facial cues provide speakers and listeners with an array of information that can be used during interactions to aid the establishment of shared understanding. Face processing skills were investigated in the current study using a face-processing test developed at the University of Stirling (Bruce, et al, 2000). This test comprises of black and white digitised images of child and adult faces divided into four discrete categories: these are identity, expression, gaze and facial speech. The specific research questions addressed through the current study are as follows:

1. How readily are the current participants able to process information made available from the face? This is important as many of the assumptions underlying the usefulness of non-verbal cues rely on ‘typical’ access to this channel of information.
2. Can a relationship be found between face processing skills and communicative effectiveness? Specifically, might performance on the face processing test predict communication success on the Map Task?
3. Can evidence be found to support the claim of selective impairment in the processing of specific posed facial expressions in people with intellectual impairments, such as anger and surprise, as compared to happiness and sadness?
4. What, if any, association might there exist between the face processing skills and level of need? For example, does the ability to discern facial information co-exist with more developed language skills in some individuals?

From the evidence reported here it is predicated that participants will discern information presented in the face selectively depending on which particular aspect of facial processing is under investigation. Further it is predicted that individuals demonstrating higher levels of face processing skills will be communicatively more successful during the Map Task as they will be able to capitalise on non-verbal feedback cues made available during interactions with their partner, such as changes in facial expression. These can help to ease constraints on establishing joint understanding (e.g. Doherty-Sneddon, 1995). Baron-Cross, Spitz and Cross (1993) differentiate between so called 'simple emotion' produced by things in the world, such as happiness and sadness, and 'cognitive emotions', which involve imputing beliefs to another when attributing cause. Examples include surprise and embarrassment. Baron-Cohen et al (1993) suggest that simple emotions lie within the understanding of people with autism while those attributed to motives and cause (cognitive emotion) pose greater difficulty. However, these authors found that performance was worse for surprise (cognitive emotion) than happy and sad (simple emotions) in participants with autism and those with intellectual impairments and therefore a similar outcome is predicted here. That is, it is proposed that posed expressions of simple emotions (happiness and sadness) will be identified correctly by the current participants at a higher rate than for surprise and angry.

Finally, earlier research outlined here suggests that typically developing children do not become face experts until around 10 years of age (e.g. Carey and Diamond, 1977). Before this age, children are less able to decode information from the face that will allow them to differentiate one face from another. It is predicted that participants in the current study with verbal scores within the range of a typical 10 year old will demonstrate identity matching skills beyond those with a lower verbal score, and that this will be related to the way that they process facial information. A deal of caution is taken in

making this prediction as a) it assumes a relationship between verbal scores and M/A and b) verbal scores (IQ) are based on criteria outlined in the B.P.V.S. This test takes one measure of vocabulary use, single word comprehension, as a basis for calculating verbal IQ and may therefore not necessarily be predictive of overall language ability.

Nevertheless, level of need, or cognitive functioning, does appear to be related to performance on tests of identity matching in people with intellectual impairments (Davies et al, 1994)

Few predictions are possible in relation to gaze and facial speech due to the dearth of research in this area. However, on accumulation of evidence from research outlined above and other areas of face processing (e.g. Bell and Espie, 2000a, b) it is expected that participants will demonstrate an array of skills within and between test categories.

9.2.1. Test of Face Processing

Items relating to each test category were presented to the participants in four separate folders. These were expression, identity, facial speech and gaze. Each category contained several tests of varying difficulty and participants are asked to complete the first and easiest tests before progressing, where successful, to more difficult levels. The test was originally developed for investigation of face processing skills in typically developing children. All digitised images were of children's faces with the exception of two tests, which contained adult representations.

9.2.1.1. Expression

Expair: This examines participant's ability to make judgements about which of two faces shows a particular emotion. The test is divided into four sections and participants asked 'which of the two faces are 1) happy, 2) sad, 3) angry and 4) surprised. Individuals

scoring 10/12 or more move onto the following level, Expmatch.child. During half of these trials the same child's face is used as both target and distracter while in the other half two different faces are shown.

Expmatch.child: This is a matching test where participants are asked 'which of the two faces at the bottom of the picture feels the same way as the one at the top of the picture?' This section contains twelve trials plus one practise session. During half of these trials different children's faces are used as target, correct choice and distracter items, whereas in the other 50% the correct choice has a different identity from the target and the distracter has the same identity as the target.

Expmatch.adult: Individuals move onto Expmatch.adult if they score 10/12 or more on the previous section. This test is similar to Expmatch.child but with adult rather than children's faces and has only eight trials. Testing on Expmatch.adult is carried out separately from the above trials to avoid boredom/fatigue.

9.2.1.2. Identity

There are five identity tests of incremental difficulty. Each level of the test has 16 trials in which the target and incorrect face is always shown in full face and with a neutral expression. The correct choice is shown with either a neutral or smiling full face or with a neutral or smiling 3/4 view. This allows for identity matching where the correct answer is reached: 1) through pattern matching (full face neutral); ii) regardless of expression change (full face smiling); iii) from a different view (3/4 neutral); iv) from a different view with a different expression (3/4 smiling). Individuals are asked to 'point to the face at the bottom that belongs to the same person as the one at the top'.

Idmatch.Sim: Here the target and distracter faces are of similar appearance (age, sex, and hair colour). Candidates scoring 12/16 or more move onto Idno.Dis whereas those scoring 11/16 or less proceed to Idmatch.Dis. All further trials are held at a later date.

Idmatch.Dis: This test is simpler than the above as target and distracter faces are dissimilar in appearance. Once completed, this marks the end of identity testing for participants.

Idno.Sim/Idno.Dis: Only those candidates scoring 12/16 on Idmatch.Sim move onto this level of testing. Idno.Sim and Idno.Dis are similar to Idmatch.Sim and Idmatch.Dis but with additional facial features (hair and ears) removed. Idno.Sim follows successful completion of Idno.Dis (i.e. minimum score 12/16).

Idmask.Sim: This is similar to Idno.Sim but with a grey circle obscuring each eye.

Idmask.Sim is presented to candidates following success (13/16 or more) on Idno.Sim.

9.2.1.3. Facial Speech

This test features facial gesture associated with speech. These are the mouth configurations normally associated with making the following sounds: [a] / [i] / [f] / [u]

Soupair: Participants are asked to 'point to the person who is saying 1) [a], 2) [i], 3) [f] and 4) [u]' from a choice of two faces during three trials of each verbal gesture.

Individuals scoring 10/12 or more progress to the following level.

Soumatch.ff: Participants are asked to match one of two possible choices to the target face shown at the top of the page. For half of the trials the identity of the correct choice and distracter is different from that of the target. The correct choice for the other 50% has

a different identity from the target and the distracter has the same identify as the target. All faces are shown full view and trials begin with a practise session. Successful completion on this test (minimum 10/12) leads to Soumatch.45.

Soumatch.45: This test is similar to Soumatch.ff but with the face at the top of the page shown in 3/4 view. Testing begins with a practise session and continues for twenty-four trials.

9.2.1.4. Gaze

This category investigates the ability to decode cues relating to eye gaze direction and starts with a brief discussion about looking: 'you know you can look at someone in two different ways. Either with your head and eyes (experimenter looks at the participant square on) or just with your eyes (experimenter moves head so that it is 3/4 view to participant but with eyes looking at them). What is important is what the eyes are doing as these show where someone is looking'. During gaze testing, the following four trial types are used: 1) correct head full face with eyes forward versus incorrect head at an angle and eyes at an angle - participants are correct where they use either the head or eyes to make a judgement. 2) Correct head at angle with eyes forward versus incorrect head at an angle and eyes at an angle - participants must use the eyes as the head angle is not useful. 3) Correct head full face and eyes forward versus incorrect head full face with eyes at an angle - participants must use the eyes as the head is pointing forward in both pictures. 4) Correct head at an angle with eyes forward versus incorrect head full face and eyes at angle - if participant uses head angle he/she will be incorrect.

Gazepair: Participants are asked to 'point to the face that is looking at you' from a choice of two faces. Candidates achieving a minimum score of 10/12 move forward to the next stage.

Gazematch.45: Here the face looking forward and in full view is introduced at the top of the page and participants are asked to 'point to the face at the bottom that is looking the same way as the one at the top' (12 trials). For half the trials the identity of the target, correct choice and distracter are different from one another and during the other half all three faces are the same. Sessions begin with a practise session and successful candidates (scoring minimum 10/12) are presented with Gazematch.10 at a later date.

Gazematch10: This is similar to the above but uses adult faces at 10° to the page. There are eight test trials.

9.2.2. Participants and procedure

Participants were the thirteen main participants from the Map Task. Each was tested individually in a quiet room in their Day Centre. Test folders were presented in the following order: Expression, Identity, Facial Speech and Gaze, with follow up sessions approximately seven days after initial trials. Individuals were asked to point or answer 'left' or 'right' during testing and responses were recorded on prepared sheets.

9.2.3. Results and Discussion

Scores are based on percentage correct for each of the test categories. Overall, participants demonstrated acuity in discrete areas of face processing, supporting research predictions, but with identity matching posing particular difficulty for a number of individuals. A number of participants completed all test levels for expression (5), facial speech (4) and gaze (4) trials, while nine participants progressed beyond the first level of identity matching. All participants progressed beyond the first level of testing in at least one discrete category. Means for each test category are shown in Table 9.18, below.

Participant	1	2	3	4	5	6	7	8	9	10	11	12	13
Exppair	100	75	92	75	83	100	100	92	83	92	92	75	75
Ematch.C	83	-	100	-	75	92	92	92	67	58	43	-	-
Ematch.A	75	-	100	-	-	75	100	92	-	-	-	-	-
Idmat.sim	69	94	100	87.5	44	100	94	87	88	69	69	100	100
Idmat.dis	100	-	-	-	81	-	-	-	-	100	100	-	-
Idno.dis	-	37.5	50	19	-	87	50	87	50	-	-	50	44
Idno.sim	-	-	-	-	-	75	-	63	-	-	-	-	-
Idmask	-	-	-	-	-	-	-	-	-	-	-	-	-
Souppair	92	58	100	75	83	83	83	83	83	100	75	100	75
Smatch.ff	42	-	83	-	66	92	92	92	75	75	-	75	-
Smatch.45	-	-	91	-	-	87	87	96	-	-	-	-	-
Gazepair	58	92	100	67	66	92	100	100	100	83	67	75	50
Gmatch.45	-	100	100	-	-	100	100	66	100	33	-	-	-
Gmatch10	-	62.5	12.5	-	-	75	75	-	63	-	-	-	-

Table 9.18 Percentage items correct for each test category (expression, identity, facial speech and gaze).

Noticeable from Table 9.18 is the sharp drop in percentage correct scores for some individuals as they progress from one level to the next. For example, Participant 4 was successful in less than a quarter of test items once progressing beyond the first stage of identity matching and a similar trend can be found for Participant 10 for gaze. This suggests that these individuals were less able to discriminate discrete areas of information available from facial cues as task difficulty increased. Overall, Participants 4, 5 and 13 appear to demonstrate difficulty across all four discrete test items and may therefore experience more global deficits in face processing skills and/or difficulty in discriminating facial information from the test materials. Of interest is the double dissociation between expression and gaze in two individuals. Participant 1 who, although not progressing beyond the first level of gaze testing, goes on to complete the most advanced stages of expression. In contrast, Participant 2 continues on to the third and final stages of gaze, while not moving beyond the first trial for expression. This provides evidence for modularity in face processing (e.g. Bruce & Young, 1986) in adults with intellectual impairments. The remaining participants displayed an array of scores across

discrete test items, with Participants 3, 6 and 7 successfully completing all stages of expression, facial speech and gaze testing and progressing beyond the first level of identity matching. No association was found between face processing skills and communication success as measured by performance on the Map Task, counter to research predictions.

Findings from this study suggest that individuals may be differentially equipped to deal with information carried in the face and that this may lead to difficulty in decoding non-verbal cues. This has important implications in terms of the ability of individuals to decode non-verbal feedback during interactions and the ease with which they can use this type of information to maintain mutual understanding. It is suggested that wider investigation should be undertaken of face processing skills in people with intellectual impairments so that awareness can be raised of the potential problems facing this population in discriminating non-verbal cues. Difficulty in decoding facial information has potential implications for communication process. Where interactions take place in a face-to-face setting, speakers and listeners make certain assumptions about the processes underlying communication. For example, as listeners we can assume that accessing speaker lip movements will assist us to process auditory speech (e.g. Campbell et al, 1986; Summerfield, 1992). Discrepancies in the visual/auditory signal, however, can lead to blends that create new or novel sounds from those articulated by the speaker (McGurk and MacDonald, 1976). It might be expected then that individuals experiencing difficulty or asymmetry in the way that they detect and/or processing speaker lip movements would be disadvantaged in how able they are to deal with information made available concurrently through the verbal and non-verbal channels.

Another important dimension to effective communication, joint attention, involves using eye direction to judge what the interlocutor is attending to. Direction of gaze can assist speakers and listeners to a) assess that the interlocutor is ready to engage and b) their continued attention during conversations. Clark and Brennan (1991) suggest that visual cues associated with continued attention can assist speakers to monitor their partner's level of understanding. Difficulty in detecting direction of gaze could lead to problems in assessing continued or joint attention for some people with intellectual impairments. Finally, difficulties associated with recognising expressed emotions can also lead to problems in interpreting and reacting to different communication partners (e.g. Martin, Rusch, Lagomarcino and Chadsey-Rusch, 1986; Harwood et al, 1999) where the interlocutor is not aware of this.

A negative correlation was revealed for the first levels of happy and surprise, with $r = -.56, p < .05$: means = happy 2.7 (0.5); sad 2.8 (0.4); angry 2.6 (0.7) and surprise 2.4 (0.8). No further differences were found. So increased recognition of happiness co-occurred with greater difficulty in decoding surprise. This supports research predictions and is similar to the trend reported by Baron-Cohen et al. (1993). These authors distinguish surprise as a cognitively more complex emotion than happy or sad as recognition typically involves imputing mental states (i.e. beliefs) to another. Difficulty in discriminating complex emotions may not therefore be exclusive to people with autism but may be also be linked with other measures of processing ability.

Participants' face processing scores fell midway between the levels observed for 4 - 5 ys and 6 - 7 ys typically developing children (Bruce et al, 2000), with the exception of Participants 3, 6, 7 and 8. This suggests that these individuals may process facial features as isolated items of information, rather than configurally, as demonstrated in typically

developing children below 10 years of age (e.g. Carey and Diamond, 1977). Research predictions that individuals with a verbal IQ score of 10+ years would perform more successfully during the recognition test were not supported from the current analysis. This may be an artifact of the current testing procedures since the majority of participants neared flooring on this section of the test. It is possible that alternative forms of assessment (such as in vivo identity matching) may have increased the saliency of facial features and eased performance constraints for some if not all of the participants. However, it is important to reflect on what has been learned from research on face processing skills in typically developing children (e.g. Carey, 1992; Ellis, 1992). Much of the improvement observed in older children's face recognition skills is thought to reflect their increased knowledge of faces per se as compared to their younger counterparts. Therefore basing research predictions on verbal M/A takes no account of the experiential and chronological development of adult communicators and their exposure to different faces over many years. It would be surprising then if one isolated measure of cognitive development were to independently predict performance on a task of this nature.

In conclusion, recognising and responding to information carried in the face is essential during social interaction (e.g. Stewart and Singh, 1995) and therefore of critical importance during consideration of issues relating to social inclusion. The dangers of assuming or overestimating face processing skills are clear. If we are to support and assist people with multiple levels of need to become more included within society it is vital that we are aware of where difficulties may occur. The results from this study suggest that decoding information presented in the face may be particularly challenging for some individuals. It is important therefore that carers and those in regular contact with this population are made aware of the communication difficulties that may be

associated with deficits in face processing skills so that they might assist individuals to overcome confusion as and where it occurs.

Two caveats associated with previous research also have implications for the present study. 1) Discrimination of facial information using static black and white photographs may not represent recognition of faces in everyday situations. Here, for example, expressions and gaze can be momentary and embedded within contextual information (e.g. Chung and Thomson, 1995). Findings from the current study may not therefore represent how effectively individuals are able to decode non-verbal cues outside the test situation. 2) Visual-perceptual difficulties may have influenced the ease with which some individuals were able to discern discrete aspects of facial information. Although no individual reported difficulty with visual acuity (beyond corrected vision), this may nevertheless have been a factor for some participants. Wider investigation of processing skills using more contextualised information e.g. using real life scenarios may provide a clearer picture of individuals' ability. Generalising findings beyond the current investigation is also limited by the small sample size. The current participants represent one small cohort from within the diversity of an adult population and may therefore be unrepresentative of other individuals with multiple levels of need. Anecdotal evidence from the Pilot Study ($n = 6$) reveals a broadly similar pattern of results to that reported during the main study, and so it is by no means clear how successfully individuals with intellectual impairments are able to process facial information.

The following study focuses on gazing behaviour during the Map Task and investigates if communication partner influences the use of gaze in the thirteen Main Study participants.

9.3. Study 2: Gazing patterns in young adults with intellectual impairments and their communication partners

Gaze serves a variety of functions within the context of everyday encounters. Some of these have to do with communicating and maintaining social relationships (e.g. Argyle, 1975) while others relate to the accomplishment of task goals such as the regulation of speaker turns (e.g. Sacks et al, 1974). Kleinke (1986; based on Patterson, 1983) categorises the functions of gaze as providing information, regulating interactions, expressing intimacy, exercising social control and facilitating task success. He also emphasises that patterns and levels of gaze are influenced by cultural and environmental factors such as interlocutor's experience of non-verbal cues, the relationship and familiarity between speakers and listeners.

Gaze functions as one of an array of non-verbal displays accessible to speakers and listeners, and so communicative outcome can also be influenced by other non-verbal cues such as gesture and facial information (Exline and Fehr, 1982). The current study focuses on one measure of non-verbal behaviour, gaze, which is intimately linked with communication. Specifically, the research attempted to investigate if patterns of gaze (frequency and duration) varied as a function of communication partnership (carers, students and friends) and how this might relate to other outcome measures, i.e. communicative success and the level of verbal effort.

Developmental studies focussing on the use of visual communication signals in typically developing children suggest that younger children tend to rely more heavily on non-verbal cues than older children and adults (Doherty-Sneddon, 1995; Doherty-Sneddon and Kent, 1996). Here, performance on two referential communication tasks was

significantly poorer for younger speakers and listeners (4 ys and 6 ys) when visual cues were not available (audio-only) in comparison to face-to-face interactions. Although both groups of children increased their verbal effort during audio-only interaction (i.e. number of words to complete the task), this did not appear to compensate for the loss of non-verbal signals. These authors suggest that this may have been because young listeners found it easier to process information presented in the non-verbal channel (Doherty-Sneddon, 1995) and that non-verbal communication placed less demands on younger typically developing children (Doherty-Sneddon and Kent, 1996). Not until around the age of 11 years were children more able to deal with the loss of visual signals in a way more typical of adult communicators. This illustrates that the non-verbal communication provides a particularly important channel of communication for some speakers and listeners. Gaze can therefore act both as a signal to the interlocutor (e.g. continued attention) and as a channel for sampling information (e.g. assessing continued attention), and on a number of different levels and for a variety of purposes. Here I will focus on three of these functions that are particularly important in communication: 1) providing information, 2) turn-taking and 3) achieving task goals.

9.3.1. Providing information

Gaze acts as both a signalling device and channel for accessing non-verbal information (Argyle, 1975). For example, direction of gaze can provide feedback to speakers about their interlocutors' focus of attention (Exline and Fehr, 1982) and help listeners to process auditory information and identify speaker goals (Summerfield, 1992; Baron-Cohen, 1995). A number of studies have shown that individuals tend to gaze more as listeners than speakers (Kendon, 1967; Argyle, 1975), though this has been found to vary along a number of dimensions such as dominance, the relationship between interlocutors (e.g. Argyle and Cook, 1976) and difficulty of topic (Beattie, 1980). Kendon (1967) suggests

that speaker gaze functions in two different ways during social encounters. These are that 1) looking towards a partner's face allows speakers to monitor listener behaviour. This can help to alert speakers to communicative breakdown (e.g. changes in facial expression) and provide opportunities to re-establish mutual understanding (Clark and Brennan, 1991). 2) Varying the frequency and level of gaze also allows speakers to regulate the exchange of turns during interaction. This will be discussed more fully in the following section.

Kendon (1967) and Beattie (1980) propose an inverse relationship between levels of gaze and the hesitancy of speech. Beattie (1980) predicted that speakers would look away from their partner's face during hesitant phases of speech as this requires additional cognitive planning which is incompatible with monitoring listener behaviour. He observed differences in the level of gaze during hesitant and fluent phases of speech, and more hesitancy during fluent phases of speech associated with gaze aversion. So gaze is influenced by the cognitive load placed upon interlocutors. Access to non-verbal signals can help listeners to ground information (Clark and Brennan, 1991). For example, McGurk and MacDonald (1976) found that speech perception was greatly influenced by visual access to the speaker's mouth. This integration of visual and auditory displays of speech provides huge advantage to listeners processing discrete linguistic items, especially where the auditory channel is attenuated (Summerfield, 1992). Feedback has also been demonstrated during variation in the accessibility of facial cues (Argyle, Lalljee and Cook, 1968). These authors manipulated visibility along five dimensions – normal vision, dark glasses, mask, one-way screen and audio-only – and found that comfort decreased as the other became less visible. This suggests that interlocutors felt disadvantaged in not being able to access visual signals.

Argyle (1974) suggests that one of the most important determinants of gaze is liking i.e. the level of affiliation between interlocutors. He proposed that increased looking co-occurs with levels of liking as part of the conventional signalling of affection and as a means of gathering feedback on friendship and approval. He suggests, however, that gaze will not in itself necessarily alter levels of intimacy and that other factors such as culture and the distance between interlocutors may also influence gazing patterns. This is based on Argyle and Dean's (1965) equilibrium model, which seeks to explain the level of gaze and other non-verbal behaviours according to the proximity and compensatory actions of individuals. This model presumes a counterbalance based on liking and intimacy between some optimal distance between, for example speakers and listeners, and compensatory movements or action, such as leaning backwards or forwards. Although since challenged on a number of counts (e.g. Feyerseisen and deLannoy, 1991) this model nevertheless underlines the importance of taking account of contextual factors when assessing non-verbal behaviours.

Boyle et al (1994) found that familiar interlocutors gazed more towards their communication partner during the Map Task than when he/she was unfamiliar. Familiar partners also communicated (marginally) more successfully and used more words and turns than where interlocutors were previously unfamiliar. Therefore the constraints on establishing mutual understanding varied along three dimensions. These were according to a) whether interlocutors were previously known to one another, b) the amount of verbal material available to speakers and listeners and c) the availability of visual cues. Of particular interest is that Boyle et al (1994) reports that levels of gaze increased during episodes of communication difficulty, suggesting that interlocutors used the visual channel to access additional feedback information beyond that presented in speech. This supports earlier research which suggests that interlocutors make use of visual and verbal

information when attempting to establish mutual understanding (Clark and Brennan, 1991).

Finally, gaze can also provide information about another's mental state. This is because direction of gaze can allow us to make judgements about when another is thinking, their focus of attention and possible future actions (Baron-Cohen, 1995). Baron-Cohen and Cross (1992) propose a developmental trend towards the perception of other's cognitive mental states from the direction of gaze, with 4 year old typically developing children able to relate external features of gaze to internal mentalistic states.

9.3.2. Turn-taking

Accessing visual cues can help to regulate the management of turns (Kendon, 1967; Boyle et al, 1994), and so gaze can play an important role in the efficient transfer of information between speakers and listeners. Precisely how gaze manages turns is as yet unclear and quite controversial (e.g. Feyerseisen and deLannoy, 1991). Kendon (1967) found consistency in gazing behaviour during social interaction which suggests that speakers tend to look away at the beginning of utterances and re-engage as it draws to a close. He proposed that this allows speakers to 1) reduce the cognitive load during planning of utterances and 2) regulate speaker turns. These actions signal to the listening partner that he/she 1) is about to speak and 2) willing to hand over the floor. In line with predictions, Kendon (1967) observed either no response or a delayed response from listeners following 29% of utterances ending with an extended look. This compared to 71% of those ending with speakers averting gaze. Patterns of gaze were also found to co-occur in a regular fashion with changes in the behavioural repertoire of speakers, such as movement in the position of the head.

However, a number of studies have challenged these assumptions and suggest that turn-taking efficiency is influenced more globally by a combination of linguistic and non-linguistic features of discourse as well as non-verbal cues (e.g. Duncan, 1972). Further, Beattie (1981) found that gaze acted as an influence on turn-taking only during discussion on difficult topics. Therefore, even though patterns of gaze may co-ordinate with the production and planning of speech (Beattie, 1980), the precise nature of this relationship is as yet unclear.

9.3.3. Task goals

Kleinke (1980) reports that researchers interested in the use of gaze as a means to accomplish task goals have focussed on two discrete areas: 1) information seeking and 2) facilitating communication. Clark and Brennan (1992) argue that for communication to be successful, speakers and listeners should try to establish mutual understanding so that information can be added to their common ground. Gaze can assist in this grounding process by providing an additional channel through which feedback can be observed on the level of mutual understanding e.g. changes in facial expression and attention.

Evidence to support this approach comes from a number of sources (e.g. Boyle et al, 1994; Doherty-Sneddon 1995). These authors propose that gaze can assist interlocutors to accomplish task goals by providing feedback and information on the progress of interactions.

Access to visual cues also allows interlocutors to be more confident that messages are understood and that communication is running smoothly (Doherty-Sneddon 1995; Doherty-Sneddon et al, 1997). This author found that individuals taking part in an audio-only condition elicited more feedback and checked their own understanding of previous messages more frequently than when interacting face-to-face. Further, those parts of the

dialogue where feedback was elicited in the audio-only condition were associated with gaze during face-to-face interactions (Doherty-Sneddon, 1995). This suggests that gaze serves the same function as verbal checking mechanisms and reduces the verbal effort required to accomplish communication goals.

Gaze then provides a channel for sending and receiving information and this is used in collaboration with verbal cues. As a result, dialogues tend to be more efficient during face-to-face encounters in terms of the number of words and speech acts required to establish mutual understanding (e.g. Boyle et al, 1994; Doherty-Sneddon, 1995; Doherty-Sneddon et al 1997). So removing access to visual cues not only alters the process by which individuals communicate but also the verbal effort required to do so effectively.

Speaker and listener gaze then is influenced by a number of factors and fulfils a number of functions. The focus of interest in the thesis is on the communicative functions of gaze and takes as a starting point that gaze can facilitate effective communication by providing a channel through which speakers and listeners can gain access to non-verbal information. Analysis is undertaken on the global level of gaze in each partnership group, that is, on how much Information Givers and Followers gaze towards one another during the Map Task. Future investigation might also look at variation in the level of gaze within each task dialogue, such as during difficult and easy sections of the map. Earlier research (Boyle et al, 1994) suggests that gaze frequency increases during times of communication difficulty in typical adults in an effort to ease constraints on establishing mutual understanding. The research reported in the thesis compares differences in the level of gaze during interactions with a carer, student or peer Information Follower. A number of different predictions were possible based on the findings from earlier research. These are outlined below.

1. Familiar dyads (carers and peers) would gaze at a higher level than where the interlocutors were previously not known to one another, i.e. student Follower dyads (e.g. Boyle et al, 1994). This takes as its premise that interlocutors look more towards those they like in order to signal interest and to gather feedback on approval and liking (e.g. Argyle and Cook, 1976). One caveat associated with this prediction relates to the assumption of symmetry in the carer/main participant relationship. Findings from the analysis of dialogues reported in Chapter 8 suggested that care providers may have attempted to secure a more dominant role during the task and that this removed the communicative lead from the main participants. It was suggested that this might have occurred as a result of a didactic communication style adopted by care providers based on their previous encounters with the main participants. Interlocutors sensitive to this may have adjusted their level of gaze in line with perceived differences in status or authority (Argyle, 1988). This means that levels of gaze may be lower during interactions with a carer than where the Information Follower was a student.
2. Levels of gaze would be higher where previous analysis has shown that the interlocutors used verbal checking mechanisms (e.g. Check games) to monitor levels of mutual understanding (see Chapter 8). This predicts that interlocutors would gaze more during carer and student Follower interactions than where the Information Follower was a peer. Earlier research (e.g. Doherty-Sneddon, 1995; Doherty-Sneddon et al, 1997) has shown that gaze can serve some of the same feedback functions as speech and tend to be used by interlocutors at the same dialogue location as verbal checking mechanisms.
3. Higher levels of gaze, through their association with illocutionary acts aimed at monitoring levels of understanding, would co-occur with a more successful communicative outcome (i.e. lower deviation score). This is because non-verbal cues

can help to ease constraints on mutually grounding information (e.g. Boyle et al, 1994) and lower the cognitive workload on speakers and listeners (Feyerseisen and deLannoy, 1991; Doherty-Sneddon, 1995).

9.3.4. Method and procedures

In the current study Information Giver and Follower gaze was coded from the video recordings of all carer, student and peer interaction (39 trials). Gaze was measured from the initiation of a glance towards the partner's face, whether this was as a whole head movement or simply movement of the eyes, until gaze was averted. Details of the recording equipment can be found in Chapter 7, Main Study. Each videotape was played twice so that Giver and Follower gaze could be marked separately onto dialogue transcripts, regardless of whether this was in the speaker or listener role. Different coloured pens were used to mark Giver and Follower gaze and continued over the text (words and/or turns) until the direction of gaze was averted.

Patterns of gaze were investigated in three ways, each providing a qualitatively discrete measure of how much gazing occurred:

1. gaze frequency
2. gaze duration
3. proportion of words associated with gaze

9.3.4.1. Reliability rating

Four transcripts were coded independently by a naïve judge. This was an undergraduate student otherwise unconnected with the research. A kappa co-efficient performed on Information Giver gaze revealed a value of $k = 0.72$ for agreement on gaze frequency and $k = 0.9$ for gaze duration. Agreement corrected for chance on Information Follower gaze was found at $k = 0.8$ for gaze frequency and $k = 0.83$ for gaze duration. This analysis

demonstrates that findings reported in the thesis are a reliable measure of the level of gaze observed for Information Givers and Follower.

9.3.4.2. Gaze frequency

Gaze frequency measures the number of episodes of gaze per 100 words of dialogue and includes gazing while listening and speaking. An episode of gaze is said to have taken place once an individual looks towards their partner's face and continues until such time as gaze is averted. Frequency is calculated by dividing the number of episodes of gaze across verbal exchanges by the total number of words used by participants to complete the task, multiplied by 100. All analyses were carried out separately on Information Giver and Follower gaze. Analysis revealed that Information Givers and Followers did not change their levels of gaze with different communication partners

A one way ANOVA with partner as within-subject variable (3 levels: carer x student x peer) found no difference in the frequency of Giver gaze across conditions. Means are as follows: carer = 6.5 (3.9); student = 6.3 (3.9), peer 9 (7.2).

An analysis of variance on Follower gaze with partner as the between-subject factor (carer x student x peer) revealed no significant effects; means: carer = 6.7 (2.9); student = 11.1 (11.1); peer = 6.0 (2.8). No association was found between Giver and Follower gaze and other performance measures.

It would appear then that frequency of gaze was not influenced by changes in communication partner for Information Givers and that carers, students and peers gazed towards their partner at an equivalent rate across Map Task trials. Frequency of gaze was

not association with communicative success (Map Task scores) or the number of words used to complete the task in either role.

9.3.4.3. Gaze duration

Gaze duration was calculated by dividing the number of words associated with gaze by the number of occurrences of gaze. This calculates the length of glances in terms of the number of words exchanged between speakers and listeners in any one episode.

A one way ANOVA was carried out on Information Giver duration, with partnership (3 levels: carer x student x peer) as within-subject variable. This found a trend towards differences in the duration of gaze according to whether the partner was a carer, a student or a friend, with $F(2,24) = 3.11, p = .06$. This occurred as the result of a marginal increase in the duration of Giver gaze when interacting with a carer ($t(12) = 2.1, p = .06$) and student ($t(12) = 2.1, p = .06$) in comparison to a peer. Means are shown below in Table 9.19.

Analysis of variance performed on Follower gaze duration with partnership a between-subject variable (3 levels: carer x student x peer) found a significant effect for partnership condition, with $F(2,38) = 4.2, p < .05$ (see Table 9.18 for means). Post t-tests analysis revealed that this occurred as a result of carers gazing towards their communication partner for longer than peers ($t(24) = 2.65, p < .01$). No further differences were found.

No relationship was found between the length of gaze and communicative success i.e. Map Task scores. However, an association was revealed between duration and the number of words used by Givers ($n = 39$) ($r(37) = .55, p < .000$) and Followers ($r(37) = .41, p < .01$) to complete the task. Means are as follows: total words exchanged between

interlocutors = 359.1; Giver gaze duration = 3.6 (1.8); Follower gaze duration = 3.6 (1.8).

Therefore, as verbal effort increased so too did the likelihood of longer periods of gaze.

	Carer	Student	Peer
IG	4.2 (2)	3.9 (1.80)	2.8 (1.3)
IF	4.6 (2)	3.4 (1.4)	2.7 (1.5)

Table 9.19. Mean (S.D.) number of words associated with an episode of gaze.

So Information Givers tended to gaze towards their communication partner for longer periods when he/she was a carer or a student. Gazes towards peer partners were short in comparison. Carers gazed for longer at Information Givers than peer partners but at a similar rate to students. Gazes were also longer where interlocutors exchanged more words. Therefore the benefits to carer and student dyads were twofold. First, more words were exchanged during these interactions and second, longer periods of access were gained to non-verbal signal where verbal effort increased. This may reflect differences revealed in the types of conversational acts produced during interactions as reported in Chapter 8. Both carers and students initiated more acts aimed at checking their own understanding of previous messages (Check) and so may have been less confident about the progress of interactions than peer interlocutors. As gaze can perform the same role as verbal feedback mechanisms (Boyle et al, 1994; Doherty-Sneddon, 1995), interlocutors may have capitalised on the availability of non-verbal cues as a way of supplementing information available in the verbal channel. Further, Check games used by peer Information Followers were less effective at clarifying previous messages than in the other two groups, as highlighted in Chapter 8. Therefore, concomitant levels of gaze may

have been lower during peer interactions as interlocutors may have been less confident about the role of feedback cues. Of interest is the match between Giver and Follower gaze across partnership groups. Argyle and Dean (1965) propose that speakers and listeners settle down to a given level or equilibrium of gaze according to how comfortable they feel with one another and within social norms (Argyle and Cook, 1976). Levels of gaze can be influenced then by situational as well as personal factors. It appears from the current research that participants with intellectual impairments may have matched their level of gaze to the Information Follower and that where this level was high, they responded by gazing more frequently towards their partner. Information Givers working with a carer and student therefore gained greater access to visual cues than during interactions with a peer, and were also monitored more frequently for understanding by the Information Follower.

9.3.4.4. Proportion of words associated with gaze

A third way of investigating patterns of gaze is to calculate the proportion of dialogue associated with glances towards another's face. This produces a measure in percentage terms of the level of gazing between interlocutors transformed for dialogue length, and is carried out by dividing the number of words associated with gaze by the total number of words exchanged between interlocutors, multiplied by 100. Therefore the dependant variable in analysis performed on transformed data is the number of words associated with gaze per 100 words of dialogue. Proportional analysis was performed separately on Giver and Follower output and means are shown in Table 9.20.

	Carer	Student	Peer
IG	28.4 (16.4)	26.9 (17.1)	23.8 (14.1)
IF	29.6 (15.6)	30.5 (13.8)	17.7 (12.5)

Table 9.20. Mean (S.D.) proportion (%) of words associated with gaze by role for each partnership group.

A one way ANOVA on Information Giver gaze words with partnership a within-subject variable (3 levels: carer x student x peer) showed no effect for partnership group. So Givers gazed towards the Information Follower an equivalent level once dialogue length is taken into account.

Analysis of variance performed on Follower gaze words, with partnership as between variable (3 levels: carer x student x peer), revealed a significant difference in the level of gaze across partnerships ($F(2,38) = 3.34, p < .05$). This occurred as a result of higher level of gaze for carer ($t(24) = 2.14, p < .05$) and student ($t(24) = 2.47, p < .05$) in comparison to peer interlocutors. No further differences were found.

Therefore, once dialogue length was taken into account, Information Givers gazed towards their communication partner at an equivalent rate regardless of whether they were a carer, a student or a friend. This reinforces the suggestion outlined previously that longer periods of gaze tended to co-exist with increased verbal effort. In contrast, carers and students gazed proportionally more than peer Information Followers. This means that not only were these interactions informationally rich in terms of the number of words exchanges between interlocutors but also that student and carer Follower dyads gazed

proportionally more than peer interlocutors. Finally, no relationship was found between these measures and Map Task scores.

9.3.5. Summary and conclusions

Main participants gazed towards their communication partners at a similar rate regardless of whether they were a carer, a student or a friend. However, glances towards carers and students tended to be longer than where the interlocutors were friends. No differences were found in the frequency of Information Follower gaze though carers looked for longer than peer Information Followers. Longer periods of gaze were associated with increased verbal effort for both Information Givers and Followers. Once dialogue length was taken into account it was revealed that carers and students gazed more in proportion to the number of words exchanged during interactions than peer Information Followers. Predictions that familiar partnerships would gaze more towards one another were not supported in the current study. Information Givers duration of gaze was more closely linked to the number of words produced during interactions than familiarity. A similar trend was demonstrated for Information Followers. That is, less difference was found between levels of gaze in carer and student Follower dyads than between these partnerships and peer interlocutors. Of interest is that carers and students may have increased levels of gaze as part of a scaffolding process, or at least in line with increased verbal effort. This suggests that these individuals may have been unsure about the progress of interactions and used gaze as a means of gaining feedback on Giver instructions and to monitor their own understanding of previous messages. As a result these interactions were informationally rich in terms of the amount of verbal and non-verbal information available to speakers and listeners in comparison to peer interactions. It appears likely, therefore, that carers and students used non-verbal signals in their

attempt to scaffold interactions and as a means of gauging levels of understanding with their communication partner. In other words, carers and students used a multi-channel approach to communication and this involved the integration of verbal and non-verbal verbal signals. An important point here is perhaps not that carers and students looked more, but that peers were not supplementing the verbal channel non-verbally. It is entirely possible that situational features (e.g. task demands) may have constrained gazing behaviour in the research reported in the thesis. Nevertheless, what is clear from the analysis is that peer level of gaze fell well below that reported for carer and student Follower dyads and reinforces the notion of paucity during peer interactions. It is proposed that further investigation is required of the use of gaze in people with intellectual impairments so that a clearer picture might be gained of how effectively individuals are able to access non-verbal information.

Gaze was not associated with communicative success (deviation scores) for Information Givers or Followers. This is a little puzzling as carers and students gazed more as a proportion of word use than peers and were more effective at grounding information with their communication partner. This suggests that gaze may have been used in a different way by carer and students and/or that the communication style adopted by carers exerted such a powerful influence on the outcome of interactions that accessing non-verbal cues was unable to increase levels of mutual understanding. Closer investigation is required of the way that gaze was used during collaborative sequences and the ways that this was associated with communicative success. Unfortunately this is out with the time scale of the current investigation.

The final part of this investigation focuses more globally on information carried in the non-verbal channel and how interlocutors may have used it to establish mutual

understanding. The research aimed to find out if gaining access to non-verbal cues would influence how effectively third party listeners were able to ground information in comparison to where only an audio signal was available. If non-verbal signals have a significant added value, overseers should gain additional information from watching video footage of interactions, over and above what might be gained from an audio- only condition.

9.4. Study 3: Non-verbal communication in young adults with intellectual impairments and their communication partner.

It has previously been demonstrated that non-verbal cues can be used by speakers and listeners to establish mutual understanding (e.g. Clark and Brennan, 1991, Doherty-Sneddon, 1995). Results from Study 2 show that interlocutors used one non-verbal channel, gaze, during interactions with their communication partner. Study 3 now focuses more broadly on the use of non-verbal signals during Map Task trials in one partnership group, student Follower dyads. This was carried out to investigate the presence of non-verbal cues during interactions and to establish if information carried in this channel would also assist third party listeners or bystanders to ground information. Student Follower dialogues were selected as they had previously been shown to be the most successful in terms of communication outcome measures. In the event, one interaction could not be used due to technical difficulties (Pair 5), leaving twelve interactions for testing. The main research questions addressed in Study 3 are as follows.

1a. Do bystanders capitalise on the communicative value of non-verbal cues, i.e. does gaining access to non-verbal information increase bystander understanding as compared to where visual signals are not available?

1b. Does taking account of the communicative effectiveness of interactions influence this relationship? Might measuring bystander understanding against the communication success of interlocutors provide us with a different picture of value of non-verbal signals?

An interactionist or collaborative viewpoint predicts that the presence of non-verbal cues will advantage bystanders as they can ease constraints on establishing understanding (e.g. Boyle et al, 1994). The model also predicts that bystanders will experience greater difficulty establishing understanding than Information Givers and Followers. That is, they will be less successful at grounding information than the interlocutors. This is because unlike the Giver and Follower, bystanders are not party to the collaboration involved in establishing mutual understanding and can therefore be less confident that their interpretation of speakers messages is correct (Schober and Clark, 1989). Interest in the Study 3 is on the influence of non-verbal cues on this process. The research questions outlined above and findings from earlier studies allow us to generate the following hypotheses:

- 1) Bystander understanding will be greater (i.e. more successful) during access to visual cues as compared to where only an audio-only signal is available. This takes as its starting point that non-verbal cues will provide bystanders with information in addition to that encoded in speech (e.g. Feyerseisen and deLannoy, 1991) and that this will increase understanding. So variations in the communication environment will alter constraints on listener understanding (Clark and Brennan, 1991).
- 2) Bystander understanding is influenced by the communicative effectiveness of speakers and listeners (Schober and Clark, 1989). All things being equal it is predicted that taking account of communication success will alter the relationship between visibility context (visual/audio versus audio only) and bystander understanding. This is because comparing bystander scores to those produced during

the Map Task takes account of the level of information that was grounded during interactions and uses this as a benchmark against which to measure bystander understanding. Analysis has previously revealed that dyads including a student partner were not equally effective in establishing mutual understanding (range of scores: $122\text{cm}^2 - 586.5\text{cm}^2$). It might be expected then that communicatively more successful interactions would be informationally rich in terms of their verbal and non-verbal value and that accessing this facilitates bystander understanding more effectively than auditory cues alone. Alternatively, it could be argued that the non-verbal channel will play a more important role for bystanders during less effective communication episodes as non-verbal information can bring saliency and clarity to speaker messages (Kendon, 2000). McNeill (1985) states that interlocutors articulate verbal and non-verbal information in partnership with one another. Therefore access to the audio channel alone can provide bystanders with only part of this unified message.

9.4.1. Participants

These were twenty-two female (mean age: 24:10 ys) and two male (mean age:21:00 ys) undergraduate students recruited from one of three institutions of Higher Education in the Edinburgh area. All were native British speakers and had little or no previous contact with adults with intellectual impairments. Students were in the main first year Speech and Language Therapy students ($n = 19$) recruited from a different cohort from the participants in the main study. The remaining three participants were from two other institutions studying Business Management, Biology and Psychology. These participants were invited through personal contact.

9.4.2. Materials

Stimulus items were Super VHS video recordings of the interactions between main participants and their student partner. Each recording was presented twice, once in the audio-only condition and once with video playback. Video recordings presented a split-screen image of both Giver's and Follower's face and upper body. All tapes were replayed on a Panasonic Nicam Super VHS video recorder (model no: NV-HS900) and a Philips 24" colour monitor (model no: 25CE6570/05B) connected to external Sony stereo headphones (model no: MDR CD450). The relevant Information Follower map from Map Task trials (Map A, B & C) was presented to participants on a sloping wooden stand (as described previously).

9.4.3. Reliability rating

Two bystander maps from each condition (audio-only/video) were scored separately by a novice marker. This was an undergraduate student otherwise unconnected with the study. Analysis on the author and novice scores produced a Pearson's correlation co-efficient of $r = .99, p < .01$, means were as follows: current author = 316 cm^2 (162.2); novice = 321 cm^2 (160.4).

9.4.4. Design and procedures

A between-subject design was used with student participants tested in either the audio-only or video context. Participants were randomly assigned to the audio-only or video condition and presented individually for testing. This resulted in twenty-four separate trials, twelve in the audio-only condition and twelve in the video condition. Individuals were seated at a table approx. 70 cm from the playback monitor and presented with headphones and an Information Follower map. During the audio-only condition the monitor was positioned at a 90° angle from the participants line of vision so that they

could not view the video feedback. Individuals were asked to watch and/or listen to a recording of a Map Task trial and to try to replicate the route drawn by the Information Follower as accurately as possible.

9.4.5. Results and discussion

Scoring was calculated in two ways. 1) Measurement was taken of the difference (cm^2) between Giver routes and those drawn by current participants. This provides a measure of how bystanders were able to make use of information made available in the visual and/or auditory channel. 2) By measuring the difference in cm^2 between the route drawn by participants in the current study and those drawn by the Information Follower in the main study. This measures bystander understanding from verbal and/or non-verbal exchanges and takes into account the communicative success of the original interactions. In other words, this provides an accurate measure of bystander performance in relation to how well information was grounded between speakers and listeners.

Two x Independent t-tests performed on the mean deviation scores with visibility context a between-subject variable (2 levels: audio-only x video) found no effect for visibility condition in comparison to Giver or Follower routes. Means are shown below in Table 9.21. The means represent the difference in cm^2 between the route drawn in the current study and Information Giver (top row) and Information Follower routes (middle row). Table 9.21 also illustrates the original mean deviation score for student Follower dyads (bottom row). Therefore, bystander understanding was not influenced by the availability of non-verbal signals in comparison to Giver or Follower maps and so research predictions are not supported.

Map	Audio-only	Video
Giver	258.9 (121)	262 (110)
Follower	15.9 (51)	12.3 (85)
Main Study	242.9 (112.4)	

Table 9.21. Mean cm² deviation scores (S.D.) for bystanders in comparison to Giver (top row) and Follower routes.

I will discuss findings from these analyses separately as these represent two discrete areas of investigation.

A number of alternative suggestions are proposed for the finding from comparison to Information Giver routes. First, it might be suggested that non-verbal signals did not influence the outcome of Map Task trials since no apparent benefit was gained to bystanders from access to non-verbal information. In other words most, if not all, the relevant task information was carried in the verbal channel. This is possible though unlikely as analysis on gazing patterns has already established that interlocutors increased their levels of gaze where the Information Follower was a student or a carer. This suggests that speakers and listeners gathered and/or sent information via this channel and used it to help meet ground criterion (Clark and Wilkes-Gibbs, 1986). That is, interlocutors used non-verbal cues as a means of establishing mutual understanding. Second, wide variation in the bystander deviation scores suggests that some dialogues may have been impoverished in terms of their informational value to third party listeners and this may have masked any underlying effect of visibility context. Of interest is that the spread of scores for both the audio-only and video condition is fairly similar to that observed during the Map Task, suggesting that some interactions were communicatively

less productive than others. This would have made it more difficult for bystanders to ground information with or without the addition of non-verbal signals. Finally, current procedures may not have been sensitive to the transmission of non-verbal signals and therefore may have compromised the saliency of non-verbal cues.

Analysis on bystander and Follower deviation scores takes account of the outcome of interactions between speakers and listeners. A high Follower deviation score occurs where interlocutors were less successful at grounding information than those producing lower deviation scores. All things being equal, bystander routes based on these same interactions should demonstrate a similar level of variation. Analysis revealed that accessing visual signals did not influence bystander performance, however, variation around the means (standard deviation) was extremely wide. This might be accounted for as follows. Less successful interactions are more likely to produce higher deviation score in Follower and bystander maps since they would be impoverished in terms of their informational value and the saliency of speaker messages. This in turn would make it particularly difficult for bystanders to ground information, as unlike the Information Follower, they cannot request clarification of ambiguous utterances (Schober and Clark, 1989). So as communication performance decreased (higher deviation scores) so too would the ease with which bystanders were able to ground information. This was investigated using Pearson's correlation analysis on bystander and Follower deviation scores. Analysis revealed that these measures were related, with $r = .94, p < .01$ (audio-only) and $r = .82, p < .01$ (video condition). Therefore as Map Task deviation scores increased, so too did the disparity between bystander and Follower maps, resulting in wide variation between these scores; range of bystander scores: audio-only = 113.5 – 452 cm²; video condition = 127.5 – 501 cm². Bystanders then were less effective at grounding information from less successful interactions regardless of the availability of

visual cues. This produced wide variation in how accurately they were able to replicate Follower maps and may have masked any advantage of accessing visual information.

9.5. Summary

1. Face processing: participants displayed an array of scores with acuity in discrete areas of test categories. Three participants completed all test levels for expression, facial speech and gaze, while one participant completed two out of four categories (expression and facial speech). All individuals appeared to experience difficulty with identity matching. A double dissociation was revealed for expression and gaze, supporting proposals for modularity in face processing skills (e.g. Bruce and Young, 1986). Some individuals produced scores that suggest they might process facial information in a piecemeal fashion rather than on a configural basis.
2. Gaze: Givers gazed for longer when interacting with carers and students, and this was associated with the number of words produced during these dyads. Carers and students gazed more as a proportion of total verbal effort and for longer than peers. Duration of gaze related to the number of words used by carers and students. Therefore, as verbal effort increased so too did the duration of gaze for Givers and Followers. Patterns of gaze were not related to Map Task scores or familiarity. It is proposed that carers and students used gaze in their attempt to scaffold interactions.
3. Non-verbal communication – bystander analysis: procedures were unable to determine the presence of non-verbal signals during interactions. A number of possible explanations are given. Bystander deviation scores were influenced, however, by the effectiveness of communication during Map Task trials. More difficulty was encountered in grounding information where interactions were less successful.

9.6. Chapter conclusion

Using static, decontextualised pictures to investigate face-processing skills is not unproblematic, as individuals may find it more difficult to identify specific facial configurations when displayed in isolation from real-life situations. Nevertheless, four participants performed near ceiling in three out of four test categories suggesting that materials were not inappropriate or inaccessible to individuals. Taken together with patterns of gaze, it would appear that participants actively utilised gaze as part of their communicative repertoire and engaged with partners consistently throughout Map Task trials. However, what is also apparent is that processing facial information may be particularly challenging for some individuals. This has implication for how readily these young people may be able to access facial cues and establish shared understanding with their communication partners during face-to-face interactions.

It appears that carers and students may have used gaze as part of an attempt to support interactions. This is of considerable interest as it suggests that carers and students maximised all possible opportunities to support and maintain conversations and that non-verbal signals formed part of this multi-dimensional communicative effort. What is a little more disappointing, however, is that current procedures were unable to isolate information carried in the non-verbal channel during interactions. This may have resulted from the quality of visual information presented to third party listeners from video recordings of interactions. It was clear, however, that bystanders in both visibility conditions experienced difficulty in establishing understanding where communication was less successful. This corroborates previous findings that interactions with a student partner were not all equally successful in establishing mutual understanding between speakers and listeners.

Research has already indicated that care staff experience difficulty in recognising non-verbal signals in individuals with intellectual impairments (e.g. McConkey et al, 1999; Purcell et al, 1999). Findings from the present study suggest that it is far from clear how effectively some individuals are able to discriminate facial cues. This has profound implications in terms of the saliency of communicative encounters between individuals and their care staff, especially for those relying more heavily on non-verbal forms of communication. It is of particular importance then that care providers are provided with opportunities to become more practised in recognising non-verbal forms of communication and are alerted to the possibility that some individuals may experience difficulty in processing facial information, such as changes in expression and the direction of gaze.

Chapter 10. Thesis conclusion

10.1. Introduction

The purpose of this thesis was to investigate the effectiveness of communication in young adults with intellectual impairments with different communication partners. The specific questions addressed through the thesis related to the influence of partnership on communication style, awareness and adaptability of people with intellectual impairments to meet the communicative needs of their partner and the role of non-verbal signal during interactions. Each of these three areas of investigation will now be discussed separately.

10.2. The influence of partnership on communicative effectiveness

Communication structure and process was compared during interactions with a carer, a naïve (student) partner and a peer. These three partnership groups were selected for two reasons. First, it was felt that this would broadly represent the typical communicative encounters for people with intellectual impairments. Second, it allowed us to look at communication outcome where it was predicted that a) the interlocutor would attempt to scaffold interactions (carer x student Followers) and b) where this level of scaffolding was not available (carer/student x peer Followers). Main findings from the research showed that outcome was most successful where the Information Follower scaffolded interactions in such a way that it allowed the Information Giver to maintain the communicative lead i.e. during collaboration with a student partner. It was proposed that adopting this communication strategy was most successful because it allowed the main participants to take the communicative initiative during interactions and created a more equal role for them during the task than where the Information Follower was a carer. Kaiser and Goetz (1993) suggest that supporting interactions can have a normalising influence on communication for people with intellectual impairments as it increases opportunities to participate while at the same time removing some of the burden of planning and

maintaining discourse. Student scaffolding, it is proposed, provided support as it was based on what had previously occurred during the interaction and with recourse to the information already made available between speakers and listeners. This helped to maintain coherence during interactions without removing control from the Information Giver.

Underpinning communication success in the current research then is the notion of partnership during discourse and collaboration between speakers and listeners.

It was suggested that one explanation for the less successful outcome in dyads including a carer was their overuse of complex open questions aimed at introducing new information into the task (Query-w questions). These questions withdrew the communicative initiative from the main participants and failed to identify specifically where misunderstanding had occurred. Detailed analysis on the structure and form of Query-w games revealed that they were more complex during interactions with a carer in terms of their non-linear form. A more effective means for resolving communication difficulty was demonstrated during interactions with a student partner. Here queries were broken down into smaller, discrete units that required short and/or no/yes type responses or checked understanding of previous utterances (Check games). This approach reduces the cognitive load on participants by focusing directly on discrete areas of difficulty (Booth and Booth, 1996) while grounding information (Clark and Brennan, 1991) in previously established mutual or shared knowledge.

It is proposed that one factor underlying carer communication style is listener expectation. This is to suggest that care providers may have assumed that they would be required to adopt a more dominant role during the task and to adopt communicative strategies that would allow them to do so. Carers may also have overestimated the level of shared

understanding established with their partner based on previous communication encounters (e.g. Clark and Wilkes-Gibbs, 1986), leading to the expectation that could assume a higher level of common ground than was in fact the case. Research has previously shown that care providers experience particular difficulty in matching their communication style to the needs of people with intellectual impairments (e.g. Bartlett and Bunning, 1997). This thesis reinforces and extends this finding by demonstrating how expectation plays a pivotal role in formulating carer communication style and the role assigned to the client. Here we have shown that preconceptions of asymmetry affect not only the communicative posture adopted by care providers but also the response of the communication partner. We have demonstrated how assuming fewer, or different, assumptions can often be more effective and efficient at establishing mutual understanding, even where interlocutors are previously unknown to one another.

It would appear from the current research that carer communication style was more effective at maintaining social or interactional coherence rather than the transfer of transactional information. This tendency has previously been observed in the exchanges of adults and typically developing children (e.g. Robinson, 1981; Shatz, 1977, 1983). Shatz suggests that while useful in scaffolding their child's productions, parental structuring does not necessarily lead to more sophisticated communication behaviours. Robinson (1981) shows that wh-type questions are less effective at improving children's communication performance as they fail to make clear to the listener the nature of the difficulty. The current findings demonstrate that less parity is also achieved between speakers and listeners where information is introduced primarily in the form of open wh-questions. The thesis has shown that facilitating partners to take the communication lead provides as a minimum the opportunity to practise and maintain current repertoires but also the potential to extend and develop these skills through sensitive scaffolding.

Communication outcome was least successful where the interlocutors were peers. This was due in part to the low level of verbal material made available by peer Followers and the frequency and effectiveness of conversational acts aimed at monitoring self-understanding (Checks). A number of possible explanations were provided for the difficulty experienced by peer Followers in monitoring understanding, not least that individuals may have been less confident about the timing or need to initiate self-checking mechanisms. It was proposed that peer Followers were less effective at exploiting the communicative value of self-checking mechanisms or may have failed to recognise how ineffective they were in maintaining mutual understanding. Therefore, one important feature of effective communication skills that is highlighted through the structure and process of peer interactions is the role of listener feedback.

The developmental literature shows that listener feedback can assist young typically developing children to recognise message ambiguity and inadequacy and to produce clearer, more accurate utterances (e.g. Patterson and Kister, 1981; Whitehurst and Sonnenschein, 1981; Sonnenschein, 1984). Fujiki and Brinton (1993) propose that comprehension monitoring may present two discrete challenges to people with intellectual impairments. These relate to the volume of messages that may need to be resolved and the act of comprehension monitoring itself. Further difficulties may be encountered in detecting the trouble source of misunderstanding (e.g. Abbeduto et al, 1997). Although engaging in the act of communication repair may be a collaborative procedure (e.g. Clark, 1996), knowing how and when to signal the need for repair is very much a listener role. Therefore, it is recommended as part of this thesis that people with intellectual impairments should be provided with opportunities to practise and develop effective listening skills so that they might a) become more aware of discrepancies in their level of self-understanding and b) signal to their communication partner when difficulties occur.

10.3. Awareness of the communicative needs of partners

The section above (Section 10.2) focused on peer partnerships from the perspective of the listener (Information Follower) and on their role during interactions. Here we look more specifically at the main participants and awareness on their part of the communicative needs of their partner. Effective communication requires that speakers take account of listener needs when constructing messages so that intention and meaning can be recognised and responded to appropriately (e.g. van der Gaag and Dormandy, 1993). This takes as its premise that speakers and listeners hold separate representations of the discourse and that communication will be most effective where parties construct and decode utterances to take account of others' beliefs (e.g. Johnson-Laird and Garnham, 1980). Proportional analysis revealed that Information Givers used Align, Instruct and Explain games most frequently with peer Followers. Two possible explanations were provided for this. First, it was suggested this resulted from the greater communicative burden assumed by Information Givers as a result of the low level of contribution from Information Followers. This is discussed below. Second, it was proposed that the proportionally more frequent use of Align games during peer interactions represented an attempt by the Information Giver to adapt their communication style to meet listener needs and to increase levels of mutual understanding. Align games are particularly useful in maintaining discourse coherence as they help to ground preceding within the context of the ongoing interactions. Examples from the current research include 'ok?', 'next question', 'right?' and 'you got that?'. It is proposed that Information Givers used these mechanisms in an attempt to align their model of discourse with that of the Information Follower's and that this assisted them to construct task instructions based on common or shared beliefs (e.g. Anderson and Boyle, 1994). It is also possible, however, that the mechanical use of Align games may reflect emphasis on interactional rather than transactional coherence during peer interactions.

Shatz (1983) proposes that true communication is contingent upon taking account of listener needs and knowledge of the way that utterances relate to prior discourse. It is proposed that Align games demonstrate awareness of both these skills in main participants, first as an attempt to bring speaker and listener models of discourse closer together and second, as a way of making messages more contingent on the ongoing discourse. It is proposed that the proportionally high Giver level of communicative effort devoted to maintaining discourse coherence during peer interactions represents an attempt by the main participants to adapt their communication style to meet the needs of peer Followers.

An alternative explanation for the higher use of Align, Instruct and Explain games might be that Information Givers were responding to the lower level of contribution from peers when compared to carer and student Followers. This is entirely reasonable and suggests that Information Givers may have attempted to bridge the gap between speakers and listener knowledge by eliciting feedback from the Information Follower on the progress of interactions (Align games) and by providing additional task information (Explain games). Anderson (1995) suggests that younger typically developing children may choose to engage at a lower level during the Map Task in order to manage the cognitive demands of the task. She suggests that this can simplify their role as speakers and listeners and allow the children to concentrate on constructing or decoding instructions. It is possible, therefore, that task demands may also have constrained the communicative repertoire of Information Followers (Shatz, 1977), and that this forced the Information Giver to assume a more active role.

Nevertheless, apparent from both of the above explanations is that main participants were aware on some level of the need to collaborate with their communication partner. This demonstrates recognition on their part of the saliency of the listener role and the need to construct messages to take account of shared knowledge (e.g. Clark 1985). This is

important, as coherence is maintained during discourse only to the extent that speakers can match their contributions to that of the listener's representations of the message (Gernsbache and Givon, 1995).

10.4. The role of non-verbal signals during interactions

One purpose of the thesis was to look at the use of non-verbal signals in the main participants and their communication partners. It has been suggested that non-verbal cues play a key role in facilitating access to communication for people with intellectual impairments and that they are heavily relied upon for expressing personal choice in some individuals (e.g. Bradshaw, 1998; McConkey et al, 1999a, b). The approach taken throughout this thesis has been one of the added value of non-verbal signals as a source of information supplementary to that articulated through speech (e.g. Kendon, 1983, 2000; McNeill, 1985; Goldin-Meadow et al, 1992). The perspective taken here is that speakers and listeners use visual signals to ease constraints on establishing mutual understanding and as part of a multi-channel system of communication (Clark and Brennan, 1991; Boyle et al, 1994).

If non-verbal cues are useful in helping interlocutors to gauge the progress of interactions it might be expected that Information Givers would gaze towards their partner during periods of uncertainty, such as following the issuing of instructions. Conversational Games Analysis (Kowtko et al, 1991) allowed us to investigate this as it assigns codes to the various verbal checking devices used by Information Givers and Followers. One game, the Align, holds a close contiguous relationship to the issuing of instruction and is used by Information Givers to check listener understanding and to signal readiness to continue with the task (Doherty-Sneddon, 1995; Doherty-Sneddon et al, 1997). This was supported in the current research during analysis on peer interactions. Doherty-Sneddon and colleagues have shown that gaze can serve some of the same feedback functions as verbal checking

devices. It was predicted therefore that some temporal relationship might exist between the use of Aligns and gaze during peer interactions. Analysis revealed that Align and Check games reliably elicited gaze in Information Giver and Followers during peer interactions, as did other conversational acts.

One possible reason for the high level of gaze observed during Check games is that peer Followers monitoring was so infrequent during interactions that Information Givers became less confident about how well information was being grounded and compensated for this by increasing access to feedback through the non-verbal channel. This is to claim that Information Givers capitalised on the availability of non-verbal cues during episode of communicative uncertainty as an attempt at providing feedback to their communication partner and a source for gathering additional task relevant information. It is suggested that the non-verbal channel was used on these occasions as a cognitively uncomplicated system for encoding and decoding information (Feyerseisen and deLannoy, 1991), complementary to that encoded in speech

That gaze duration was shorter for Information Givers interacting with a peer might be explained as follows. Information Givers collaborating with a peer may have found their role to be cognitively more demanding than where the Follower was a carer or a student. This is because Givers may have been required to devote greater cognitive resources towards planning and managing interactions with peers, and this could have led them to avert gaze (Beattie, 1980). Analysis on the number of words used by interlocutors supports this (see Chapter 7). Information Givers contributed more words than peer partners during the Map Task and therefore would have predominantly assumed the speaker role. Givers gaze length might have been shorter during peer interactions, therefore, than where more time was spent listening (e.g. Argyle, 1988), as was the case in

carer and student Followers dyads. Here Followers used marginally more words and turns than Information Giver and significantly more conversational acts.

Counter to predictions, partnership did not influence the proportion of gaze to dialogue in Information Givers. Gazes were longer, however, where the interlocutor was a carer or a student. So partnership influenced communication process though not the overall level of gaze. Analysis revealed that Giver gaze duration closely matched that of the interlocutor. Therefore, where Followers looked for longer so too did the Information Giver. This is interesting as it suggests a close computational link between the structure and content of dialogues and levels of gaze in speakers and listeners, though direction of cause can not be assumed from the current analysis. However, as a minimum it would seem that there exist a number of conversational devices such as those featured most frequently in carer and student dyads that are associated with increased gaze duration and are effective at establishing mutual understanding. It is proposed that Check games demonstrate this role in the current analysis. Explicit probing of speaker meaning is effective at establishing and maintaining mutual understanding (e.g. Anderson et al, 1994; Anderson and Boyle, 1994) and acts as an elicitor of gaze in typically developing children and adults (Doherty-Sneddon, 1995; Doherty-Sneddon et al, 1997). It is proposed that Check games represent a particularly useful linguistic device for engaging people with intellectual impairments as they provide the communication partner with opportunities to monitor the level of shared understanding while potentially increasing the duration of gaze.

Experimental procedures did not reveal any communicative advantage in having access to visual cues for third party observers. A number of explanations were provided for this finding. Apparent from the analysis was that bystanders experienced greater difficulty in grounding information where communication was less successful. Wilkes-Gibbs and Clark (1992) propose that participating in a conversation is the most effective way of

establishing mutual understanding. This is because speakers design their messages with reference to what they believe to be current common ground and in the expectation that listeners will recognise their intention based on mutual or joint beliefs. Bystanders are not party to this collaborative process and are therefore not included in establishing joint reference. As fewer salient clues became available from the task dialogues so too do opportunities to 'buy-in' on speaker and listener grounding procedures. This gap between bystander and interlocutor shared knowledge widened in accordance with how successfully Givers and Followers established mutual understanding, even though bystanders were party to the same verbal and/or non-verbal information as task participants. So here communicative effectiveness was a more powerful and salient driver in determining bystander success than the availability of visual information.

10.5. Research points

Formal assessment of communication skills can provide a useful though not predictive measure of how people with intellectual impairments might use their communicative repertoires. This is because assessment can offer guidance on what may be less likely, rather than what is possible, during communication exchange. A truly global approach to communication must place equal if not greater emphasis on the context of interactions and the opportunities provided to speakers and listeners to maximise communication skills. So communication partners plays a vital role in ensuring parity to all contributors of an interaction (e.g. Bradshaw, 2001) and are pivotal in increasing access to communication and the wider community for people with learning disabilities.

Much of the earlier research on people with intellectual impairments focused on ways of increasing access to the community at large following deinstitutionalisation (e.g. Owings, et al, 1981; O'Brien, 1987; Cullen, 1988; Markova et al, 1992). More than three decades of policies aimed at increasing social inclusion have not, however, guaranteed participation

in mainstream services or facilities for many individuals (Scottish Executive, 2000; Department of Health, 2001). It is vital then that we take a close look at the culture of services provided to people with intellectual impairments so that we might identify where problems lie. Critical to success are care providers and those in regular contact with client groups and so it is important that we identify how they perceive their role within the context of service provision (McConkey et al, 1999a). Here it has been clearly demonstrated that carer/client interactions are influenced by expectation. The thesis has shown that effectiveness can be predicted in part by the communication posture adopted by partners, and that success can be made more difficult to achieve where the listener is not sensitive to this. Careful scaffolding can provide an important bridge between speaker and listener understanding. It is important then that care providers are provided with adequate skills to ensure the optimal communication environment (Bartlett and Bunning, 1997) for service users so that they might find ways of contributing more fully to decision-making.

A note of caution was raised in the thesis regarding the ease with which some main participants were able to interpret facial information, such as direction of gaze, expression, lip/mouth configuration and identity matching. It is possible that the main participants may have experienced some difficulty in decoding facial cues during the Map Task and that this influenced how readily they were able to utilise facial feedback cues. The visual channel plays an important role during communication as it allows speakers and listeners to sample a wide range of information presented in other's faces (e.g. Ekman, 1992). It appears likely therefore that difficulty might occur where the communication partner is not aware of potential deficits in processing facial cues. Care providers and those in regular contact with people with intellectual impairments should be provided with training on the communicative value of facial feedback cues so that they might become more aware of how difficulties in processing non-verbal information can influence communication process.

Effective communication has as much to do with the context of interactions and those taking part as it has to do with the verbal and non-verbal contributions of speakers and listeners (van der Gaag and Dormandy, 1993). The thesis has shown that changes in communication partner can have a profound influence on the communicative effectiveness of young people with intellectual impairments. This was demonstrated using methodological procedures that allowed for spontaneous, extended dialogue between the interlocutors within a context controlled environment, and where communication success was measured against the individual's own performance. Using a within-subject design therefore avoided the need for comparison against other speaker/listener groups balanced on M/A (typically developing children) or other cognitive measures, such as IQ.

The Map Task (Brown et al, 1983) was shown to be effective in eliciting collaborative sequences from the participants, those most typical of everyday encounters (e.g. Clark and Marshall, 1981), that were goal driven and contextually relevant to the task. As communication goals were also known to the experimenter independent of what was mentioned during interactions, the task also provided a useful means for assessing how effective Givers and Follower were in tackling communication difficulty and establishing mutual understanding. Modifications made to the task prior to the main study (see Part 3, Chapter 5) ensured that it was accessible to the vast majority of participants. The Map Task provided an effective means for looking at communication in young people with varying strengths and levels of need, and with different communication partners.

Dialogues produced during the Map Task were coded using Conversational Games Analysis (Kowtko et al, 1991). This system of analysis provided a useful framework for looking at speaker and listener interactions as codes were assigned to the perceived communication goals of speakers rather than the grammatical completeness of utterances. This is particularly apposite to the current research as earlier studies have revealed

difficulties in the way that language is encoded and decoded by some people with intellectual impairments (e.g. Rosenberg, 1982; Rondal and Edwards, 1997). Games Analysis also allowed us to look independently at speaker and listener contributions and the ways that they combined iteratively during interactions. This revealed problems in the level of self-monitoring during peer interactions and raised concerns about distortions in the communication environment of carers and main participants. Conversational strategies were identified that were more or less effective in mutually grounding (Clark and Brennan, 1991) information and helpful or otherwise in maintaining parity between speaker and listener contributions. Specifically, CGA successfully identified those illocutionary acts that facilitated effective communication for the participants and those that appeared to make it less likely.

10.6. The way forward

The thesis opened with Nirjie's (1992) expression of the key principles underlying normalisation, which state that people with intellectual impairments 'should be given the opportunity to live a life as similar in nature as possible to that of others, with similar rights and responsibilities'. Nirjie (1969) states that 'the normalisation principle means making available to the mentally retarded patterns and conditions of everyday life which are as similar in nature as possible to that of others, with similar rights and responsibilities'. These words set out quite clearly then the lifestyle changes we might expect to see for people with intellectual impairments at the beginning of the 21st century. So just what has been achieved in the decades since normalisation was first introduced by Nirjie (1969) and Wolfensberger (1972), and operationalised in terms of O'Brien's (1987) five service outcomes of community presence, choice, competence, respect and community participation? What have we learned from our experiences of policies aimed at increasing social inclusion so that greater parity is ensured in future decision-making processes? Also, how best might we move forward so that people with intellectual impairments can

become 'as competent and independent in their personal daily routine as possible' and develop skills which will enable them to participate in 'regular community life as much as they can' (Nirjie, p20, 1992)? Negotiation of these points requires that we consider global issues relating to the delivery of services, but also the experiences of service users and care staff training.

Two major Government policy documents outline quite clearly the accomplishments of service providers in the UK over recent decades (The Same as You, Scottish Executive, 2000; Valuing People, Department of Health, 2001). These accomplishments include increased community presence, with fewer adults and children in long-term institutionalised care (Scottish Executive, 2000: 1965 – 7,000 people with severe disabilities; 1998 – 2,450 people with learning disabilities; Department of Health, 2001: 1969 – 58,850 patients (adult and children); 2000 – 10,000 in NHS facilities), and an expansion of services aimed at creating greater access to decision-making, such as self- and citizen advocacy groups. These changes have had a profound effect on the lives of people with intellectual impairments, their families and those entrusted to provide services and care (Scottish Executive, 2000). So social presence, as measured by being present in the community, has increased significantly under earlier policy initiatives. The evidence suggests, however, that is not necessarily commensurate with increased community participation (e.g. Markova et al, 1992; Reynolds, 2002). Much still needs to be done if we are to deliver the same experiences, choice and opportunities to this population as are available to mainstream society (Scottish Executive, 2000; Department of Health, 2001). Attitudes and practices must continue to change if we are to increase life chances. For example, one important issue raised through the current research is that it is far from clear just how much tenancy people with intellectual impairments hold over decisions affecting their life, or if they are truly in partnership with service providers. Government policy aimed at increasing personal choice and social inclusion can have little intrinsic value to

service users if it fails to take account of practitioner expectation and effectiveness.

Fundamental to the success of inclusion policy is therefore the development of clear and effective communication pathways that promote exchange between service users and care staff, and that benefit communication success (RCSLT, 1996).

Orford (1993) suggests that behaviour can be seen as a function of the person-in-context, the social setting and systems that surround and influence the individual, and the ways they interact. Each element in the equation is subject to change over time, so that people are continually influenced by changes in their environment, and the environment by people. This reciprocity creates new systems, and these are influenced in turn by individual experiences and the ways they shape, and are shaped by, their surroundings. Within such a framework, communication knowledge and success might be viewed as a function of the interplay between individual strengths and weaknesses and the opportunities made available to practice and develop skills. Creating environments that benefits effective communication increase the likelihood of success (e.g. van der Gaag and Dormandy, 1993), and through time, the possibility that individuals can influence their own situation and others around them (e.g. Bradshaw, 1998). Shaped in this way, the environment creates new opportunities for engaging with others, and new ways to practice and develop effective communication skills. Earlier studies (e.g. Shatz, 1983; Money, 1996) have shown that language development is influenced by features external to the individual, and that situations that fail to promote language use can lead to fewer communicative encounters (van der Gaag, 1989b). This is important, as becoming an effective communicator involves gaining insight into the subtleties of the communication process through taking the role of speaker and listener (e.g. Anderson and Boyle, 1994). So needed systems that respond to the individual and promote exchange and the potential to develop effective communication skills can benefit people with intellectual impairments by increasing success in everyday encounters and the possibility of influencing others.

Taking control over decision-making is seen as fundamental to enabling people with intellectual impairments lead fuller lives and to becoming more active within the community (Scottish Executive, 2000; Department of Health, 2001).

Central to Government policy is the notion of increased saliency and cohesion in identifying the current and future needs of people with intellectual impairments. They propose that a partnership should exist between the various agencies providing care, the individuals themselves and their families and carers if services are to become more person-centred and responsive to client needs (Scottish Executive, 2000; Department of Health, 2001). Finding ways to identify preferences and need is therefore critical to the success of user-led services. 'Personal life plans' hold key information about the wishes, preferences, healthcare and care support needs of service users, and are used by services, families and carers to provide structure and guidance on decisions affecting the daily lives of people with intellectual impairments. Ownership of the life plan rests firmly with the service user, his/her family and carer providers.

The current findings raise concerns, however, over the authorship of life plans, as choice may be articulated through the input and interpretation of parties other than the service user. This is often the case for people with severe communication impairments as here particular difficulty can be experienced in getting the message across and in contradicting the views of others (Grove et al, 1999). These authors state that those who facilitate the communication acts of people with limited communication skills need to ensure that their own desires and beliefs are not misrepresented as those of the speaker. Misrepresentations can occur because the ascription of interpretation, rather than meaning itself, is frequently overlooked as a contributing factor to assessment of people with intellectual impairments (Grove et al, 1999). The current research reinforces and extends this point by proposing that interpretation is also influenced by the global constraints placed upon speakers by their

communication partner. Specifically, misrepresentation of decisions and opinions might also occur where speakers are prevented from articulating choice through the communication posture of the interlocutor. The thesis has shown that listener response is intimately tied to speaker initiative (e.g. Anderson et al, 1994), and that transactional communication was more difficult rather than easier to achieve during interactions with a care provider. So illocutionary acts that remove the communication lead from the interlocutor, such as the overuse of complex open questions, can reduce the number of occasions where he/she might introduce new information, and therefore fewer opportunities to demonstrate choice. It seems prudent then that all contributors to documentation outlining the needs and preferences of people with intellectual impairments are provided with training and guidance on how best to facilitate effective communication exchange. Otherwise we might not avoid the pitfall of responding to the best interests of service providers rather than the users themselves. Cameron and Murphy (2000) have shown that the interests and opinions of young people with intellectual impairments are not necessarily recognised by those providing care. So clear and effective pathways are needed for articulating choice if services are to become more person-centred.

One way forward is the use of auxiliary communication devices, such as signs, symbols and picture boards as a meaningful way to explore the like and dislikes of people with intellectual impairments. These can be useful because they a) help to contextualise information so that it becomes more concrete to the interlocutors and b) move closer together speaker communication style and listener understanding (Bartlett and Bunning, 1997). Decisions around the choice of communication system should take account of user skills and how these might change over time (Miranda et al, 1990; RCSLT, 1996).

Miranda et al (1990) propose that further constraints can include: 1) user and partner preference – the usefulness of alternative forms of communication aid, such as portability and durability; 2) accessibility – how easily understood the conveyed messages are to users

and listeners; and 3) cost – the affordability of sophisticated communication devices.

Message ownership, however, raises a number of concerns. Grove et al (1999) suggest that communication partners are faced with two conflicting pressures during interaction with auxiliary communication device users. First, in order to engage in the communication process, partners may need to ascribe meaning to client behaviours, thereby introducing interpretation. Second, in order to avoid this pressure, partners could instead rely on only those communication acts that unequivocally signal meaning. However, this can lead to fewer opportunities for engaging in communicative acts and possible breakdown in communication process. So meaning tends to become ascribed to communication acts through mediation with the process of interpretation. This it would seem is unavoidable. Recognising the role of interpretation is therefore critical to the success of communication process involving parent, professional and others (Grove et al, 1999), if steps are to be taken to ensure accuracy and ownership of messages. The thesis has shown that certain illocutionary acts exist that can assist speakers and listeners to establish meaning during communication. One example is the Check game (e.g. Kowtko et al, 1991; Doherty-Sneddon, 1995). Checks are particularly useful since they allow listeners to monitor their own understanding by explicitly questioning the interpretation of previous messages and alert speakers to misunderstanding. So checking their own interpretation of earlier communication acts can provide partners with an effective means for identifying message ownership and establishing choice.

Effective communication involves the transmission of speaker meaning and intent and the recognition of this by listeners (e.g. Bates, 1976). Mediating this process via an auxiliary communication channel can present challenges to the initiator and receiver of communication acts (e.g. RCSLT, 1996), and places great emphasis on the role of communication partnership (Kaiser and Goetz, 1993). So collaboration is essential if all parties to the communication act are to identify message meaning and establish shared

understanding. Learning the necessary skills to make use of auxiliary communication systems requires commitment from people with communication difficulties (e.g. Mirenda et al, 1991) - isn't it only fair that we should demand the same level of effort from their communication partners.

A number of useful tools have been developed over recent years that provide ways of engaging people with intellectual impairments and their care providers in the communication process. Talking Mats (Murphy, 1998) represent a particularly useful means for discussing more complex issues around emotions and feelings. The mats were first developed as a tool for adults with a range of communication difficulties (such as cerebral palsy) and their use has now been extended to include people with intellectual impairments. The participants use pictorial cues to map out feelings about any number of topics, such as relationships, home life and pastimes. The author (Murphy, 1998) suggests that physically moving the pictures around the Talking Mat under heading such as happy/sad, like/don't like and 'not sure' can assist the participants to organise their thoughts and then to communicate these to others. Cameron (2001) proposes that this could be particularly useful during the development of a personal life plan. Murphy and Cameron (2002) show that the mats can also provide a medium for discussing communication style with care providers. They found that care staff gained insight into their own use of verbal acts, and how this might map onto user understanding, during training and practice sessions with service users. Misalignment in carer communication style and service user understanding has previously been recognised as problematic in the communication environment of people with intellectual impairments (e.g. McConkey et al, 1999a, b; Bartlett and Bunning, 1998; Bradshaw, 1998; 2001a, b). So a multi-dimensional approach to communication which includes techniques supplementary to those available from the client's own repertoire can benefit process and outcome by providing a means for

scaffolding interactions but also new pathways for developing a more effective communication environment.

Communication Passports (McEwan and Millar, 1993) offer an alternative, though not unrelated, collaborative means for articulating choice and preference. Each 'passport' carries personalised information about the passport holder, such as 'Things I can do for myself', 'Things I like to talk about' and 'How I express myself / influence my environment', as well as specific information relating to the management of care (CALL, 1997). The idea behind the Communication Passport is that each person in the day-to-day environment of people with intellectual impairments holds key information about individual strengths, preferences and needs, but that this is seldom shared with others. McEwan and Millar (1993) propose that this information or knowledge represents power, and that this power can be used by the individual to influence and shape their environment and to increase self-image. The passport is presented to those 'who need to know' (e.g. care providers, medical staff) as a representation and acceptance of who that person is and so allows the reader to focus on solutions, rather than problems, about the best way forward. van der Gaag and Dormandy (1993) state that having the power to control the environment is fundamental to increasing independence. The Communication Passport builds on this dictum by creating a means for empowering the individual to present an image of 'self' that is positive, accurate and value-led. This can bring about attitude change (McEwan and Millar, 1993) and so increased opportunity for participation within society and for engaging with the communication environment.

Dobson (2001) states that most communication intervention aimed at people with intellectual impairments is now delivered by care staff in day and residential centres. So critical to the success of programmes aimed at delivering change is staff motivation (e.g. Hodgkinson, 1998; Cameron and Murphy, 2002). Lord (2002) suggests that many of the

difficulties associated with the delivery of training to care providers, such as staffing problems and the movement of clients between services, can be overcome where staff motivation is high. She found that client needs were more likely to be met where staff were motivated towards intervention and change. So making available tools that promote exchange takes us somewhat towards increasing the level of interaction between care providers and people with intellectual impairments. How useful these are in bringing about change, however, is determined in part by the level of commitment demonstrated by care providers. The efficacy of staff training has been a source of concern for a number of years. Purcell et al (2000) proposes that one source of problem may be the lack of clarity or clear identity about the purposes of service provision. Is it to teach, care or advocate for service users? Are service users pupils, patients or partners? Purcell and colleagues (2000) suggest that emphasis should shift towards delivering an environment more conducive to partnership and mutually held goals (and away from direct communication training) where service provider philosophy is found to unduly influence carer/client communication (Purcell et al, 2000). Misconception over the normalisation (Nirjie, 1969; Wolfensberger, 1972) of communication may also contribute to carer communication style (Bartlett and Bunning, 1997; Banat et al, 2002). Carers may fail to take account of listener needs in the expectation that they should engage with their client in an age appropriate manner. However, this can lead to over-estimation of the level of client understanding (Bartlett and Bunning, 1998). Findings from the current research support the influence of expectation in carer/client interaction. It is proposed that carer expectation of their role as a communication partner may lead them to assume a more dominant role during interactions and/or a higher level of mutual understanding than is in fact the case. Either one of these can lead to a less successful communication outcome (e.g. Anderson and Boyle, 1996; Anderson et al, 1997). Training needs to take account then of the expectations of care providers if greater democracy is to be delivered to service users.

Cullen (1988) reports few long-term effects on staff behaviour as a result of training programmes. He suggests that any short-term gains, such as they are, hold little benefit to service users. This receives support from a number of studies (e.g. van der Gaag and Dormandy, 1993). Dobson (2001) explains that difficulties can lie in evaluating the effectiveness of communication training programmes since outcome is affected by a wide range of variables, such as the way that intervention is delivered by care staff, where intervention takes place and the client group. Problems can include the transfer of skills from training to practice (e.g. Brown, 1998) and in identifying and measuring improvement reported by carers in their communication with clients (Purcell et al, 2000). Purcell and colleagues (Purcell et al, 1999, 2000; McConkey et al, 1999a, b) suggest that carers experience difficulty in recognising their own and their clients' use of verbal and non-verbal acts and that this leads to a mismatch in speaker and listener understanding. Research suggests that feedback on communication performance can help care staff to gain valuable insights into their own behaviour (e.g. Money, 1997; Murphy and Cameron, 2002), and so represents one way forward towards increasing the efficacy of the carer/client interaction. Video analysis of the care/client communication has also successfully targeted and identified specific areas of difficulty, such as disparity in the reported and actual use of non-verbal acts in care providers (e.g. McConkey et al, 1999a, b; Purcell et al, 1999; Bradshaw, 2001b). Staff training it would seem is central to any discussion on how we might benefit the communication environment of people with intellectual impairments.

Carer participation in the delivery of communication intervention is now seen as essential to service policy (RCSLT, 1996). It is important then that we learn lessons from earlier work looking at the efficacy of staff training. A number of points appear salient to the current discussion. First, training should take place in a context that is similar to everyday interaction and involve real life situations, such making a meal and during informal

activities, and be as uncomplicated as possible (e.g. van der Gaag and Dormandy, 1993; Purcell et al, 2000). An extension of the current research might be to look at problem-solving within the context of a real life situation, such as budgeting or planning a weekly shop or outing. Care staff should be encouraged to assist their client to assume the communication lead by using simple sentences that check their own interpretation of previously mentioned information combined with simple open and closed questions. Second, opportunities should be made available for gaining feedback on carer/client interactions. This has been shown to be particularly effective in changing staff behaviour (Cullen, 1988). Feedback can be written, verbal or videotape in form but should provide care staff with a critical analysis of their style of communication, intervention methods and/or progress towards particular goals (van der Gaag and Dormandy, 1993). In the thesis video analysis was used to compare patterns of one non-verbal signal, gaze, in each of the three partnership groups and to investigate the contingency of gaze with verbal feedback mechanisms. This type of analysis might also provide useful feedback to care providers on their own and their client's use of non-verbal acts and act as a point of discussion around non-verbal communication in general. Third, the most effective means of delivering communication training to care staff may involve a combination of different techniques, such as one-to-one sessions with the care provider, staff training on communication awareness, keeping progress records and/or analysis of video feedback. This is can help to generalise skills beyond the training environment (e.g. Money, 1997; Purcell et al, 2000). Finally, a problem-solving or 'action-research' approach might help to identify specific communication strategies that benefit carer/clients interaction. This information can then be shared with other staff members so that a more tailored approach can be taken to communication with individual clients in specific situations (Purcell et al, 2000). This person-centred approach represents a shift away from more traditional research methods that tend to look for global or 'main effect' measures of difference/similarity in communication behaviour (Purcell et al, 2000). Taking a more individualised approach,

however, can lead to delivery of services more closely matched to user needs (e.g. Bradshaw, 1998).

To end on a positive note, it would appear that massive progress has taken place over recent years in the way that society has come to value and respect the lives of people with intellectual impairments. This is evident from most current Government policy. The Same as You (Scottish Executive, 2000) and Valuing People (Department of Health, 2001) catalogue quite clearly the successes and failures of earlier policies and present guidance on how best to move forward. Four primary principles lie at the heart of current policy: Rights, Independence, Choice and Inclusion (Department of Health, 2001). The research reported in the thesis suggests that there may still be some way to go before we can be confident of meeting these targets. However, exciting new initiatives, such as Talking Mats (e.g. Murphy, 1998; Cameron, 2001; Murphy and Cameron, 2002) offer new ways and opportunities for engaging people with intellectual impairments in communication research and practice. This is a positive step forward. Ensuring evidence-based practice that is grounded on sound scientific principle brings with it the reward of increased efficacy in the delivery of communication intervention and greater insight into where and why difficulties may occur (e.g. van der Gaag and dormandy, 1993). Increasing access to self- and citizen advocacy also suggests greater accountability for people with intellectual impairments and a positive move towards greater independence and personal choice. Fundamental to creating a life like any other then is partnership and equality, and the right to access effective communication.

Appendix 1: Consent form, letter, information sheet and questionnaire for Day

Centre participants and their parent/guardian/carer



Queen Margaret University College

EDINBURGH

Dear

Communication Research Project: Information Sheet

My name is Anne Walton and I am a research student in Edinburgh. I am beginning a three year study using video to look at how people talk to each other. I am writing to ask if you would like to be involved.

I may ask you to be video taped talking to three different people, two people that you know well, and one person you have not met before. This should take about 45 minutes to complete.

If you think that you would be interested in taking part, please tell your (parent/carer). They have a form for you to sign and some questions for you to answer.

If you would like to talk to me first, I can be contacted during the daytime by 'phone. We could arrange a date for me to visit you at your Day Centre. My telephone number is 0131 3173693.

You don't have to take part in this research if you don't want to.

Yours sincerely

Anne Walton, Bsc (Hons)

Director of Studies: Jois Stansfield, Msc RegMRCSLT DipCST

Queen Margaret College

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Dept Speech & Language Sciences

Communication Research Project: Young Adult Consent Form

I agree to take part in this study.

I have read and understood the information sheet and this consent form. I have had the chance to ask questions about taking part.

I understand that I do not need to take part in this study.

I understand that I can stop taking part in this study at any stage for any reason.

Name of participant

.....

Signature of participant

.....

Signature of investigator

.....

Date

Further information is available from:

Name of Investigator: Anne Walton
Address of Investigator: Department of Speech and Language Sciences
Queen Margaret College
Clerwood Terrace
Edinburgh, EH12 8TS
Telephone: (0131) 3173693

Queen Margaret College

EDINBURGH Established in 1875

Dept Speech & Language Sciences



Communication Research Project: Questionnaire

I am asking for a small amount of voluntary information about the young people with learning disabilities participating in this study. Could you please assist him/her to complete this form. All information will remain strictly confidential.

1. Young adults name
2. Young adults date of birth
3. Place in family (e.g. 1st of 2 children)
4. What is his/her most preferred system of communication? (please tick)

Talking
- Signing (e.g. Makaton,).....
- Symbols (e.g.Rebus;Blisssymbols).....
- Talking supported by signing
- Talking supported by symbols
- Other (please specify)

5. Has the young person ever had their hearing tested? If YES, how long ago were they last tested (roughly)? Can you please give as many details as you can about the result.

.....
.....

6. Has the young person ever had their vision tested? If YES, how long ago were they tested (roughly)? Can you please give as many details as you can about the result.

.....
.....

7. Does the young person regularly attend a Centre during the daytime? If NO, what sorts of things does the young adult tend to do during the day?

.....
.....

8. Does the young person regularly take part in events in the evening or at weekends (e.g. as a member of a sports club)? If YES, what kind of events are these?

.....
.....

Anne Walton, BSc (Hons)
Director of Studies: Jois Stansfield, MSc RegMRCSLT DipCST,
Senior Lecturer/Course Leader

Thank you very much for your help



Queen Margaret University College

EDINBURGH

Dear (Parent/Guardian/Carer),

Communication Research Project: Information Sheet

My name is Anne Walton and I am a research student in the Speech and Language Sciences Department, Queen Margaret College, Edinburgh. I am just beginning a three year study on communication of young adults with learning disabilities. I am particularly interested in how communication may change according to different conversational partners. In order to do this I am also going to need your help.

I would like you and your (son/daughter/client) to take part in a task. This will be recorded using audio and video equipment and should take about 45 minutes to complete. Your (son/daughter/client) is also likely to be asked to take part on two further occasions, each of which should take about 45 minutes. If you are interested, could you please assist him/her to complete the attached form and short questionnaire and to return it to me in the enclosed envelope. Your (son/daughter/client) has also been given their own information sheet outlining details of the study.

Please refer to the Information Sheet which is attached to this letter for more details of the study.

Yours sincerely

Anne Walton, BSc (Hons)

Director of Studies: Jois Stansfield, MSc RegMRCSLT DipCST, Senior Lecturer/Course Leader

Queen Margaret College

EDINBURGH Established in 1875



Dept Speech & Language Sciences

Communication Research Project: Information Sheet

If you and your (son/daughter/client) are interested in taking part in this study, you will be asked to carry out a task. This task might be to talk about a map or a picture and should take about 45 minutes to complete. Whilst you are doing this I will record your conversations on audio and video equipment. Your (son/daughter/client) is also likely to be asked to take part on two further occasions, once with each of the following partners:

- someone who has no experience of working or living with people with a learning disability
- a friend

After this, audio and video tapes will be watched to see how communication varies with different partners. All of the tasks will take place at the Department of Speech and Language Sciences, Queen Margaret College, Edinburgh.

Any information which emerges as a result of this study will be analysed at Queen Margaret College and used only for this study. Once this information is coded it will become anonymous.

This research is completely unassociated with any other matter concerning Speech and Language Therapy Services or Lothian Health. You and your (son/daughter/client) will be free to withdraw from the project at any time.

If you or your (son/daughter/client) would like to discuss any matter related to this study I can be contacted by telephone on (0131) 3173693 during normal office hours. You can also contact Jois Stansfield (Director of Studies) for further information on (0131) 3173683.

I hope that you and your (son/daughter/client) will join in this exciting new research.

Anne Walton

Appendix 3a: Test of perspective taking: theory of mind

Bowling Scenario adapter from Baron-Cohen (1989) and Perner & Wimmer (1985)

Name materials:

Two houses; a bowling alley; a swimming pool; trees separating the bowling alley from the swimming pool; 3 characters (Lucy, Stephen and Chris).

This is the story of Stephen and Lucy who live in this town. Stephen and Lucy have been bowling all morning. They like playing bowls.

Naming question: which is Stephen/Lucy?

Here they are at the bowling alley. Along comes their friend Chris. He would like to play bowls too. But Lucy hasn't any money left. She is very sad. 'Don't worry' says Stephen, 'you can go home and get some money and play bowls later. We'll stay here at the bowling alley all afternoon'. 'Oh good' says Lucy, 'I'll be back in the afternoon'.

Prompt [1] Chris has heard that Lucy will come back in the afternoon to play bowls. Chris has heard that!

Prompt Question [1] where did Stephen say to Lucy that he would be all afternoon?

So Lucy goes home. She lives in this house. After a while Stephen says 'I'm too hot. I'm going along to the swimming pool for a while. Perhaps a swim will cool me down.

Prompt Question [2] where did Stephen say he was going? (If the participant doesn't answer correctly repeat the relevant information).

Prompt Question [3] did Lucy hear that?

Stephen walks to the swimming pool. On the way he passes Lucy's house. Lucy sees him and asks 'where are you going?' Stephen says 'I'm going to the swimming pool. I was too hot in the bowling alley'. So off he goes to the pool.

Prompt [4] where did Stephen tell Lucy he was going?

Prompt [5] does Chris know that Lucy has talked to Stephen?

Now Chris goes home for more money. He lives in this house. Chris goes inside his house to get his money and then goes to Lucy's house. He knocks at the door and says 'Is Lucy in?' 'No' says her father, 'she's just left. She said she was going to meet Stephen'.

Prompt [2] Remember, Chris doesn't know that Lucy has talked to Stephen. He doesn't know that!

Belief Question: Where does Chris think that Lucy has gone to look for Stephen?

Justification Question: Why?

Reality Question: Where did Lucy really go to find Stephen?

Memory Question: Where was Stephen at the beginning of the story?

Appendix 3b: Test of perspective taking: theory of mind

Park Scenario adapted from Baron-Cohen (1989) and Perner & Wimmer (1985)

Name Materials:

Two houses; a 'grassed' area containing three trees; a Community Centre; trees separating the park from the Centre; 3 characters (Sandy, Ben & Julie).

This is the story of Ben and Julie who live in this town. This afternoon Ben and Julie are together in the park listening to Julie's CDs.

Naming question: which is Ben/Julie?

Here they are at the park. Along comes Sandy. She loves to listen to CD's. After a while, Ben has to go home to feed his dog. He is very sad. 'Don't worry' says Julie, 'you can go home to feed your dog and listen to my CDs later. I'll be in the park all evening'. 'Oh good', says Ben 'I'll be back in the evening to listen to your CDs'.

Prompt [1] Sandy has heard that Ben will come back in the evening to listen to CDs. Sandy heard that!

Prompt Question [1] where did Julie say to Ben that she would be all afternoon?

So Ben goes home. He lives in this house. Suddenly it starts to rain. Julie says 'I'm going to the Community Centre to listen to my CDs. It's nice and warm there'.

Prompt Question [2] where did Julie say she was going? (If participant doesn't answer correctly repeat the relevant information).

Prompt Question [3] Did Ben hear that?

Julie walks to the Community Centre. On the way she passes Ben's house. Ben sees her and asks 'Where are you going?' 'I'm off to the Community Centre' says Julie 'to play my CDs'. So off she goes to the Community Centre.

Prompt Question [4] where did Julie tell Ben she was going?

Prompt Question [5] Does Sandy know that Ben has talked to Julie?

Now Sandy goes home for tea. She lives in this house. Sandy goes inside her house and has tea. Then she goes to Ben's house. She knocks at the door and says 'Is Ben in?' 'No' says his mother, 'he's just left. He said he was going to meet Julie'.

Prompt [2] Remember, Sandy doesn't know that Ben has talked to Julie. She doesn't know that!

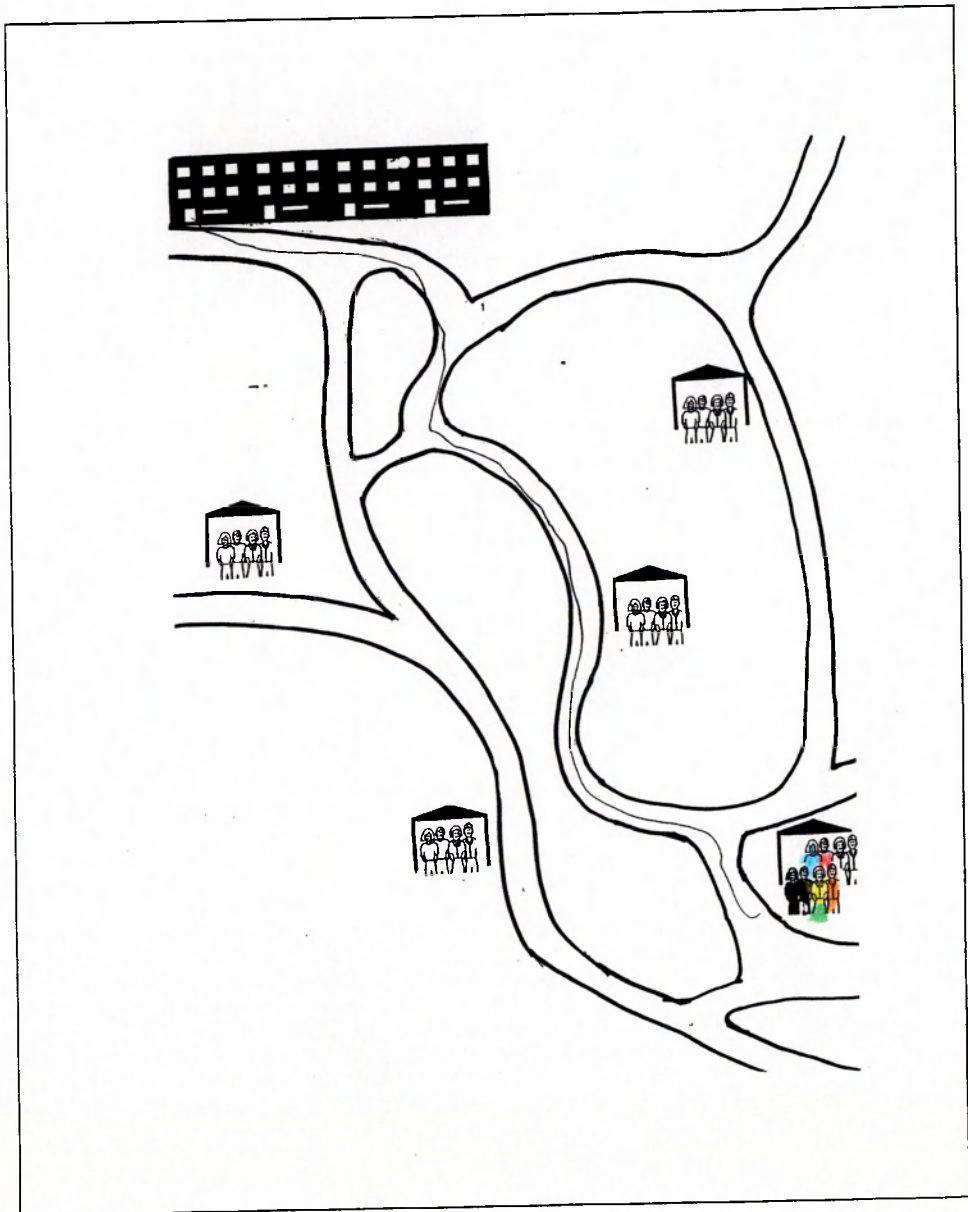
Belief Question: Where does Sandy think that Ben has gone to look for Julie?

Justification Question: Why?

Reality Question: Where did Ben really go to find Julie?

Memory question: Where was Julie at the beginning of the story?

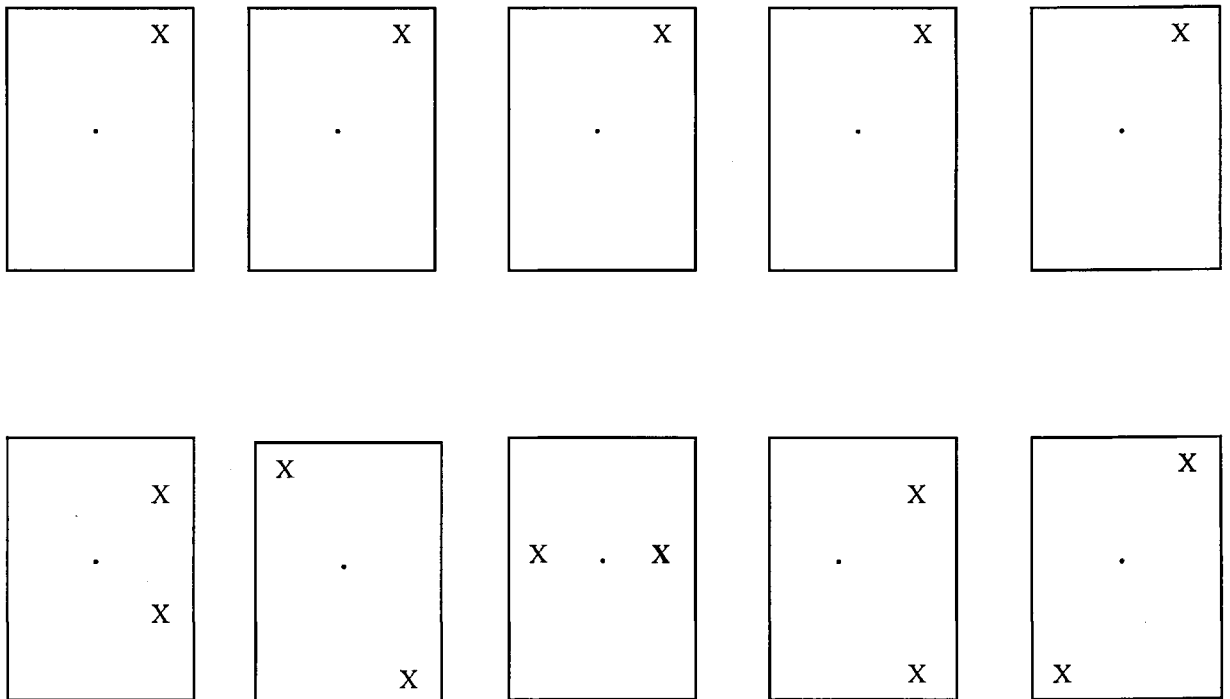
Appendix 4: Materials for investigation of motor-co-ordination skills



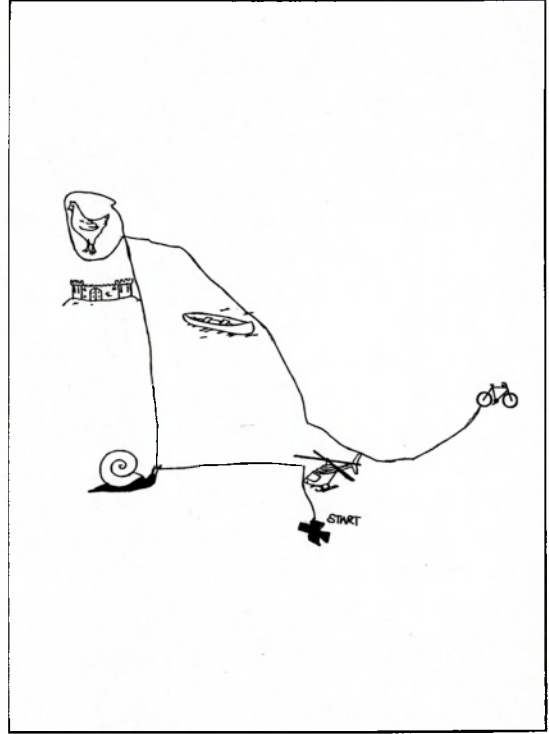
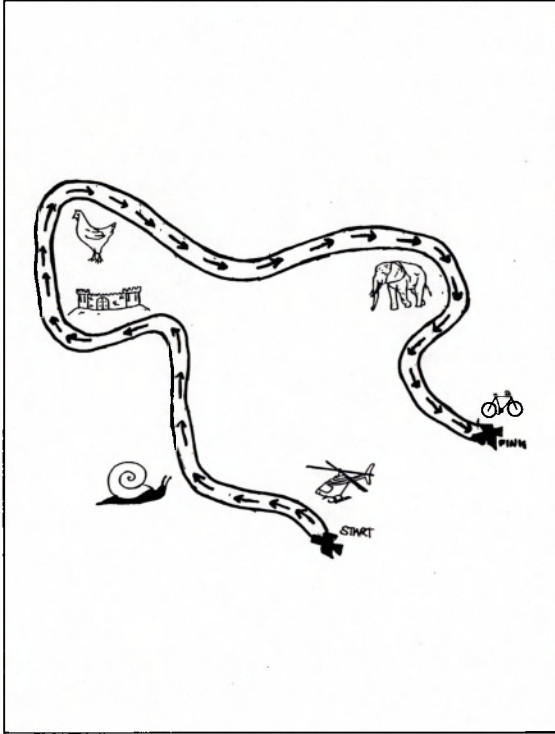
Appendix 5: Test of Same/Different Picture and Location

Picture		Location	
Same	Different	Same	Different
Cup and saucer	Bed – Rake	Dustbin	Television
Candle	Boy – Dustbin	Candle	Boy
Apple	Penguin – Scissors	Bell	Watch
Watering can	Bell – Television	Watering can	Paintbrush
Watch	Paintbrush – Kettle	Apple	Cup and saucer
Practise cards		Practise cards	
Lamp		Cap	

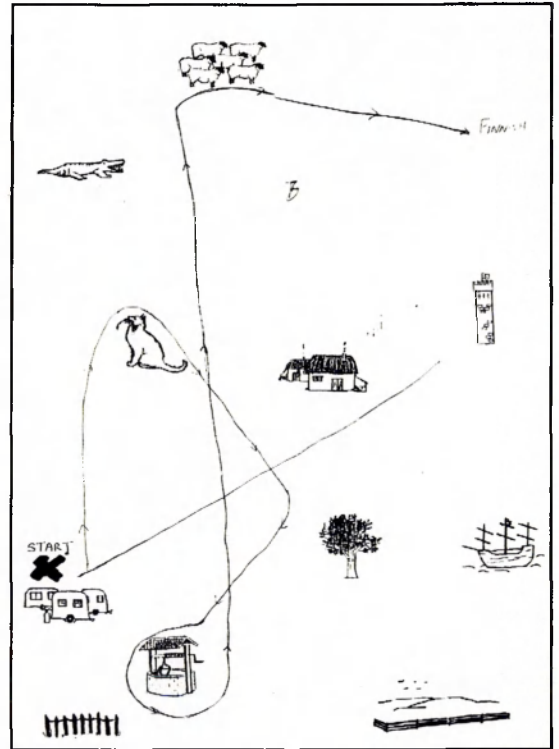
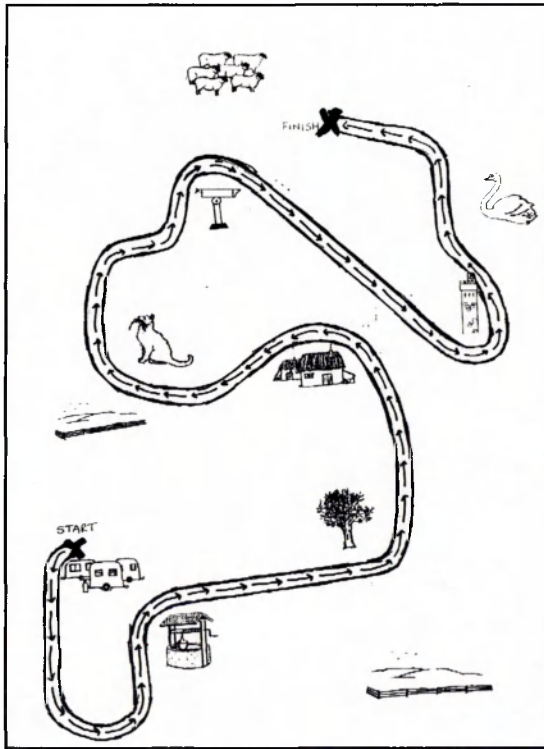
Position of pictures on same (Cards 1 – 5, moving from left to right of the top row) and different location cards (Cards 6 – 10, moving from left to right of the bottom row).



Appendix 6. Information Giver and Follower maps for practise session: Pilot Study 1

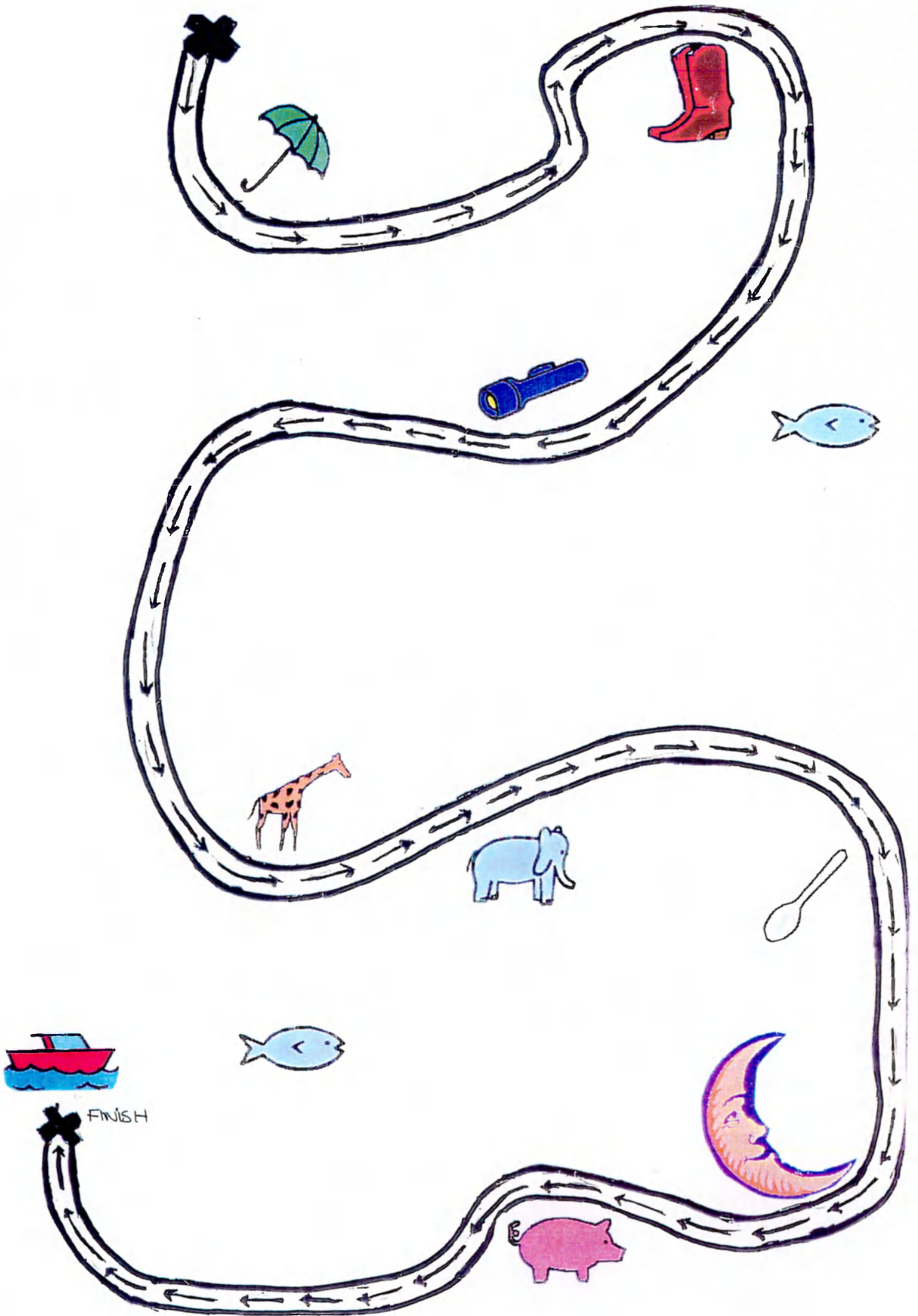


Appendix 8. Pair 3, carer Information Follower: Pilot Study 1



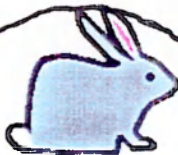
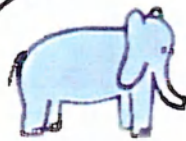
Appendix 9: Information Giver and Follower maps: Pilot Study 2 and Main Study

(Pair 8, peer Information Follower; Main Study)



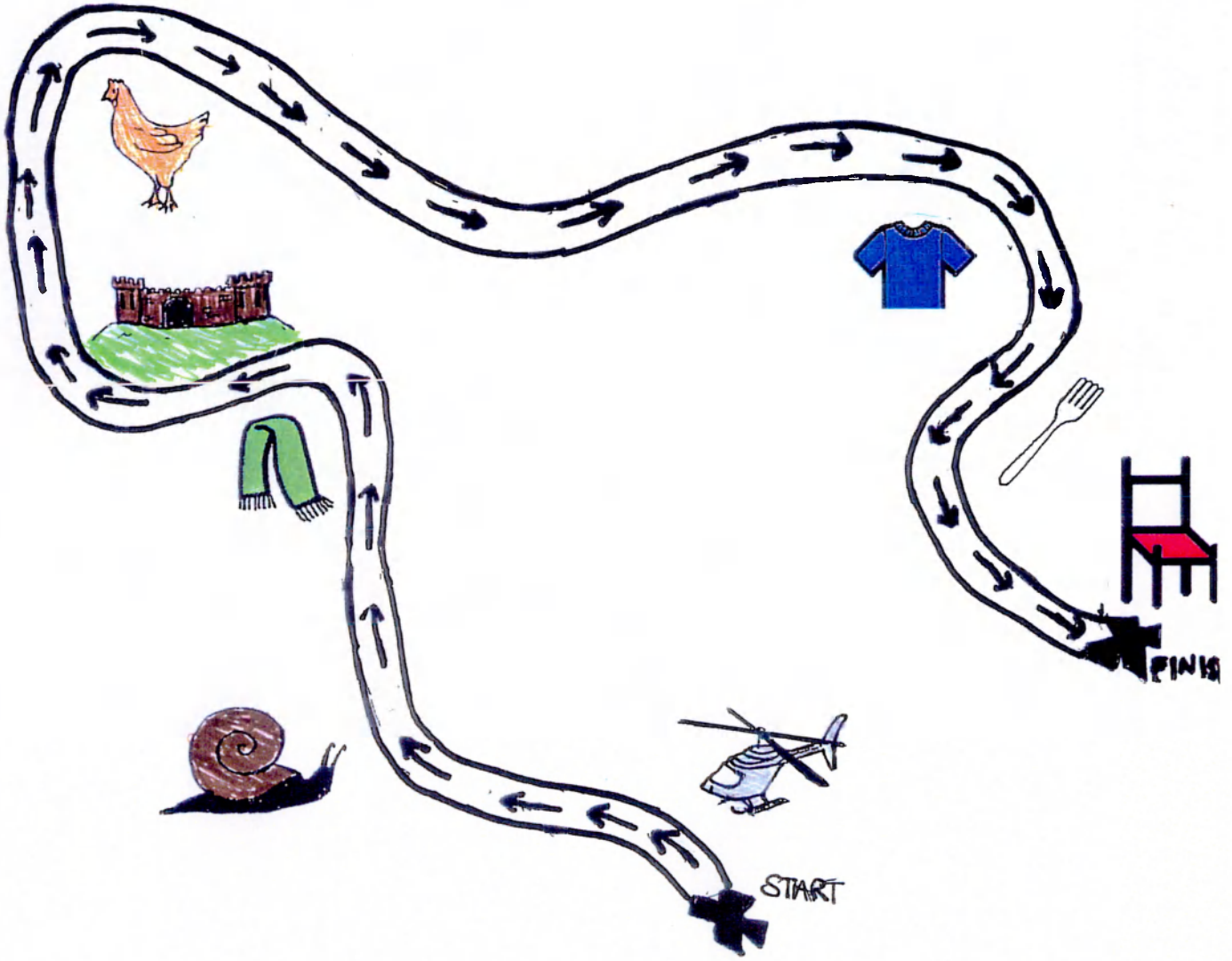
FINISH

START



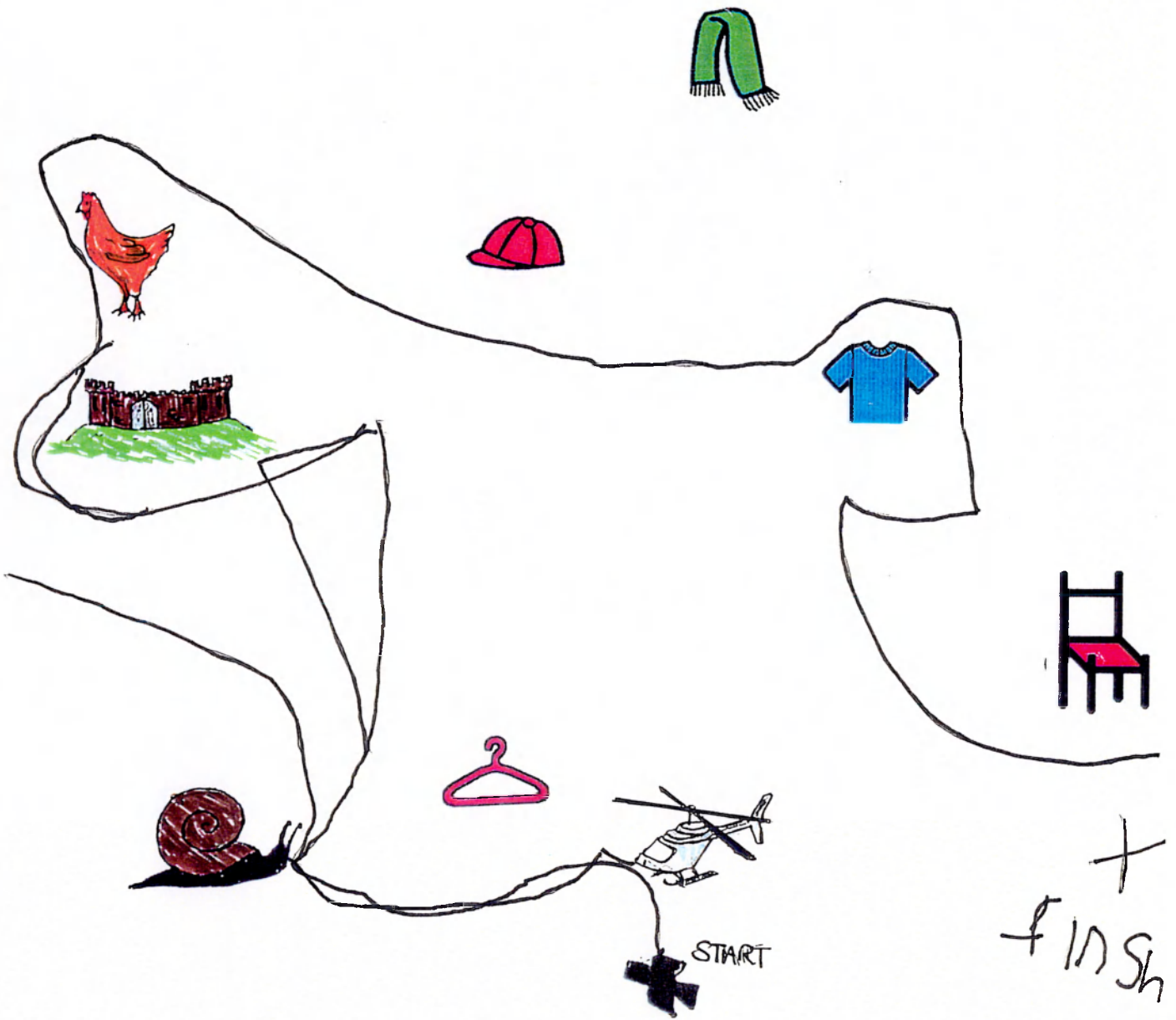
Appendix 10: Information Giver and Follower maps for practise session: Pilot Study

2 and Main Study Pair 5, carer Information Follower; Main Study)



START

FINIS



Appendix 11: Test of perspective taking: theory of mind

First Order Theory of Mind adapted from Baron-Cohen, Leslie and Frith (1985)

Vicky and Claire

Name materials:

A basket; a box; a miniature bar of chocolate; 2 characters (Vicky and Claire).

This is Vicky and this is Claire. Vicky has a basket to keep her things in and Claire has a box.

Naming question: which is Vicky/Claire?

Vicky has some chocolate. But before she can eat it she needs to wash her hands. So Vicky puts the chocolate in her basket and goes off to the bathroom. While she is away, Claire takes the chocolate and hides it in her box. Vicky returns from the bathroom to eat her chocolate.

Belief Question: Where will Vicky look for her chocolate?

Reality Question: Where is the chocolate really?

Memory Question: Where was the chocolate at the beginning of the story?

Alistair and Mark

Name materials:

A basket; a box; a cupboard; a football; 2 characters (Alistair and Mark).

This is Alistair and this is Mark. Alistair has a basket for keeping his things in and Mark has a box.

Naming question: which is Alistair/Mark?

Alistair has a football. But before he can go out to play football he needs to have his lunch. So Alistair puts the football in his basket and goes to the kitchen. While he is away, Mark takes the football and hides it in the cupboard. Alistair returns from the kitchen to collect his ball.

Belief Question: Where will Alistair look for his ball?

Reality Question: Where is the ball really?

Memory Question: Where was the ball at the beginning of the story?

Appendix 12: Summary of procedures for familiarising Day Centre participants and staff with the experimenter and recording environment

a) Familiarisation with the experimenter:

1. Initial contact: Day Centres in the Edinburgh area providing services to young adults with intellectual impairments were approached by the experimenter and invited to take part in the study. Service Managers and/or their assistants were shown examples of the task materials. Each contributing facility ($n = 4$) gave permission for the experimenter to approach service users and their key worker about participating in the study. The experimenter then visited each Centre on an informal basis (e.g. during coffee and lunchtime breaks) for approximately one month. Each Centre was visited for around two hours per session, two-three times a week for a month. 2. Getting to know one another: the experimenter joined ongoing activities, such as drama, cooking and art in each Centre for the duration of the study (approximately three hours a week per Centre for one year). This included weekend and evening events (e.g. craft fairs) and participating in a community drama production for the local Fringe Festival. Time was also spent chatting informally with service users (e.g. during coffee breaks) whether or not they had previously indicated interest in participating in the study. 3. Post participation: the experimenter remained in contact with each participant through continued involvement in the Centres (as outlined above) and during feedback sessions. This is detailed below.

b) Familiarisation with the recording environment:

The participants were shown around the recording suite by the experimenter on arrival at QMUC and introduced to members of staff. Each participant was provided with a brief description of the recording equipment and the way that it contributed to data gathering procedures. This included viewing feedback from the studio cameras in a separate control room. The participants were informed that video recordings of their own interactions (and corresponding maps) would be available for viewing with the experimenter following their third and final Map Task. This would take place in their own Day Centre and be open only to those individuals featured in the recording i.e. participant/carer or participant/peer. Students were provided with an opportunity to view their own video recording at QMUC. All of the participants were informed that no other individual would gain access to the research materials. Finally, participants and their partners were invited to join the experimenter for refreshments in the College catering facility following each Map Task recording i.e. prior to returning to their Day Centre.

Appendix 13. Non-parametric analysis on Map Task scores, number of words, turns and words per turn.

Test	Variables	Result
	Map Task scores	
Friedman	Carer x Student x Peer	$X^2(2)=5.09, p<0.08$
Wilcoxon	Carer x Student	$z=-1.96, p=0.05$
	Carer x Peer	$z=-1.78, p=0.08$
	Student x Peer	$z=-2.23, p<0.05$
	Words (dyads)	
Friedman	Carer x Student x Peer	$X^2(2)=12.46, p<0.01$
Wilcoxon	Carer x Student	$z=-2.44, p<0.05$
	Carer x Peer	$z=-3.46, p<0.001$
	Student x Peer	$z=-1.56, p=0.1$
	Words: Simple Effects for Information Givers	
Friedman	Carer x Student x Peer	$X^2(2)=5.21, p=0.07$
Wilcoxon	Carer x Student	$z=-2.34, p<0.05$
	Carer x Peer	$z=-1.8, p=0.07$
	Student x Peer	$z=-1.08, p=0.3$
	Words: Simple Effects for Information Followers	
Kruskal Wallis	Carer x Student x Peer	$X^2(2)=19.5, p<.000$
Mann Whitney	Carer x Student	$z=-1.8, p=0.07$
	Carer x Peer	$z=-4.01, p<.000$
	Student x Peer	$z=-3.03, p<0.1$
	Words: Information Givers Vs Information Followers	
Mann Whitney	Carer +Student +Peer	$z=-0.64, p=0.5$
Mann Whitney	Peer dyads	$z=-2.69, p<0.1$
	Turns: (dyads)	
Friedman	Carer x Student x Peer	$X^2(2)=11.23, p<0.01$
Wilcoxon	Carer x Student	$z=-1.9, p=0.06$
	Carer x Peer	$z=-3.52, p<.000$
	Student x Peer	$z=-1.8, p=0.07$
	Turns: Simple Effects for Information Givers	
Friedman	Carer x Student x Peer	$X^2(2)=11.23, p<0.05$
Wilcoxon	Carer x Student	$z=-1.82, p=0.07$
	Carer x Peer	$z=-3.01, p<0.01$
	Student x Peer	$z=-1.96, p=0.05$
	Turns: Simple Effects for Information Followers	
Kruskal Wallis	Carer x Student x Peer	$X^2(2)=13.19, p<.001$
Mann Whitney	Carer x Student	$z=-1.95, p=0.05$
	Carer x Peer	$z=-3.52, p<.000$
	Student x Peer	$z=-1.85, p=0.07$
	Words per Turn (dyads)	
Friedman	Carer x Student x Peer	$X^2(2)=1.08, p=0.6$
	Words per Turn: Simple Effects for Information Givers	
Friedman	Carer x Student x Peer	$X^2(2)=12.12, p<0.01$
Wilcoxon	Carer x Student	$z=-0.71, p=0.5$
	Carer x Peer	$z=-2.9, p<0.01$
	Student x Peer	$z=-2.5, p=0.01$
	Words per Turn: Simple Effects for Information Followers	
Kruskal Wallis	Carer x Student x Peer	$X^2(2)=10.86, p<0.01$
Mann Whitney	Carer x Student	$z=-0.23, p=0.8$
	Carer x Peer	$z=-3.1, p<0.01$
	Student x Peer	$z=-2.54, p=0.01$
	Words per Turn: Information Givers Vs Information Followers	
Mann Whitney	Carer + Student + Peer	$z=-0.15, p=0.9$
Mann Whitney	Peer dyads	$z=-3.57, p<.000$

Appendix 14: Analysis on the number of words used by Information Givers and Followers excluding the use of fillers, repeats and unintelligible words.

A mixed analysis of variance with partnership (3 level: carer x student x peer) a within-subject variable and role (2 levels: Information Giver x Information Follower) the between-subject factor revealed a main effect for partnership ($F(2,48) = 11.89, p < .000$) and an interaction between partnership and role ($F(2,48) = 6.01, p < .01$). The dependant variable was the number of words used by interlocutors minus fillers (e.g. ehm), repeats and unintelligible words. Analysis revealed no difference in the number of words used by Information Givers and Followers. The means are shown below in Table A. Post hoc t-tests revealed findings consistent with previous analysis on the number of words use by interlocutors (see Chapter 7) with the following two exception.

1. A marginal effect was revealed for the number of words used by Givers and Followers in dyads including a carer, $t(15.4) = 2, p = .06$. This means that carers tended to use more words than the main participants in these interactions.
2. Carers used marginally more words than students, with $t(24) = 1.94, p = .06$. All other levels of significance remain the same as those reported in Chapter 7.

These finding suggest that carers used fewer fillers, repeats and/or unintelligible words than the Information Giver or student Information Followers.

	Carer	Student	Peer	Total
IG	190 (90.9)	118.3 (76.8)	142.7 (103.2)	150.3 (75.8)
IF	331.5 (238.6)	184.5 (131.6)	52.3 (55.1)	189.4 (90.1)
Total	260.7 (191.1)	151.4 (110.8)	97.5 (93.3)	

Table A. Mean (SD) number of words used by Information Givers and Followers in each partnership group minus fillers, repeats and unintelligible words

Appendix 15. Non-parametric analysis on CGA: Chapter 8, Section A

Test	Variables	Result
CGA: Carers x Students x Peers		
Friedman	Align	$X^2(2)=1.65, p=0.4$
	Instruct	$X^2(2)=4.04, p=0.1$
	Explain	$X^2(2)=11.1, p<0.01$
Wilcoxon	Carer x Student	$z = -0.67, p=0.5$
	Carer x Peer	$z = -2.49, p=0.01$
	Student x Peer	$z = -2.76, p<0.01$
Friedman	Query y/n	$X^2(2)=2.46, p=0.3$
Wilcoxon	Query-w	$X^2(2)=13.61, p<.001$
	Carer x Student	$z = -2.36, p<0.05$
	Carer x Peer	$z = -2.95, p<0.01$
	Student x Peer	$z = -1.74, p=0.08$
Friedman	Check	$X^2(2)=15.1, p<.000$
Wilcoxon	Carer x Student	$z = -0.94, p=0.3$
	Carer x Peer	$z = -2.94, p<0.01$
	Student x Peer	$z = -3.09, p<0.01$
CGA: Simple Effects for Information Followers		
Kruskal Wallis	Explain: Carer x Student x Peer	$X^2(2)=11.91, p <0.01$
	Query y/n: Carer x Student x Peer	$X^2(2)=16.09, p <.000$
Mann Whitney	Carer x Student	$z = -0.65, p=0.5$
	Carer x Peer	$z = -3.74, p<.000$
	Student x Peer	$z = -3.21, p<.001$
Kruskal Wallis	Query-w: Carer x Student x Peer	$X^2(2)=17.61, p<.000$
Mann Whitney	Carer x Student	$z = -2.87, p<0.01$
	Carer x Peer	$z = -3.95, p<.000$
	Student x Peer	$z = -1.5, p=0.1$
Kruskal Wallis	Check: Carer x Student x Peer	$X^2(2)=17.75, p <.000$
Mann Whitney	Carer x Student	$z = -0.95, p=0.3$
	Carer x Peer	$z = -3.95, p <.000$
	Student x Peer	$z = -3.15, p <0.01$
CGA: Information Vs Information Followers		
Mann Whitney	Align	$z = 0.56, p=0.6$
	Instruct	$z = -4.47, p<.000$
	Explain	$z = -4.09, p<.000$
	Query-w	$z = -4.44, p<.000$
	Check	$z = -4.47, p<.000$
Number of Query-w words and Turns		
Mann Whitney	Words: Carer x Student	$z = -2.09, p<0.05$
	Turns: Carer x Student	$z = -2.32, p<0.05$
Percentage of Words devoted to Query-w questions		
Mann Whitney	Carer x Student	$z = -1.88, p=0.06$
Number of Landmarks Introduced During Interactions		
Friedman	Carer x Student x Peer	$X^2(2)7.37, p<0.05$
Wilcoxon	Carer x Student	$z = -0.56, p=0.6$
	Carer x Peer	$z = -2.27, p<0.05$
	Student x Peer	$z = -2.26, p<0.05$
Number of Landmarks Introduced by Information Givers and Followers		
Mann Whitney	Carer + Student + Peer	$z = -3.81, p<.000$
Landmark Introduction: Type 1 Initiations		
Friedman	Carer x Student x Peer	$X^2(2)=7.3, p<0.05$
Wilcoxon	Carer x Student	$z = -1.26, p=0.2$
	Carer x Peer	$z = -2.21, p<0.05$
	Student x Peer	$z = -1.46, p=0.1$
Landmark Introduction: Type 2 Initiations		
Friedman	Carer x Student x Peer	$X^2(2)=8.96, p=0.01$
Wilcoxon	Carer x Student	$z = -0.94, p=0.3$
	Carer x Peer	$z = -2.37, p<0.05$
	Student x Peer	$z = -2.01, p<0.05$

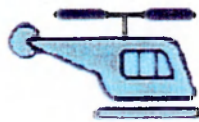
Appendix 16: Pair 5, carer Information Follower: Main Study



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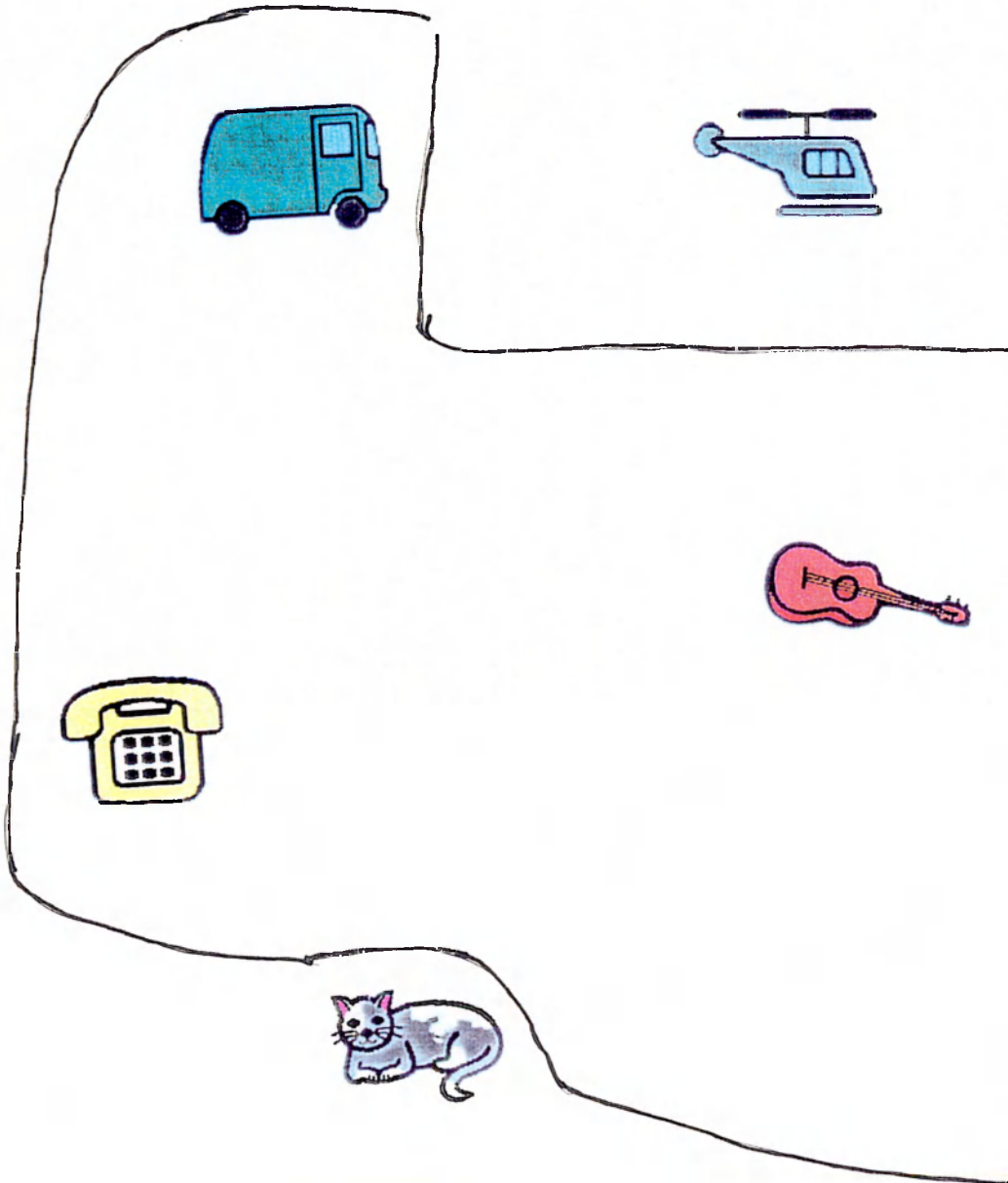
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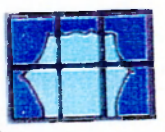
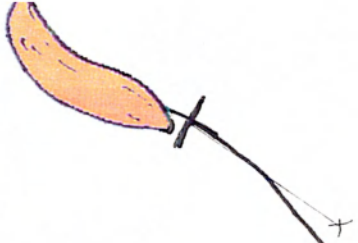
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Appendix 17: Pair 13, student Information Follower: Main Study

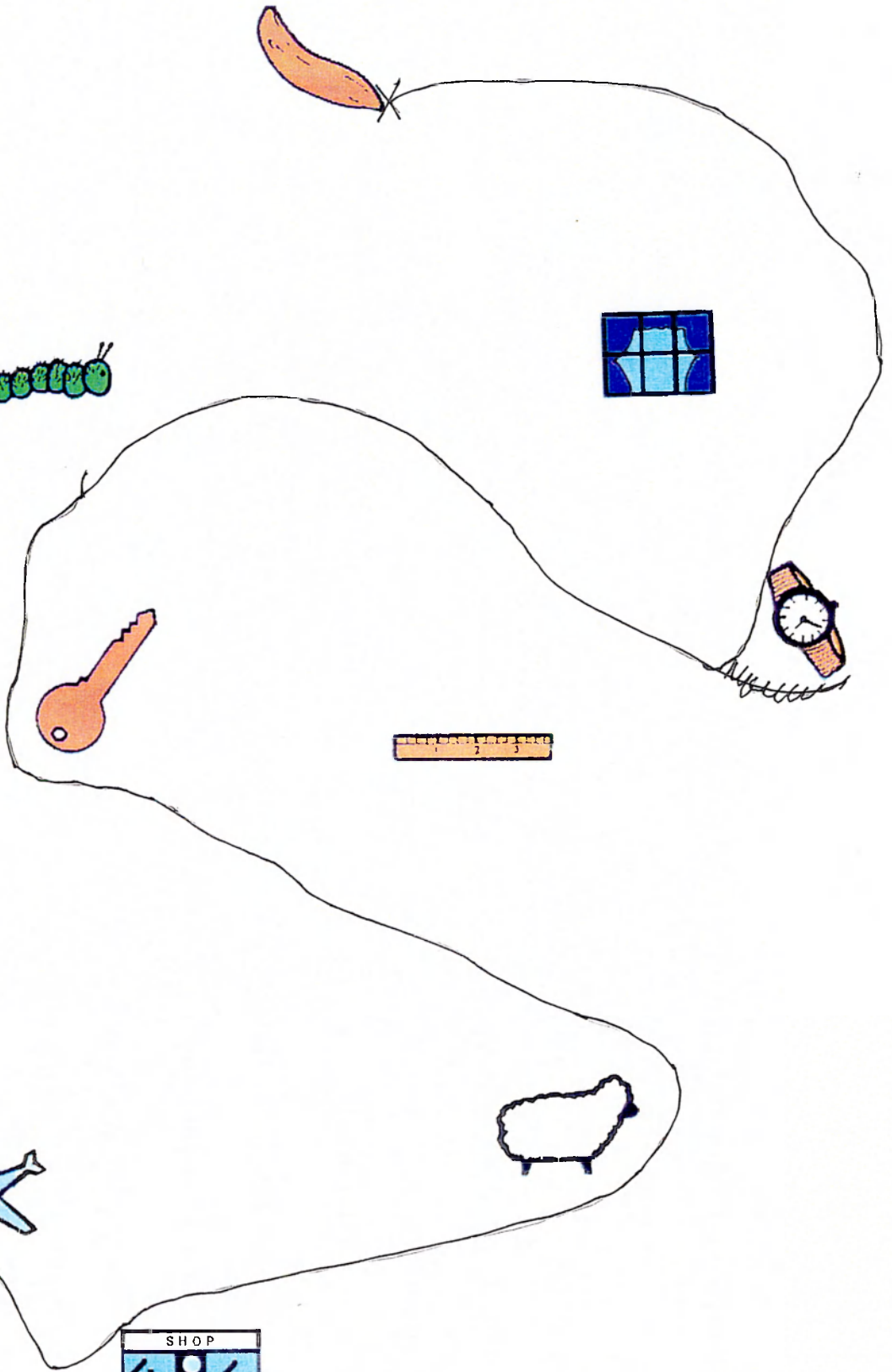


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Appendix 18: Pair 6, student Information Follower: Main Study

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Appendix 19. Non-parametric analysis for Study 2 (levels of gaze) and Study 3 (bystander study)

Test	Variables	Result
Study 2: gazing patterns: frequency, duration and words per gaze		
Frequency		
Friedman	Information Giver: Carer x Student x Peer	$X^2(2)=2, p = 0.4$
Kruskal Wallis	Information Follower: Carer x Student x Peer	$X^2(2)=3.8, p = 0.1$
Duration		
Friedman	Information Giver: Carer x Student x Peer	$X^2(2)=5.7, p = 0.06$
Wilcoxon	Carer x Student	$z = -1.8, p = 0.9$
	Carer x Peer	$z = -2.4, p < .05$
	Student x Peer	$z = -1.9, p = 0.06$
Kruskal Wallis	Information Follower: Carer x Student x Peer	$X^2(2)=8.19, p < .05$
Mann Whitney	Carer x Student	$z = -1.6, p = 0.1$
	Carer x Peer	$z = -2.8, p < 0.01$
	Student x Peer	$z = -1.3, p = 0.2$
Number of words per gaze		
Friedman	Information Givers: Carer x Student x Peer	$X^2(2)=1.01, p = 0.6$
Kruskal Wallis	Information Followers	$X^2(2)=6.8, p < 0.05$
Mann Whitney	Carer x Student	$z = -0.49, p = 0.6$
	Carer x Peer	$z = -2.23, p < 0.05$
	Student x Peer	$z = -2.23, p < 0.05$
Study 3: bystander study		
Mann Whitney	Bystander x Information Giver map	$z = -0.17, p = 0.9$
	Bystander x Information Follower map	$z = .000, = 1$

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