CHAPTER 2

THE ADAPTIVE RESPONSE: DEVELOPMENT OF A FRAMEWORK FOR THE DESCRIPTION OF COMMUNICATION-RELATED BEHAVIOURS

2.1 INTRODUCTION

Over decades the occupational therapy profession has been involved in the development of theoretical constructs related to adaptive behaviour. The concept 'adaptive behaviour', although used in psychology (e.g. Piaget, 1978) has, however, not been used in relation to the development of communication skills. As the concept of adaptive communication behaviour could enhance understanding of the integration and intricacies involved in communication development, this chapter aims to define the concept of adaptive behaviour by referring to four different models of adaptive behaviour. From these theories, general principles will be identified and applied to a different model that will form the basis of the theoretical constructs used in this study.

Many authors have stressed the bio-psycho-social foundations of speech and/or language, depending on their particular fields of interest (Lenneberg, 1967). Jocíc (in Waterson & Snow, 1978) admits the adaptive capacity of speech, dependent upon emotional relations, cognitive and experiential capacities and the need to succeed in communication. Speech and language are, however, vehicles for communication and a more encompassing study of communication behaviour (verbal and non-verbal) also indicates a dependence upon underlying bio-psycho-social maturation. In a "reciprocal and multi-channelled approach to communication" (Lloyd, 1976:xi) the bio-psycho-social underpinnings of communication (involving sensorimotor, cognitive and social-emotional factors (Fewell & Vadasy, 1983), are acknowledged.

It is clear that communication is complex in nature and for the purpose of this research communication will be viewed as an adaptive response. The reasons for this assumption will

be discussed, identifying the underlying components involved in communication and its development.

This chapter aims at the development of a model for communication behaviour as an adaptive response in normal children, and will indicate the interrupted adaptive response in the child with mental disabilities. Support for this thesis is found in theories on communication development, as well as the domains and processes underlying this development.

2.2 LEARNING OF AN ADAPTIVE RESPONSE

Communication is not commonly viewed as an adaptive response. Sylvester-Bradley and Trevarthen, (1978:89) refer to the changes occurring during interaction as adaptation. During the following discussions the researcher will explore different avenues in order to conclude eventually why communication can be viewed as an adaptive response as it is underpinned by the developmental processes. In the field of occupational therapy the term adaptive response is well known. However, in a clinical and/or research situation the behaviour of the child, reflecting the response is observed and measured.

The adaptive response refers "to adjustments made by the individual that primarily enhance personal rather than species survival, and secondarily contribute to actualisation of personal potential" (King, 1978:431). These adjustments are made in the ongoing process of interaction with the environment in a continuum from conscious to unconscious behaviour. Environmental events and experiences have both spatial and temporal dimensions that influence function and require adaptations from the individual (Gilfoyle *et al.*, 1990). There is a constant change in the relationship between an individual and his environment and these changes motivate a person to enter into a transactional relationship with the environment which requires the individual to adapt in order to survive (Gilfoyle & Grady, 1983:549; Kielhofner, 1992; Mosey, 1986:8; Nelson, 1988; Sanders, 1976:3; Schkade & Schultz, 1992). Through this adaptation, or change in behaviour to the environmental demands, a person exerts control over the environment, which facilitates the development of further skills. When an infant matures and he begins to move around and experience his environment, he gains more sensory capabilities. These sensory capabilities enable him to gain more sensory

information from the environment. This demands more of the sensory system, which necessitates adaptive behaviour, resulting in further neurological and motor maturation. Thus, the child, by virtue of his own growth and development is instrumental in increasing the demands he experiences for increasingly complex adaptive behaviours, which leads to engagement in goal-directed purposeful experiences (Gilfoyle & Grady, 1983:549; King, 1978; Lenneberg, 1967:178).

2.2.1 Theories on the adaptation process

The occupational therapy profession has postulated some theories on the adaptation process and it is therefore not uncommon for them to link adaptation to the term occupation. Through the following discussions it will also become clear that in a therapeutic intervention situation adaptation should be closely related to activities or occupations, for an individual's performance to change. Four theories that have similarity with the two constructs of adaptation and occupation will be reviewed so that a model can be proposed from a combination of their data. These theories are the theory of spatiotemporal adaptation (Gilfoyle, Grady & Moore, 1981; Gilfoyle *et al.,* 1990); a model of adaptation through occupation (Reed, 1984); the Model of Human Occupation (Kielhofner & Burke, 1980); and the occupational adaptation framework (Schkade & Schultz, 1992).

2.2.1.1 The spatiotemporal adaptation model

Gilfoyle *et al.* (1981, 1990) focus on sensorimotor adaptations essential for functional skills. There is a direct link between sensorimotor development and communication development (Uys, 1997) and it is therefore important to review this model. They view the environment as primary stimulus for developing skills necessary for performing within a specific context. Spatiotemporal adaptation is a process by which the child discovers and absorbs information from the environment and it has a developmental sequence and matures with the alteration or modification of performance. The spatiotemporal adaptation is, therefore, a process of continual interactions among growth, maturation, development and environmental transactions. This theory is underpinned by four components, namely assimilation and accommodation (similar to Piaget's cognitive development), association and differentiation.

Association is seen as the organised process of relating the sensory information with the motor act and of relating present and past experiences with each other. Differentiation is the process of discriminating between the essential elements of a specific behaviour that are pertinent to a given situation, and distinguishing those that are not pertinent, thereby modifying or altering the behaviour in some way. Association and differentiation form an integral part of sensory feedback that occurs in time and space of the environment. Adaptation is presented in a spiral-like developmental phenomenon progressing from primitive to mature neurological responses. Three principles are specified by the spiralling continuum, namely a) adaptation to new experiences is dependent upon past acquired functions; b) during the integration of past functions with the actions of new experiences, past functions are modified in some way, resulting in higher level, more mature functions; c) the integration of higher level functions influences and increases the maturity of lower level functions. Thus spiralling implies that a child does not acquire totally new functions, but rather functions that are modifications of older lower level responses

2.2.1.2 The model of adaptation through occupation

Reed (1984) described her model as adaptation through the occupational process in a social setting for work and play. Through the use of purposeful activity or occupation a person can positively influence the achievement of adaptive responses and so minimise their loss. Purposeful activity is defined as goal-directed behaviours of tasks that the individual considers meaningful (American Occupational Therapy Association, 1997). Reed stated that adaptation occurs when the sensorimotor system integrates with the cognitive, psychological, and social systems and when the activity is successful in meeting the demands of the physical, bio-psychological or socio-cultural environment. Individuals need skills in each of the performance areas, namely motor, sensory, cognitive, intra- and interpersonal, for adaptation to occur. She sees the environment as either facilitatory or a hindrance to adaptation. A facilitatory environment is the social institutions in which people work, play and interact towards common goals of the individual. When the environment is a hindrance it becomes a non-optimal learning situation for occupational adaptation and separates people from a community. Occupational adaptation requires that the total person is involved in the planning, implementation and feedback to the maximum degree in which he is able to participate. Her

model is based on the assumption that a person adapts through the use of various occupations and it can be said that a person may adapt to the environment or adapt the environment to the person. Reed (1984) specified that adaptation could occur internally, as well as externally and the response (behaviour) can be adaptive, maladaptive or nonadaptive.

2.2.1.3 The model of human occupation

Kielhofner and Burke (1980) describe adaptation as a global construct with two subcategories, namely occupational function and dysfunction. They emphasise that adaptation is dependent upon personal satisfaction and satisfaction on the demand put forward by the environment, which is divided into objects, tasks (e.g. play), social groups and culture.

The model of human occupation seeks to explain the occupational functioning of persons. It focuses on the person's characteristics, as well as the environment as factors that influence his choices and behaviour (Kielhofner, 1992). Kielhofner and Burke (1980) proposed that occupational performance is the outcome of the interaction between a person and his unique environment. The model stresses that a person is motivated to master, to be in control and to be effective. The concept is incorporated that a person's knowledge of himself and his experiences influences his decisions. The human system is composed of three hierarchical subsystems, namely volition, habituation and performance. Volition is responsible for decisions to engage in occupations and include personal causation (beliefs about one's effectiveness), interests (disposition to find pleasure or satisfaction in occupation) and values (internal ideas about right and wrong). Habituation is responsible for maintaining patterns and routines of behaviour and includes roles (images of what positions they occupy in different social groups) and habits (images that trigger routine performances in everyday life). Performance is responsible for the direct production of behaviour and includes perceptual motor skills to select and interpret sensory information and effect co-ordinated purposeful movement, process skills such as problem-solving and lastly communication/interaction skills.

2.2.1.4 The occupational adaptation framework

This framework proposed by Schkade and Schultz (1992) gives equal importance to three

occupational adaptation elements, namely the environment, the person, and the interaction between them. The person has a desire for mastery, which results in a challenge to his skills. The environment is the demand for mastery from the person and the interaction between these two elements results in press or drive for mastery. This notion of press for mastery is included in the developmental literature, particularly that of Piaget (Flavell, 1977) and the therapist emerges as an essential facilitator between the person and the environment. Occupations are viewed as activities (e.g. play), which provide active participation, are meaningful to a person, provide a product and are an interaction for the person and the environment. Adaptation is a change in the person's functional state (including the sensorimotor, cognitive, and psycho-social systems) as a result of movement toward relative mastery over challenges put forward. The person uses three subsystems to generate, evaluate, and integrate the responses to these challenges. This framework is normative, process-based, non-hierarchical, and non-stage specific. This is an open loop where the feedback following an event influences the subsequent input.

From the above description of theories and models on adaptation and the adaptive response, it is evident that there is agreement about the importance of adaptive behaviour. Different approaches in the field do, however, lead to expansion and enhancement, ultimately presenting a broader view of factors influencing the development of adaptive behaviour. All the main features of these adaptation models should thus be integrated in a model for the description and explanation of communication behaviour as an adaptive response.

The important issues derived from these occupational therapy models of adaptation, which are applicable to the adaptation process that takes place in the development of communication-related behaviours, are the following:

- Interaction takes place between a person and the environment through the use of purposeful activities or occupations.
- Adaptation is a change observed in the person's performance, dependent on an integrated modification in all developmental domains.
- Feedback plays an important role in the adaptation process.
- Adaptation is also a process of relating present and past experiences to each other

and presents as a spiral-like developmental phenomenon where the integration of higher level functions influences the maturation of lower level functions – causing modification or change.

- An individual develops in a social context where people interact within certain cultural beliefs and norms.
- The assumption is made that people want to master, control and be effective in their environment (Kielhofner & Burke, 1980).
- The influence of distress on the adaptation process can give rise to maladaptation or disadaptation (Kielhofner, 1992:159; Reed & Sanderson, 1992:54).

2.2.2 A model for the development of adaptive behaviour with regard to communication- related skills

The above-mentioned models all stem from an occupational therapy perspective, but there are no similar structures to describe adaptation in relation to communication skills development. A model is proposed to indicate the critical areas in the development of an adaptive response with regard to communication-related behaviours.

According to various authors (Bruner, 1983; Kielhofner & Burke, 1980; Csikszentmihalyi, 1990), a person is motivated to be the master in control of his environment. It is thus important for the interventionist to analyse how to achieve mastery during intervention. Three fundamental elements are thus considered in the proposed model, namely 1) the person, 2) the external environment, and 3) the interaction that occurs between the previously mentioned two elements. The interventionist has specific challenges to meet in order to ensure that a child obtains mastery over the environment. For successful activity participation the demands or challenges inherent in the activity should meet the abilities of the child. These demands should not be too high, as this causes anxiety, and subsequently, withdrawal. The therapist should, however, press or push for mastery, ensuring that development will occur, thus being the facilitator of interaction between the external environment and the child. This is particularly true in the case of communication-related behaviours.

The following schematical model is proposed as a model of adaptation for communication-related skills.

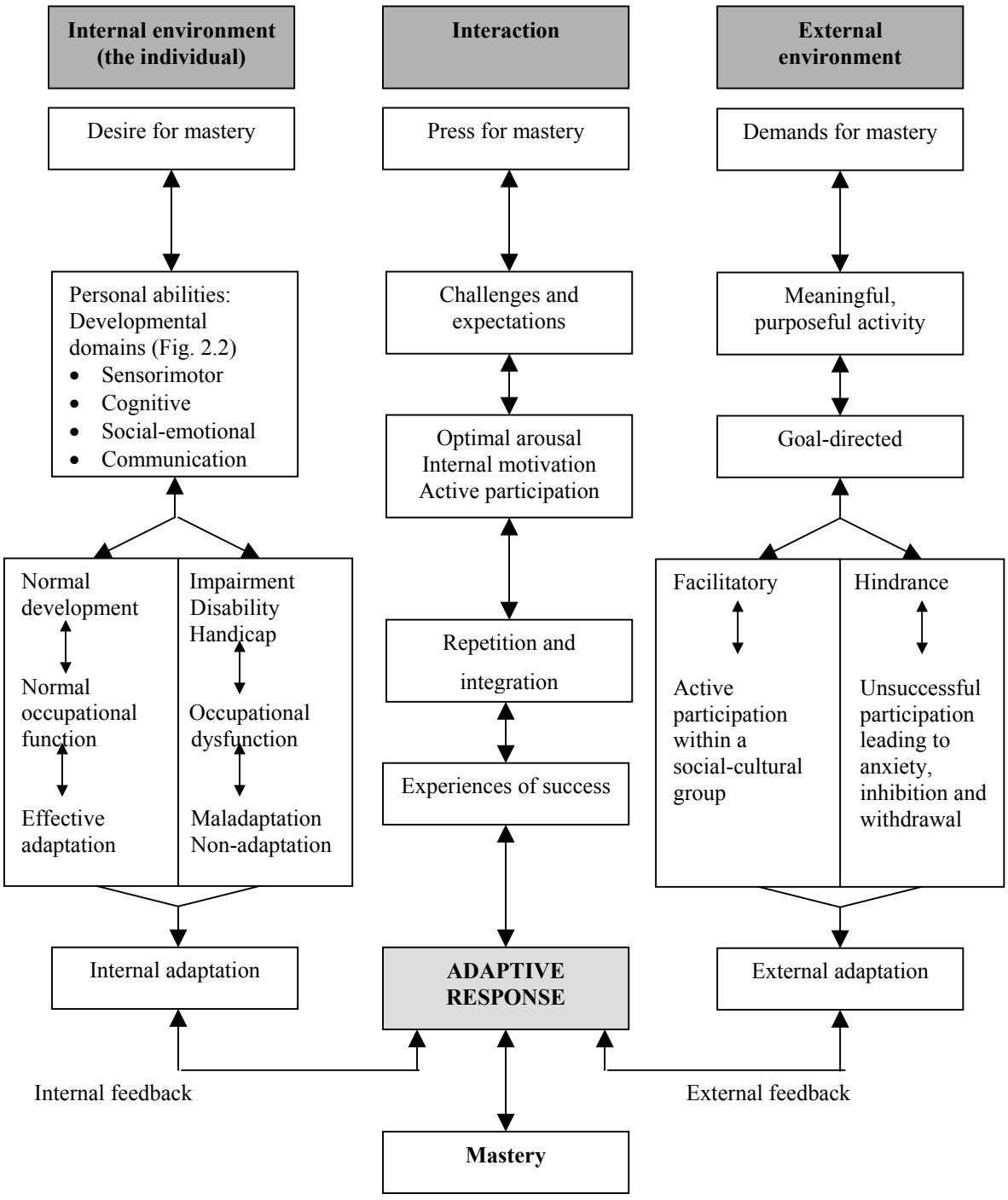


Figure 2.1 Model for the development of adaptive communication behaviour

In Figure 2.1 it is obvious that this model is an open-loop system, not hierarchical, and is based on the process and the interaction between the person and the environment. It is based on a feedback-feedforward system. Like Schkade and Schultz (1992), equal importance is given to the person, the environment and the interaction between them, thereby implying the importance of the therapist as the facilitator of the adaptation process in the child with disability. People fundamentally exist in social groups and these groups create opportunities for action and interaction (Uys, 1999). In the discussion of this model, the three fundamental elements will be concentrated on, namely the person, then the external environment, and lastly the interaction between the two. This model explains the normal developmental process, but as the aim of this research is the validation of a play package for the facilitation of communication-related behaviours (thus intervention founded on the premise that communication behaviours are an adaptive response), attention will be paid to the elimination of non-adaptation and maladaptation and the facilitation of an adaptive response.

2.2.2.1 The influence of the individual's abilities on the adaptation response

The function of internal systems influences a person's desire for mastery and consequently his internal adaptation and occupational performance (See Fig. 2.1). These systems are related to the child's developmental domains, namely sensorimotor, cognitive, social-emotional and communication. The child's developmental capabilities have an integral influence on the demands of the activity and the environment and it is therefore important to have equal weighting on the external as well as the internal adaptation process. Personal capabilities include the internal skills of sensorimotor, cognitive, socio-emotional, and communication. The child brings his own strengths, weaknesses, goals and interests to a therapeutic situation. Because play is the child's occupation (Gunn, 1975:222), his main goal would be enjoyment from a therapeutic session and his desire for mastery would occur during play.

Kielhofner (1992) stated that a child with central nervous system damage experiences distress in relation to environmental challenges. Distress interferes with all aspects of adaptation including assimilation, accommodation and association. These children are unable to use or adapt learnt behavioural responses toward sensory information and environmental demands. They are unable to initiate new responses to environmental demands, thus negating the

process of differentiation and integration. Children without developmental delays are able to modify their behaviour, thereby expanding their repertoire of problem-solving skills. Developmentally delayed children are not able to modify their behaviour, therefore they are unable to move to higher-level functions. They persistently use primitive functions and these non-adaptive strategies interfere with the adaptation process. It manifests in distortion or absence of sensorimotor and play behaviours. Reed and Sanderson (1992) stated that disadaptation occurs when there is failure to organise and respond due to confusion or disorientation, which fail to bring the person into harmony with the social or physical environment. Maladaptation occurs when there is incorrectly organised information to a response that does not meet the demands of the situation and its behaviours. It is also the inability of the individual to develop patterns of behaviour which make for success in the environment. She proposed that disadaptation and maladaptation are due to reduced or missing sensory input.

Changes (adaptation) occur as a continuum from conscious learning and doing, through non-conscious action, to adoption of unconscious habit as mastery develops – therefore adaptation occurs through active participation. In her development of a psychosocial theory, Mosey (1986) postulated that adaptation occurs in each skill area (e.g. perceptual motor, cognitive, and group interaction) in a developmental sequence and that these are dependent on and related to each other. It could therefore be postulated that through the process of adaptation, a person actively participates in activities, organising and integrating incoming stimuli from the environment, repeating the activity due to the success he experiences and therefore the ultimate objective is reached – mastery or the experience of an adaptive response. When illness or disability compromises these skills, adaptation is threatened and maladaptive function follows.

With regard to communication as an adaptive response, it is evident that an interrelated process of various developmental domains should occur to facilitate competency in communication. A deficit in one area will influence this development. Figure 2.2 provides a schematic presentation of how different developmental domains should be able to adapt to internal and external demands to ensure the development of communication as an adaptive response.

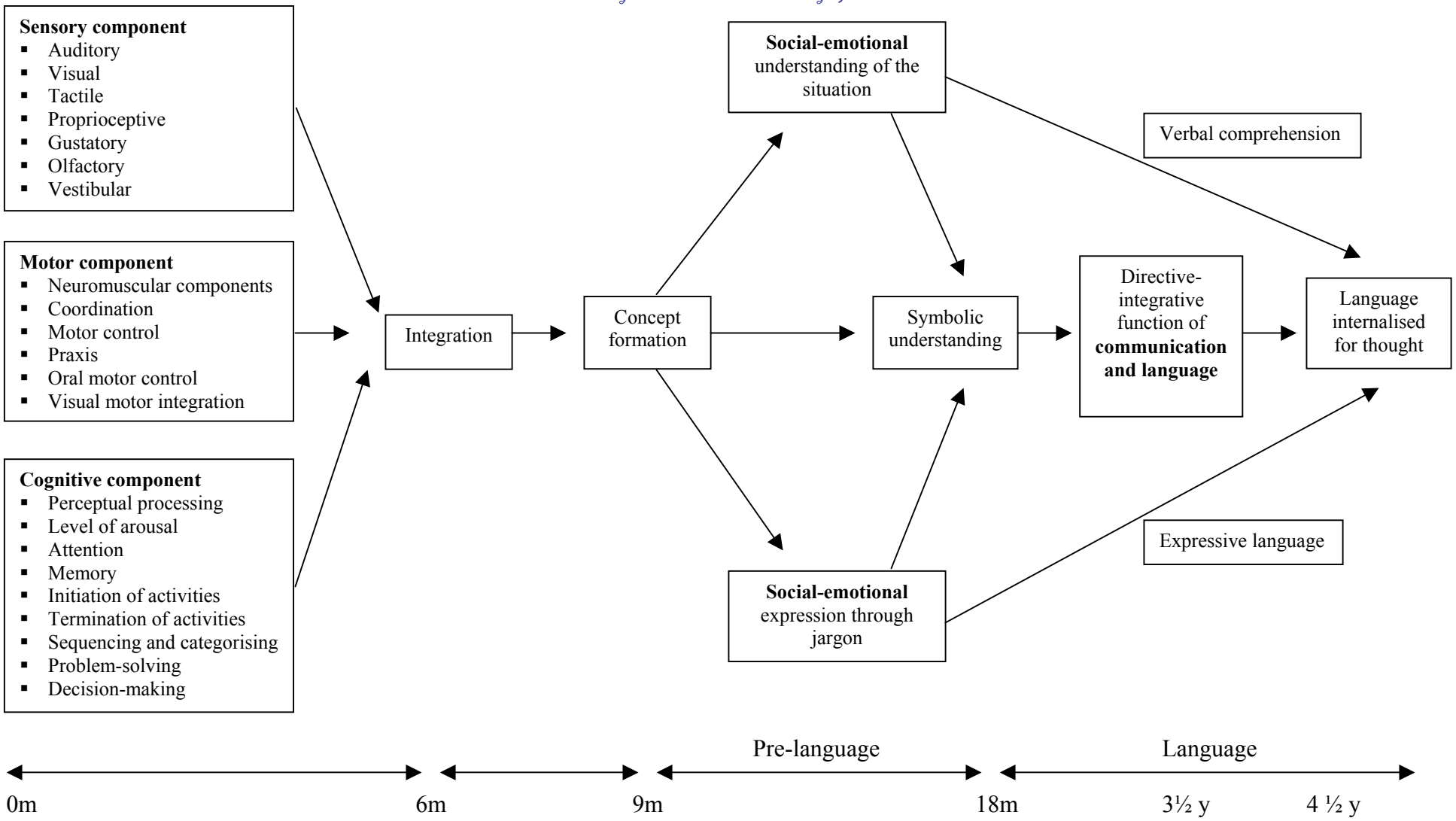


Figure 2.2 **Integration of the sensory, motor, cognitive and social-emotional domains in the development of communication.** (Adapted from Cooper, Moodley, & Reynell, 1978)

In Figure 2.2 the interrelatedness of developmental domains is evident. Sensory, motor, cognitive and social-emotional domains have to perform as a unit to facilitate intra- and interpersonal adaptation. A child has to integrate information from all the domains to perform effectively in a social context. A deficit in one domain has a direct influence on the other domains with subsequent impact and the ultimate occurrence of developmental delays.

2.2.2.2 The influence of the external environment on the adaptive response

External adaptation involves the demands for mastery (See Fig. 2.1). There should be a close relationship between the challenges inherent in the activity and the person's skills. It is therefore clear that the environment should be structured to meet the abilities of the person for him to experience success. If the challenges are too high or too low the child will withdraw as anxiety is experienced (Csikszentmihalyi, 1990). Structuring of activities include the physical accessibility of toys as well as the accessibility of the way in which the activity is presented to the child – especially the child with special needs. He should be able to actively participate through purposeful and meaningful activities with people, tasks (play), in social settings, which are specific to his culture. These activities should be goal-directed from an intervention point of view to make it purposeful for the therapist as well, as her goal would be to enhance development. If there is a hindrance in the environment where activities are not modified to ensure access for the child, he will experience anxiety and therefore the challenge cannot be met, resulting in the external adaptation process being delayed or interrupted. This could also lead to maladaptation or disadaptation. When the environment is facilitative the impact the environment has on the person contributes to an adaptive response.

2.2.2.3 The influence of the interaction between the internal and external environments on the adaptive response

Interaction between the person and the environment implies the press for mastery – ideally to create a match between the desire for mastery and the demand for mastery. Interaction through actively doing or participating in activities is the pivotal point for adaptation to occur. The responsibility of the therapist is to ensure effective interaction. The therapist plans intervention by expecting specific outcomes from the child. In other words, the therapist

expects the child to participate successfully during intervention, therefore the expectations should not be too high or too low. She challenges the child's abilities and presses for the improvement of behaviours indicative of development. When the child responds to stimuli from the external environment (e.g. a play activity), he has to use his internal abilities (systems) to interpret, integrate and organise the stimuli, to give meaning to it and to respond accordingly. When his response is effective, an adaptation response has occurred and he receives positive feedback from the external environment either through the activity itself or through interaction with the therapist, as well as from his own internal experiences. This internal experience creates satisfaction, which increases self-esteem (Csikszentmihalyi, 1990). When the child experiences an effective adaptive response, he experiences mastery. Mastery, according to Schultz and Schkade (1992:921), could be described as a sense of satisfaction, effectiveness and efficiency. Satisfaction occurs when there is a challenge from a clear structured activity, which facilitates attention from the child and where the child experiences a feeling of choice in a supportive environment. Mastery is preceded by the child's experience of enjoyment from an activity, which motivates him to ensure active participation. Through active participation in a purposeful and enjoyable activity the child repeats the actions and learning of new skills occurs.

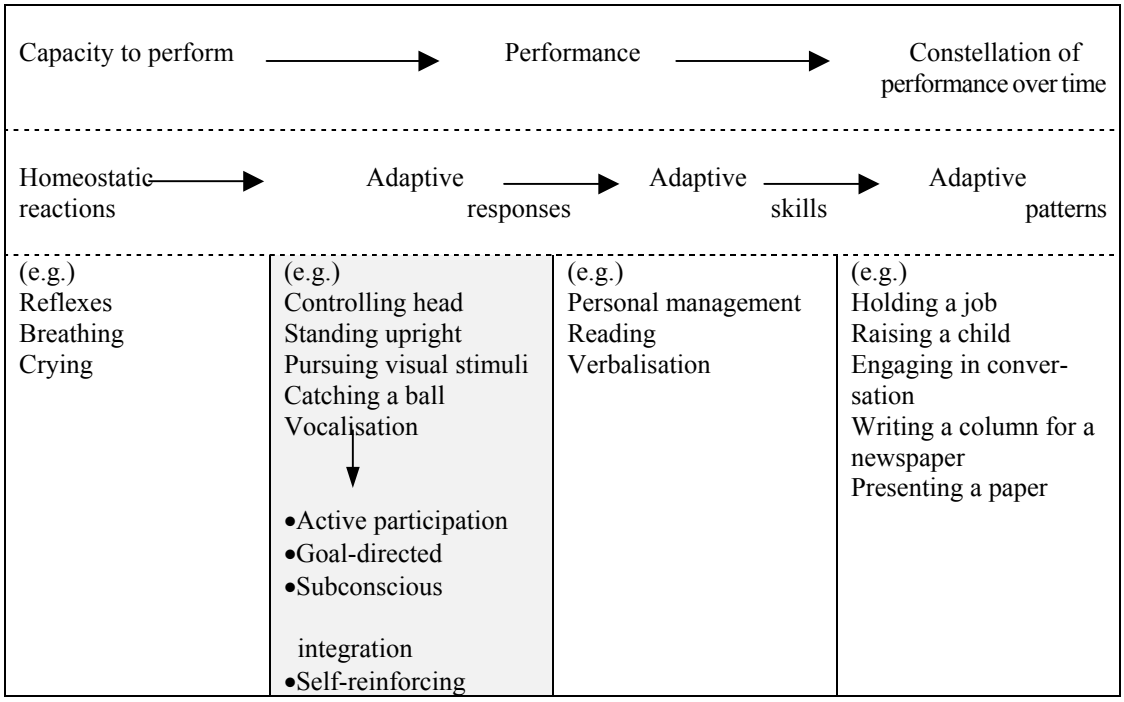
From the above description and explanation of the model (See Fig. 2.1), it is clear that the adaptive response develops when there is a match between the child's desire for mastery (depending on his personal abilities) and the environmental demands for mastery (the external challenges), through interaction (the press for mastery). The development of this adaptive response thus leads to further emergence of skills.

This process, and especially the characteristics of the adaptive response, supports King's (1978) research on the components of the adaptive response, which can be integrated into the adaptation continuum of development as proposed by Kleinman and Bulckley (1982).

2.2.3 The adaptation continuum

The adaptation continuum has to be reviewed in order to see where the adaptive response fits

in. For the purpose of this research specific attention will be paid to the adaptive response phase, as this phase requires exploration leading to mastery of adaptive skills. To explain where the adaptive response fits into the continuum of development, the model of Kleinman and Bulkley (1982) is reviewed. They postulated an adaptation continuum that places the adaptive response in a sequential and interdependent relationship to human responses that serve an adaptive function. These authors also acknowledge the human being as developing to gain maturity in adulthood. The adaptation continuum, as a conceptual tool for analysis, is illustrated in Figure 2.3.



(Adapted from Kleinman & Bulkley, 1982)

Figure 2.3 Adaptation continuum

Figure 2.3 suggests a spiralling continuum of development, where an infant does not have the full range of responses immediately, but gathers information into adulthood. Kleinman and Bulkley (1982) included four categories in the adaptation continuum, namely: homeostatic reactions, adaptive responses, adaptive skills and adaptive patterns. The concept *homeostatic reactions* are derived from the work of Dubos (1978), who defined these reactions as externally evoked and involuntary. Mechanical and physiological responses of the body, such as reflexes and autonomic nervous system responses are indicative of homeostatic reactions. Trombly (1995:962) refers to these reactions as developed capacities, which are gained through maturation, and learning of biologically-based capacities. *Adaptive responses* are

explained in terms of four features according to King (1978).

i) Firstly that a person should actively participate in or toward the environment, which demands a positive role of him. In doing this "he is acting and, not being acted upon" (King, 1978:432). This concept is clearly illustrated in Figure 2.1 where the interaction between the child and the external environment enhances active participation.

ii) Secondly, an adaptive response is goal-directed and is called forth by the demands of the environment. This includes the structuring of the environment and materials in such a way as to call forth a specific adaptive response. Therapists use goal-oriented activities during intervention in specially structured environments to facilitate an adaptive response from a person. Again, this forms part of the interaction element of the development of an adaptive response (See Figure 2.1).

iii) Thirdly the response is "most efficiently organized subcortically… (when)…attention to a task or an object permits the subconscious centers to integrate and organize a response" (King, 1978:432). The therapist should select purposeful activities which demand or pose certain challenges to the child. When a child focuses all his attention on a task, he does not focus on the organisation and integration of the different skill areas in order to accomplish the task, but rather the organisation of the sensory input and motor output is handled on a subcortical level.

iv) The fourth characteristic of the adaptive response is that of self-reinforcement. As the saying goes "nothing succeeds like success". This is also important in order to motivate a child to prolong interaction in activity participation, which brings repetition of certain skills and therefore mastery of environmental demands. The importance of the correct selection of activities is evident; otherwise no effective interaction will occur to facilitate an adaptive response.

Adaptive skills are defined, as those abilities required through combination and repetition of adaptive responses. Adaptive responses and adaptive skills constitute the performance area, which is similar to function. When therapists use the term function, they refer to the occupational performance of persons who lack the ability to perform an action or activity considered necessary for their daily lives (American Occupational Therapy Association, 1995: 1019). Finally, *adaptive patterns* are more complex than the previous categories and include

constellations such as engaging in conversation. The model in Figure 2.3 assumes that performance depends on capacity to perform, that adaptive skills stem from adaptive responses, and that constellations of performance are made up of adaptive skills. This underpins the concept of the spatiotemporal adaptation model of Gilfoyle and Grady (1983:552), who regarded adaptation as the foundation of more complex behaviour, developing as a spiralling continuum.

During the homeostatic reaction as well as the adaptive response phase, the child interacts with his environment due to curiosity and exploration in order to gain mastery, which enables him to achieve goals in society during the adaptive skill and adaptive pattern phases. Missiuna and Pollock (1991:883) stated that through exploration a child learns about the characteristics of objects, how to make decisions, understand cause-effect relationships, consequences and social skills. As these are all requisites for the development of communication, the importance of the homeostatic as well as the adaptive response phase in the developmental process of a child should not be underestimated.

Piaget's (1978) theory of intellectual development is regarded as one of the cornerstones in the field of childhood development. According to him (Berko Gleason, 1993:48) sensorimotor intellectual development, or pre-linguistic development, culminates in the development of thought. Piaget (1951) identified the first stage of development as the sensorimotor stage. He stated that during this stage, thought, in the shape of sensorimotor intelligence, begins its development. Through participation in activities with communicatively mature persons, the child acquires sensory feedback, constantly building a vocabulary of experiences. Thus, there is an integral relationship between these two developmental modalities. During the sensorimotor phase the child actively engages with the environment, constantly building a vocabulary of sense experiences. The communication development progresses from the use of signals to the use of signs (Morehead & Morehead, 1974). Firstly, the child learns to respond to an indicator or a signal, which elicits a reaction. Then he learns to assimilate certain motor actions in certain situations, acting upon them in a particular way each time. This development constitutes an early form of pre-representation. True representational skills develop at a later stage when the child begins to use single words to represent an object or its use. Finally, he uses signs, which denote thought about an entity

or event. This description correlates with the adaptation process proposed earlier. It is therefore not difficult to understand why Sanders postulated that communication is also adaptive behaviour (Sanders, 1976:17). He continues to state that adaptive communication behaviour is motoric, as various forms of communication involve the motor system.

From this discussion it seems clear that communication does not stand alone in its development. It is a multimodal process where all modalities are involved in order to ensure efficacy. Research done by Uys (1997) led her to conclude that sensorimotor and cognitive skills are more basic than those of communication, which is a higher-level function as communication skills are the most difficult ones for the child to develop.

Whereas communication is regarded as an adaptive response in the normal child, the thesis is put forward that in the child with severe disabilities communication is seen as either an interrupted, delayed or maladaptive response and thus it is necessary to study the communication process, especially in the child with developmental disabilities.

2.3 COMMUNICATION AS AN INTEGRATED ADAPTIVE RESPONSE

"Communication is the essence of human life" (Light, 1997:61). This statement forces us to investigate what communication is, how communication develops and which internal and external factors could influence communication. Communication is the transmission of messages from one individual to another, via gestural, signed, spoken, and/or written means. Although communication is a complex phenomenon not yet fully understood (Fuller & Lloyd, 1997), there are various theories that could assist us in understanding the acquisition of language.

2.3.1 Theories on communication development

In the field of language acquisition a number of theories have been put forward. It is, however, evident that these theories include a variety of factors applicable to communication development. This is because language is a symbol system used as a vehicle for communication. Communication includes, among other things writing, speech, gestures,

facial expressions, body language, and physical contact (Orelove & Sobsey, 1992: 299). In this case these theories will be discussed as theories of communication development. In an attempt to discover the process that occurs when children learn language, numerous theories regarding language acquisition have evolved over time and in synchrony with popular notions regarding child development and adult/caregiver interaction. The most influential theoretical explanations regarding communication acquisition and development will be reviewed. These include the nativist, behavioural, cognitive and interactive theories.

2.3.1.1 Nativist theory

The nativist theory asserts that a biological basis for development exists as revealed by the notion that neonatal responses to human stimuli are inborn and function as a mechanism for survival. According to this theory infants are born with an innate and unusually advanced responsiveness to humans. The task of the caregiver lies in ensuring that development occurs by being an active agent in the developmental process. This can be achieved by modelling correct sentences so that the child can develop hypotheses about the rules that govern language. The role of the adult is, however, viewed as secondary to the biological mechanism within the infant. Learning of language is viewed as an inherent process and therefore this theory is relatively pessimistic about the contribution that can be made by social agents in the developmental process (Price & Bochner, 1991). Justification for this theory of language acquisition lies in the fact that most children master the essentials of language, which is a complex task, before the age of four or five. In addition, the universal development of early language patterns also provides added ground for the credibility of this theory.

2.3.1.2 Behaviourist theory

In contrast to the relatively passive role attributed to caregivers by nativist theorists, behaviourists assume a more positive view of the contribution made by adults to the developmental process.

One of the most cited behavioural theorists, namely Skinner (1957), explained language development in terms of the operant model of learning. According to this view, infants learn

to talk by being rewarded or reinforced by mothers or caregivers for vocalisations that often appear to be produced spontaneously.

In contrast to the nativist viewpoint previously described, the behaviourists see the contribution of environmental influences and the role of mother-child interaction as important factors in child learning. This role is viewed both in relation to the pairing of responses and rewards to reinforce desirable behaviour and in relation to modelling and shaping behaviours by appropriate stimulus reinforcement. This critical role attributed to the caregiver as a reinforcing agent has important implications for early communication intervention (Price & Bochner, 1991).

2.3.1.3 Cognitive theory

The cognitive theory proposes the notion that developmental change occurs when the infant's knowledge about an entity or event is challenged or when he encounters something that is inconsistent with his previous experience and knowledge. This situation is termed "disequilibrium" by Piaget (1978). Children are viewed as having the ability to modify or adapt the concept that they hold so that they can "accommodate" this new knowledge into the relevant concept. A cognitive process occurs which involves taking in new information and integrating it into existing knowledge so that cognitive development takes place.

Language, according to Piaget (1978), provides a symbolic system by which children can represent what they know at times when actual objects or events are absent. So, according to this view of early development, children's knowledge of the world emanates from their experiences and language provides a means of representing what is known. According to the cognitive theory acquisition and absorption of new information into previously acquired knowledge are processes which children have to experience for themselves. Piaget's stages of cognitive development also highlight the simultaneous acquisition of communication skills. Adults can, however, play a facilitative role, by encouraging children to attend to relevant aspects of an event. The contribution by adults can make to the infant's cognitive development is seen as essentially limited (Piaget, 1978).

2.3.1.4 Interactive theory

Whereas the behaviourists are primarily concerned with the provision of rewards for language production, the interactive theorists place value on the contribution of caregivers to the early development of cognition and language (Bruner, 1983; McLean & Snyder-McLean, 1978; Sameroff, 1975; Vygotsky, 1962).

The contribution of social experiences, especially between adults and children, to the process of developmental change was of primary interest to Vygotsky (1962) who stated that developmental change occurs as a result of "tutoring" or "scaffolding" by a more experienced or knowledgeable person. Significant members of a child's family can have as much influence upon the developmental process as factors internal to the child (Sameroff, 1975). This idea of a mutually interactive process underlying development is also evident in McLean and Snyders-McLean's (1978) "transactional" model of language development. This model suggests that infants must enter into a language-learning partnership with mature language users. They provide support and guidance for the language-learning process. Various programmes have been developed on the principles of the interactive model. These programmes include the Ecological Communication Organization Program (MacDonald & Carroll, 1992), the Transactional Intervention Program (Mahoney & Powell, 1986) and the Hanen Early Language Parent Program (Girolametto, 1988). The principles included in these programmes are universal in that they support young beginning communicators. The principles of the interactive model are summarised by Beukelman and Mirenda (1998) as follows:

- *Be child orientated*: Respond to the child's focus of attention, follow his lead, match his style and abilities, organise the environment to promote communication, and maintain face-to-face interaction with a positive affect.
- *Promote interaction*: Take one turn at a time, wait with anticipation, signal for turns, and decrease directiveness.
- *Model language*: Comment on the ongoing activity; use contingent labelling; use repetition and short simple utterances; and expand or extend the child's turn. Caregivers are encouraged to facilitate communication during natural routines and activities.

In summary, each of the above theories has contributed to the understanding of the factors that underlie the development of communication. The theories vary in the type of processes identified as significant for the acquisition of new skills. The nativist theory asserts that learning of language is an inherent process, while the behaviourist theory believes that language is learnt due to the rewards and reinforcements by mothers or caregivers. The cognitive theory proposes that a child can adapt incoming information into existing knowledge, thereby enhancing cognitive development as well as communication development. The interactive theory acknowledges and sees socialisation as playing an inherent role in language acquisition. Interaction is therefore accepted as pivotal in the language acquisition process.

Communication interaction is seen as a multidimensional, multichannel phenomenon, implying that communication interaction depends on the convergence of cognitive, affective and linguistic processes rather than being a skill that emerges independently (Bricker & Carlson, 1981:477; Miller, Chapman, Branston, & Reichle, 1980).

Communication is influenced by various factors. The study of childhood development incorporates knowledge of the systems inherent in the developmental aspects. It is important to view the child holistically, as an evolving human being. None of the developmental skills develop in isolation, but rather in an integrative and interdependent manner. Apart from inherent factors, external environmental factors, such as people, materials and equipment available to the child, also have a crucial influence on development.

It is from this review of the theories on communication development that parallels can be drawn between communication and adaptive behaviour as described in the Model for the development of adaptive communication behaviours (See Fig. 2.1). In both instances the inherent abilities of the person, the challenges of the environment and the interaction between the two reflect the "adjustments made by the individual…that contribute to actualisation of personal potential" (King, 1978:431), namely the adaptive response. Another link between the adaptive response and communication behaviour is found in their dependence on the balanced interaction between the person's desire for mastery and the environmental demands for mastery. Furthermore, indications of corresponding developmental domains influencing

communication-related behaviours emerge, namely the sensorimotor, cognitive, social-emotional and communication domains.

Figure 2.4 illustrates the interrelatedness of the developmental domains with and in communication development.

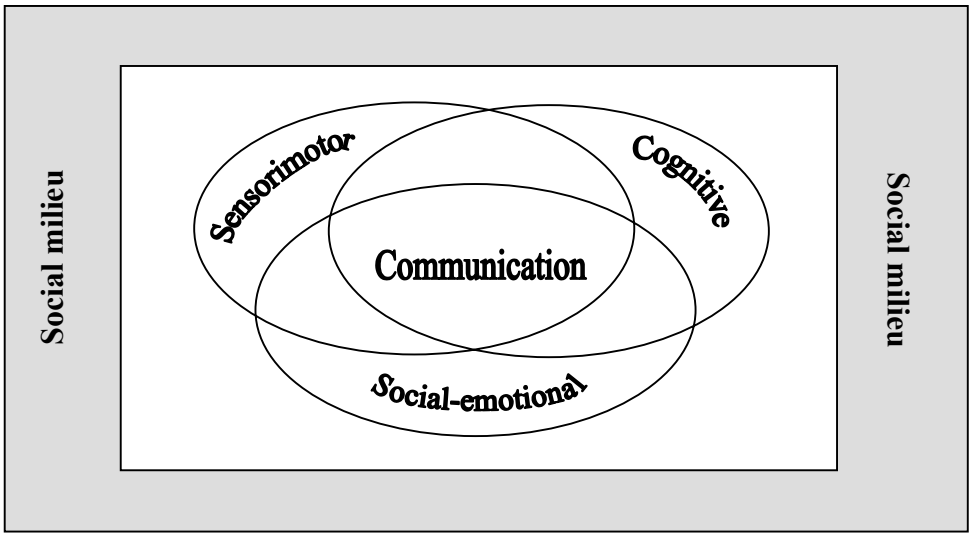


Figure 2.4 Interrelatedness of developmental domains

This figure underlines the bio-psycho-social (Mosey, 1974) involvement of communicative competency. Each of the developmental areas is of equal importance, namely sensorimotor, cognitive and social-emotional and all these skills develop in a social context where activities, tasks, social groups and cultures are involved. To be competent in communication, the skills of each area are needed, but as competency does not indicate total mastery, each area could be involved to a greater or lesser degree. It is, however, important to investigate constructs (Guralnick & Neville, 1997; Linder, 1993; Lloyd, Fuller, & Arvidson, 1997) involved in the areas of communication (See Table 2.1), in order to be able to facilitate an adaptive response

and to be able to evaluate it effectively.

Table 2.1 Constructs of communication development

Construct	Elements related to the construct
Receptive skills	- Understanding instructions: single words, short sentences or complex sentences - Understanding linguistic codes: pictures or gestures
Expressive skills (Modes)	- Common gestures - Pointing - Head-shaking - Imitation - Eye-blinking - Vocalisation - Verbalisation: words or short sentences
Expressive skills (Functions)	- Requesting interaction - Requesting action - Requesting objects - Protesting - Commenting
Discourse skills	- Initiating by drawing attention to self, introducing a new topic, requesting, and terminating interactions - Maintaining interaction by showing an interest in the topic and maintaining attention in the topic - Turn-taking by volunteering new information, requesting, joint attention, awareness
Interaction skills	- Indicating needs and wants by indicating a preference or requesting - Social closeness: eye contact, enjoyment, attention, active participation, greet partners, show of sensitivity for partners - Information transfer
Specific communication skills	- Requesting: objects, information, people, and social routine - Choice-making - Protesting - Self-expression

From Table 2.1 it is evident that the development of communication is subjected to specific internal and external factors. In the following section sensorimotor, cognitive, and psychosocial skills will be reviewed more closely. Although these factors are discussed as single constructs for the sake of comprehensiveness it is unnatural, as a developing child integrates all these constructs simultaneously to gain mastery.

If a child has been diagnosed with severe disability it implies, per definition, that his problems are multiple, including dysfunctions on a cognitive, communicative, and physical level (Wallace, Biehl, Taft & Oglesby, 1987), meaning that all of the above-mentioned factors, which also influence communication, will be affected to a greater or lesser extent.

2.3.2 Developmental domains in communication-related behaviours

2.3.2.1 Sensorimotor skills

Communication is generally considered to be intentional and involves social interaction (Blischak, Lloyd, & Fuller, 1997). For competency or mastery in communication the simultaneous development of different modalities are required. These include sensorimotor, cognitive, as well as psychosocial development. It could be said that communication is the end-product or end-result of a continuing developmental process of more basic skills (Uys, 1997) and therefore it is important to review internal and external factors influencing communication.

Communication forms an integral part of the development of basic skills and it is therefore important to evaluate the influence of the different skills on the development of communication. Sanders (1976) states that maturation of both the physical system and the nervous system is extremely important to the development of communication. The term physical system could also be described as the sensory and motor systems, which are intimately linked within the nervous system. Many refer to these systems as the sensorimotor system (Moore, 1980; Weeks & Ewer-Jones, 1983). These two systems form a definitive network through which an individual experiences and acts on the environment. Various authors acknowledge these systems as the foundation of developmental experiences (Rogers & D'Eugenio, 1981).

The sensory system forms an integral link between the individual and the environment, where all incoming stimuli are received and interpreted, creating maps of oneself and of the environment. The motor system uses these maps to plan, organise and execute movements in

response to environmental demands (Dunn, 1991). Sensory experiences are acquired through incoming information from internal conditions as well as the environment. These include touch, movement, body awareness, sound, vision and even the pull of gravity (Klecken-Aker, Brueggeman Green, & Flahive, 1995). The child uses all these sensorimotor experiences in an exploratory fashion in order to learn a variety of different schemes for interacting with objects and persons in the environment. Firstly, exploration expands the child's repertoire of motor behaviour, secondly, it enables him to develop concepts about cause and effect after a motor action has been executed and lastly, to develop motor representations of objects that result in symbolic representation, cognitive thought and language (Uys, 1997:9). Sensorimotor experience thus provides the underlying information, which facilitates the development of perceptual, cognitive, motor, and language relationships (Dunn, 1992:45). Although Dunn mentioned language as a developmental outcome of the sensorimotor experience, the researcher feels that this term should be replaced with the more encompassing term, communication, as all basic developmental modalities contribute to communication as function, be it verbal or non-verbal – language being the vehicle for communication. The underpinnings of the nativist (Price & Bochner, 1991) and interactive theories (McLean & Snyder-McLean, 1978) of language acquisition share this opinion. It is, however, important to investigate major constructs involved in the area of sensorimotor development (See Table 2.2), in order to be able to train and evaluate it effectively.

Table 2.2 Constructs for sensorimotor development

Construct	Elements related to the construct
Sensory skills	- Awareness - Processing - Perceptual processing
Neuro-musculoskeletal skills	- Muscle strength - Muscle tone - Range of motion
Motor skills	- Visual scanning and tracking - Co-ordination: gross and eye-hand - Bilateral integration - Hand function and manipulation - Visual-motor integration - Motor control - Oral-motor control

(The American Occupational Therapy Association, 1999; Linder 1993)

2.3.2.2 Cognitive skills

A child's cognitive activity consists of assimilating external data to internal cognitive-structure units. Through the utilisation of sensorimotor abilities internal and external data are simultaneously accommodated. According to Piaget (Flavell, 1977) this is adapted intelligence.

Flavell (1977:16) states that there are three forms of cognitive functioning, namely adapted intelligence, imitation, and play. He suggests that cognitive functioning shifts between imitation (the child's modelling or copying of other people's behaviour through adaptation and accommodation), and play or self-expressive behaviour (assimilating the outcome).

As the study of the relationship between cognition and language progresses, it becomes clear that the relationship between cognitive and linguistic milestones is an important issue that must be addressed (Waterson & Snow, 1978). Once again, researchers refer back to Piaget's (1951) stages of intellectual development, highlighting the simultaneous acquisition of communication skills. In Table 2.3, Hallet and Proctor (1996:4) provide information on the way the development of communication compares with cognitive development according to Piaget.

Table 2.3 A comparison of age, communication and cognitive development

Age	Communication/speech/ language milestones	Piagetian cognitive stages
Birth	Pre-intentional communication stage, adults interpret reflexes as communication, reflexive crying, vegetative sounds, vowel sounds	Sensorimotor: reflex substage, non-intentional, primary reactions, movement leads to interesting results which the child reproduces by trial and error
3 months	Pre-intentional communication stage, reduced crying and increased cooing, laughter, proto-conversation, differential response to sounds, self-imitation of vocalisations, single syllable CV sound segments, vowels predominate	Sensorimotor: secondary circular reactions, co-ordinates two types of sensory information, connections between actions and results are perceived and the actions are repeated, content dependent memory

Age	Communication/speech/ language milestones	Piagetian cognitive stages
6 months	Pre-intentional communication stage, gives clear signals of communicative interaction, increasingly lingering CV sound segments, vocalisations directed at people, self-imitations of vocalisations, intonational contours	Sensorimotor: co-ordination of secondary circular reactions, simple means-end behaviour, rates of simple associative learning stabilise
9 months	Pre-intentional/intentional communication stage, responds to own name, increases variety of non-reduplicated babbling sounds, CV or CVC syllables, varied intonational contours, coughs, hisses, clicks, intonated jargon	Sensorimotor: object permanence begins to develop (symbolic capacity)
12 months	Conventional communication stage, successive syllables, variety of CV/CVC "sentences", variety of babbling, simple directions understood best when accompanied by gestures, sentence-like intonations, first words	Sensorimotor: further developments in object permanence, intentional means-end behaviour and understanding of causality, experimentation occurs
18 months	Conventional communication stage, variety of consonants, expressive jargon, articulation intelligible 25% of the time, recognises objects by name, identifies some body parts, 50-word vocabulary, early naming, emergence of 2-word combinations.	Sensorimotor: object permanence (symbolic representation), uses images, words or actions to represent objects
24 months	Conventional communication stage, emotionally toned speech, sounds learned: 90% of all vowels and diphthongs, articulation intelligible 60% of the time, 2- to 3-word combinations	Sensorimotor: object permanence (symbolic representation)
3-4 years	Conventional communication stage, sounds learned: p, b. m, phrases and short sentences	Pre-operational: concrete concepts
5-6 years	Sounds learned: n, ng, y, t, d, k, g, f, v, r, th, s, z, ch, j, sh, articulation intelligible 90% of the time, 5 to 6-word sentences	Pre-operational: concrete concepts

Adapted from Hallet and Proctor (1996:4)

The information given in Table 2.3 provides a synopsis of the sequence of normal development. It shows clearly the simultaneous acquisition of communication development and intellectual developmental stages (Piaget, 1951). According to Piaget (Berko Gleason, 1993:48) sensorimotor intellectual development, or pre-linguistic development culminates in the development of thought. Thus the interrelatedness between sensorimotor, cognition and communication development is recognised.

Intrinsic Motivation

Another factor that influences a child's desire to communicate is intrinsic motivation. Intrinsic motivation (the desire for mastery) is strongly associated with effective and efficient learning, and this intrinsic motivation is largely a learned disposition that is, at least in part, shaped by past experiences (Bailey & Wolery, 1994). This motivation drives a child to satisfy deficient needs, e.g. the need to communicate with other people. In the Model of Human Occupation, Kielhofner, Burke and Igi (1980) posed that motivation is an innate, global urge to explore and master the world. A child's behaviour fluctuates between exploration of the environment, to become competent in practised skills, which will ensure achievement. This sequence is repeated often as the child develops.

But before children can be motivated by the urge to explore, they need to have had experiences that allowed them to discover the laws of cause and effect (Arnsten, 1990:463). In his explanation of cognitive motivation, Flavell (1977:19) poses that "a great deal of human mentation, at all developmental levels, is intrinsically rather than extrinsically motivated".

It is, once again, important to investigate constructs involved in the area of cognitive development (See Table 2.4), in order to be able to train and evaluate it effectively.

Table 2.4 Constructs of cognitive development

Construct	Elements related to the construct
Cognitive skills	- Attention and concentration - Cause and effect - Ability to make a choice - Object permanence - Problem-solving - Concept formation - Perceptual skills: identifying objects, shapes, colours and numbers on a two- and three dimensional level - Memory

(The American Occupational Therapy Association, 1999; Linder 1993)

2.3.2.3 Social-emotional skills

Social competence, according to Guralnick and Neville (1997:579), is a dynamic and higher order construct in which other domains such as cognitive, communication, affective, and motor development are integrated. There is considerable evidence to support the idea that the characteristics of the social interaction between a child and a caregiver are related to the child's cognitive development. Clarke-Steward's (1973) research findings suggest that an interactive style characterised by warmth, responsiveness, and social stimulation was related to children's later performance on the Bayley Scale of Mental Development and other indexes of intellectual and social competence. She also found a positive correlation between adult verbal stimulation and the child's ability to comprehend and express language. Another correlation was between the time the caregiver spent with the child, playing with materials and the child's level of cognitive development and complexity of play with objects. These studies indicate that regular and nourishing interaction with other people is vital for a child's social and emotional development.

Physical contact is an important factor in the infant's social development and during therapeutic intervention physical contact could assist the therapist to form an attachment with the child. This form of attachment leads to a trusting relationship. When a young child experiences mistrust it can lead to self-defeating behaviour, a reduced sense of self-esteem, and an inability to deal positively with others (Ambron, 1978:120). Various studies have shown dysfunctional social interaction patterns between that parents and infants with developmental disabilities (Barnard, Bee & Hammond, 1984; Crawford, 1982; Field, 1977; Field, 1979). Factors such as a negative set of expectations, difficulty in understanding communication, and feelings of incompetence, lead to poor caregiver-child interaction (Mitchell, 1987).

Socialisation is the learning process that guides the growth of our social personalities. It is by means of socialisation that we become reasonably acceptable and effective members of our society. Through socialisation children acquire discipline, a sense of responsibility, and the skills and knowledge that allow them to participate in the life of the family and later in the larger group around them, namely pre-school and school. The child has to learn to take into account the demands of others in his social environment. According to Ambron (1978:280)

social relations become richer as play develops.

Understanding the incompetencies, impairments, and even delays in the development of the child with a disability one must always base knowledge on the normal. The above discussions are viewed from the development of persons without any kind of disability. However, the question arises, how these developmental domains influence the child with developmental disabilities and specifically communication-related skills. It is thus important to investigate constructs involved in the area of social-emotional development (See Table 2.5), in order to be able to train and evaluate them effectively.

Table 2.5 Constructs of social-emotional development

Construct	Elements related to the construct
Social-emotional	- Social closeness: eye contact, enjoyment, active participation, greets partners and understands humour - Shows sensitivity for partners - Separation anxiety

(Ambron, 1978; Linder, 1993)

From the previous discussions it is evident that the development of communication is an interrelated process of various developmental domains to become competent in communication and language. The identification of constructs in each developmental domain is necessary in planning an intervention programme with appropriate goals. A deficit in one domain will influence the process of development.

2.4 CHILDREN WITH DEVELOPMENTAL DISABILITIES

A developmental disability results from any condition, trauma, deprivation or disease that interrupts or delays the sequence and rate of normal growth, development, and maturation (Gilfoyle & Grady, 1983:565). The resulting interference in sensorimotor processing further compromises the individual's ability to adapt and therefore to develop. As seen from previous discussions, there is a relationship between the sensorimotor system, the nervous system, environmental stimuli and adaptive responses. When these systems are deprived of

environmental stimuli, or when they cannot respond appropriately to environmental stimuli, effective maturation and development cannot occur. The nervous system, according to Harris (1971:392), consists of a series of interacting functional units that are involved in a continual interplay at different structural levels. Therefore, if one unit works ineffectively, the other units are affected in some way. Maturation and the resulting developmental behaviours become disorganised in proportion to the degree of involvement or impairment (Gilfoyle & Grady, 1983:565). Sensorimotor processing can be affected if the child has difficulty in interpreting the incoming information. Whenever sensory assimilation is inadequate, motor accommodation is limited and sensory feedback is diminished, further limiting the sensory assimilation (Gilfoyle *et al.,* 1981:178), resulting in spatiotemporal maladaptation and the consequent development of disabilities. The child thus misses the cognitive opportunities that facilitate growth in problem-solving skills (Dunn, 1992:76).

2.4.1 Children with intellectual impairments

Many different terms (e.g. mental retardation, intellectual disabilities, intellectual impairment) are used in the literature to describe children with mental retardation. The correct term currently is intellectual impairment and this is the population focused on in this research. Pretorius (1997:203) stated that mental handicap is a complex condition, and although mainly an intellectual impairment, it has wide ramifications that reflect on virtually all aspects of life. The American Association on Mental Retardation (2001) provides the following definition of mental retardation: "Mental retardation refers to substantial limitations in present functioning. It is characterised by: significantly sub-average intellectual functioning, existing concurrently with; related limitations in two or more of the following applicable adaptive skill areas: communication, home living, community use, health and safety, leisure and self-care, social skills, self-direction, functional academics and work." The AAMR apply four assumptions to the definition, namely

- Valid assessment considers cultural and linguistic diversity as well as differences in communication and behavioural factors;
- The existence of limitations in adaptive skills occurs within the context of community environments typical of the individual's age peers and is indexed to the person's individualised needs for support.

- Specific adaptive limitations often co-exist with strengths in other adaptive skills or other personal capabilities.
- With appropriate supports over a sustained period, the functioning of the person with mental retardation will generally improve (American Association on Mental Retardation, 2001). Inability to adapt stems from the widespread problems that these children experience in the sensorimotor and perceptual areas of development (Pretorius, 1997:204-205). Furthermore, this maladaptation leads to disorders of higher functioning such as communication.

The distribution of mental retardation is uneven in the different age groups as only the severe forms of this disorder are recognised when children begin pre-school or school. Most cases of intellectual impairment are only identified at school age. In the United States of America, the overwhelming majority (87%) of mental retardation falls into the mild category, and 13% belong to the moderate, severe, and profound groups (Kaplan & Sadock, 1982: 853). In an attempt to classify developmental characteristics of the mentally retarded pre-school child, the U.S Department of Health, Education, and Welfare (1963) suggested the following:

Table 2.6 Developmental characteristics of the child with mental disabilities*

Degree of mental retardation	Pre-school age 0-5 maturation and development
Profound	Gross retardation; minimal capacity for functioning in sensorimotor areas; needs nursing care
Severe	Poor motor development; speech minimal; generally unable to profit from training in self-help; little or no communication skills
Moderate	Can talk or learn to communicate; poor social awareness; fair motor development; profits from training in self-help; can be managed with moderate supervision
Mild	Can develop social and communication skills; minimal retardation in sensorimotor areas; often not distinguished from normal until later age

*Adapted from Mental Retardation Activities of the U.S. Department of Health (1963)

It is clear from this table that the sensorimotor system as well as the communication function is involved at all the different levels of mental retardation, thus emphasising the fact that professionals should include these developmental modalities when planning intervention.

Due to the interrelatedness of all developmental modalities the child with mental retardation will experience various problems in different areas of development. It is important to consider the development of all these modalities and their reciprocal influences as these behaviours could be indicators for inclusion in intervention.

2.4.2 Problems of children with intellectual disabilities

Although the definition of mental retardation indicates problems in adaptive skills, a delineation of specific areas comprising the adaptive skills is presented in Table 2.7.

Table 2.7 Problem areas identified in the child with intellectual impairments

Skills	Motivation
Ability to learn	These children tend to learn new skills and acquire new information slower than the average child. Their intellectual functioning usually keeps pace with physical growth as learning and experience go hand in hand (Steenkamp & Steenkamp, 1992:4). General development is therefore slow and limited.
Motivation	They lack inner vitality, meaning that their activity participation level is lower than the average. They lack spontaneity and their creative participation is impaired (Pretorius, 1997).
Cognition	The ability to acquire knowledge through perception, grouping, analysis, synthesis and memorising is severely impaired in the mentally retarded child, who develops at a quarter to a half the tempo of the normal child (Steenkamp & Steenkamp, 1992:3). His perceptions are limited, vague and often distorted, and this forms a poor foundation for concept formation and results in impoverished conceptualisation. It explains why this child will tend to rely on others for solving problems. Problems are observed in all areas of perceptual development i.e. basic perceptual skills, spatial orientation, figure ground, and form constancy.
Language and Communication	The child thinks in terms of action and images rather than in terms of language or symbols (Piaget's preconceptual phase of cognitive development). This implies that the child cannot use language in his thinking to replace concrete thought (Du Toit, 1981). Receptive language is impaired as he has difficulty in understanding complex verbal language. He does not readily use language for thinking or as a mental tool (Du Toit, 1980). He tends to talk later than children without disabilities, has a very limited and concrete vocabulary, and uses simple sentence construction. Poor articulation and voice disorders are common.
Concentration	This is one of the biggest problems in clinical settings as the child has problems in screening unnecessary or irrelevant detail, has a short attention span and low resistance to distraction and therefore imposes strain on the learning process (Pretorius, 1997).

Skills	Motivation
Memory	Research done by Du Toit (1981) indicates that the lower the child's IQ, the poorer his short-term memory. This might be due to impaired sensory integration of incoming information.
Development of affect	Emotional responses are of short duration and change readily with poor execution of control. Mentally retarded children experience far more anxiety than normal children and this is usually manifested as lack of interest or diminished attention (Du Toit, 1980).
Self-esteem	During the learning process the normal child experiences the pleasure of mastery, which creates a desire to learn more. This process is severely hampered in the mentally retarded child since he expects failure due to past experiences and therefore has a low self-esteem (Pretorius, 1997).
Motor development	Problems in this area are widespread and include poor fine and gross co-ordination, hyperactivity or hypo-activity, self-abusive behaviour, psychomotor retardation, poor balance, disturbances of body image and body scheme, and a tendency to tire easily. The clinical picture portrays a clumsy child (Steenkamp & Steenkamp, 1992).
Sensory defects	A substantial number of mentally retarded children has impaired vision and hearing, which results in an even greater diminution of incoming information. Zubek, Bayer & Shepherd's (1969) research on the effects of sensory deprivation leads to the conclusion that the mentally retarded child, who has an abnormal threshold of sensory perception, decreased curiosity and who reacts less readily to external stimuli, suffers sensory deprivation. This affects the process of learning through the sensorimotor modality (Kaplan & Sadock 1982).
Additional physical handicaps	To compound the above difficulties even further, one third of these children has an additional physical handicap, while one fifth also has a psychiatric disability (Kaplan, & Sadock, 1982).
Social behaviour	Mentally retarded children have many problems with social interaction, including poor conversational skills, egocentricity, poor social judgement, inappropriate behaviour, emotional instability, and poor decision-making skills. They have poor personal habits and their appearance has a detrimental effect on their social interaction (Kaplan & Sadock, 1982).
Self-care skills	Due to his level of motivation as well as his sensorimotor limitations, this child tends to stay dependent in all self-care activities longer than the norm. He will be excluded from many social experiences and exposed to health hazards if he is unable to perform basic self-care tasks (Pretorius, 1997).
Play	All of the above-mentioned problems are manifest during play and influence the play pattern severely. They lack initiative and spontaneity and are often destructive during play. Due to limited motivation, exploration is affected which results in impaired learning (Pretorius, 1997).

It becomes clear that the child with mental disabilities has multiple problems, which will affect his functioning in all activities of daily living. Because of these internal problems, we can conclude that there will be an interference with the adaptation process and disadaptation will occur, influencing occupational performance (including communication). Due to the child's lack of intrinsic motivation he has a diminished desire for mastery, which influences his ability to interact with the environment. For this reason he cannot meet the challenges put forward to him by the environment and thus experiences unsuccessful participation in activities. The internal and external feedback he receives is negative and that causes him to withdraw even more from participation. The child with mental disabilities does therefore not

experience an effective adaptive response, but rather maladaptation.

Although it is now evident that children with mental disabilities have problems with the adaptation process, the current research will focus on the consequences this has on the development of communication competence.

2.5 CONCLUSION

The thesis was put forward that communication behaviour can and should be regarded as an adaptive response as this concept would enhance understanding of the integration involved in communication development. Furthermore, such an orientation would have a direct impact on intervention approaches aiming at facilitating the development of communication-related behaviours.

Based on a review of the theories on the adaptation process, the development and characteristics of the adaptive response were identified and described. From this background a model for the development of adaptive communication behaviour was developed and defended. The model explains how the adaptive response is learned when the child's desire for mastery (depending on the sensorimotor, cognitive, social-emotional, and communication abilities) and the environmental demands for mastery are brought into interaction (press for mastery).

Although indications that communication-related behaviours can be regarded as adaptive responses, it was only through a study of the theories of communication development that the thesis could be verified. It became clear that

- communication development can be regarded as "adjustments made by the individual…that contribute to the actualisation of personal potential" (King, 1978) – the adaptive response;

- the identical developmental domains (sensorimotor, cognitive, social-emotional, and communication) underlie the emergence of adaptive responses and communication

behaviour;

- the adaptive response, as well as the development of communication, is dependent upon the person's desire for mastery, the environmental demands for mastery and the press for mastery through interaction between the person and the environment.

Based on the premise that communication-related behaviours could be regarded as adaptive responses, a further study of the field of developmental disabilities verified that non-adaptation, or maladaptation, does present in these children. However, from the knowledge gained from the study of the normal development of communication behaviours as adaptive responses, definite principles for intervention could be established. These principles, forming the cornerstones of the intervention programme, or play package, will be integrated in Chapter 3.

It is therefore on the basis on this theoretical evidence that the further development and empirical research will be conducted.

2.6 SUMMARY

In this chapter the assumption is put forward that communication is an adaptive response and this is underpinned by various theories on the adaptive response. A model for adaptation is derived from these theories. Theories on communication development were reviewed and it was concluded that an eclectic approach derived from all of them is necessary in intervention. Developmental modalities (sensorimotor, cognitive, social-emotional, and intrinsic motivation) influencing communication development were investigated and the interrelatedness of these modalities during the development process was highlighted. For the purpose of this research the child with mental retardation will be incorporated, but in order to understand disability it must be based on knowledge of the normal. The development of communication competence is a way to view communication abilities and inabilities of a child with developmental delays, as it is more important to strive for communication competence rather than perfect communication skills.