

chapter 19

Disorders of Development

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KEY CONCEPTS

AMNIOCENTESIS	EXECUTIVE FUNCTIONING	PROSODY
ATTACHMENT BEHAVIOR	EXPRESSIVE LANGUAGE	REPRESENTATIONAL ABILITY
AUTISM	FALSE BELIEF	SAVANT SKILLS
BLINDISMS	INTELLIGENCE QUOTIENT (IQ)	SECONDARY INTERSUBJECTIVITY
CENTRAL COHERENCE	INTELLIGENCE TESTS	SEMANTIC SYSTEM
CHROMOSOMES	ISLETS OF ABILITY	SENSITIVE PERIOD
CHRONOLOGICAL AGE	LEXICAL SKILLS	SENSORIMOTOR STAGE
COGNITIVE DEVELOPMENT	LONGITUDINAL DESIGN	SEVERE VISUAL IMPAIRMENT
COMPREHENSION	MENTAL AGE	SYNTACTIC SKILLS
CRITICAL PERIOD	MOTOR MILESTONES	SYNTAX
DEVELOPMENTAL DELAY	OBJECT PERMANENCE	THEORY OF MIND
DEVELOPMENTAL MILESTONES	PHONOLOGICAL SKILLS	TURN-TAKING
DEVELOPMENTAL QUOTIENT	PRAGMATIC SYSTEM	VISUAL ILLUSION
DOWN'S SYNDROME	PRAGMATICS	WING'S TRIAD OF IMPAIRMENTS
ECHOLALIA	PRETEND PLAY	WORKING MEMORY
EMBEDDED SHAPES	PROFOUND VISUAL IMPAIRMENT	

OVERVIEW

The study of children with disabilities is important for two main reasons. First, an understanding of their development can often throw light on our understanding of the processes underlying the development of the typically developing child. Second, it can lead to an understanding and implementation of effective therapies and interventions. There are many different kinds of developmental disorders and disabilities, affecting almost every aspect of development. In this chapter the author discusses three areas of disability in detail.

- Children with profound visual impairments, defined as an inability to see anything more than shades of light and dark.
- Children with autism, who display a set of clinical behaviors characterized by impairments in social behavior and communication, and a restricted repertoire of activities and interests.
- Children with Down's syndrome, who are the largest group of individuals with learning difficulties.

The study of children with profound visual impairment helps to illuminate the role of vision in development, and indicates that there are alternative routes to development that do not require vision. Study of children with autism demonstrates that having an understanding of minds is probably a critical ability for typical development. Study of children with Down's syndrome indicates that their development may be different from that of typically developing children, rather than just delayed, and suggests that a range of different processes may underlie development.



Introduction

Many of the chapters in this book focus exclusively on studies of children who are following a typical pattern of development. Similarly, most of the theories that have been described have been based on the results of studies of typically developing children. However, a number of chapters have mentioned how particular disabilities affect certain aspects of psychological development. This is because the development of children with disabilities can often throw light on our understanding of the processes underlying development.

There are a number of different ways in which the study of children with disabilities can contribute to our understanding of development. For example, studies of typically developing children may suggest that a particular sense or experience is necessary for a certain development. The study of children whose senses or experiences are limited in particular ways can provide a means of testing these ideas. Further, as well as providing “tests” of our understanding of how development comes about, the study of children with disabilities can also lead to new and different ways of understanding development. Studies of typically developing children may suggest that certain **developmental milestones** are achieved through a particular “route” or pathway. However, if this route is not available to children because of their disability and yet they still develop the behavior, this indicates that they must be developing the behavior via a different process. Of course, this process may also be available to the typically developing child, although not apparently evident when we examine their development.

The study of children with disabilities can also contribute to our understanding of the relationship between different developments. For example, children with certain disabilities may have particular difficulties in one area of development. Study of how this difficulty impacts on other aspects of their development can help elucidate the nature of the relationship between different areas of development. This may be particularly helpful when study of typically developing children has led to suggestions that certain behaviors are prerequisites for the development of other behaviors, in other words, when some causal relationship between behaviors is suggested. If children

with certain disabilities do not, or cannot, exhibit the first behavior, but do develop the second behavior, this indicates that the two behaviors are not necessarily causally related.

The study of children with disabilities can also contribute to the question of whether or not there are **critical** or **sensitive periods** for certain developments. Thus, if children with a disability develop a particular behavior at a much later age than typically developing children, this would negate any suggestion that there might be a critical age for this behavior to develop.

DIFFICULTIES IN STUDYING CHILDREN WITH DISABILITIES

Despite the relevance of studying children with disabilities for our understanding of development, there are a number of difficulties associated with their study. One of the main problems is that many children have more than one disability and, in such children, it is often difficult to separate out the effects of each disability on development. If one of our aims is to understand how particular problems affect psychological development, then it is crucial that we examine children with single disabilities. In reality, of course, this is almost impossible. And yet it should be our aim. Once we understand how a particular disability affects development, then we should be in a much better position to begin to understand how a combination of disabilities might influence the development of an individual child. However, sometimes the presence of two disabilities within one child may actually lead to new hypotheses about the origins of certain difficulties, as we shall see later in the case of visual impairment and **autism**.

If we want to ensure that our study of development in children with disabilities has implications for our understanding of the effect of a particular disability, we may need to restrict our study to particular children with that disability. Consider children who are registered blind. Blindness might seem a fairly straightforward disability since just one sense is affected. However, most children who are registered blind can see something and it is well known that even very limited experience of vision can have a marked effect on development, in that the development of such children is usually closer to that of sighted children than to the development of children who can see nothing. Therefore, if we want to understand the effect of not being able to see on development, we must restrict our study to children who have been unable to see anything since birth. In this chapter I use the term **profound visual impairment (PVI)** to describe being unable to see anything more than shades of light and dark. I shall use the term **severe visual impairment (SVI)** to include children with PVI and children who have some limited visual perception of form and shape.

However, even if we restrict our study to children with PVI, a further complication arises. This is that many children who cannot see anything have additional learning difficulties. While it may be that some of these children have learning difficulties as a result of their PVI, it is often difficult to eliminate other causes. Therefore, if our aim is to study the effect of not being able to see on development, we need to focus on children who have never had any vision and have no other disability, including learning difficulties.

Unfortunately, even if we restrict our studies to children with single, relatively clear-cut disabilities, it still may be difficult to reach conclusions about how each disability affects psychological development. The main reason for this is that different children, even if they have the same disability, vary. Just as there is variability in the ways in which children without disabilities develop, so there is variation in how children with the same disability develop. In studies of children without disabilities, this variation is usually dealt with by studying large numbers of children in order to try to eliminate the effects of individual variation; in studies of children with disabilities, this may be difficult, if not impossible, because of the relatively low incidence of certain conditions.

THREE DISABILITIES: PROFOUND VISUAL IMPAIRMENT, AUTISM, AND DOWN'S SYNDROME

There are many disorders of development and it is clearly not possible to consider them all. In the sections which follow, I shall examine the development of children with three very different disabilities – a sensory impairment (PVI), a specific disorder (autism), and a general learning difficulty (Down's syndrome). These different types of disorder shed light on development from different perspectives.

The first are children with PVI who have been unable to see anything from birth. Study of these children can help elucidate the contribution of one of our main senses, vision, to development. Second, I shall look at children with autism. Although many children with autism have learning difficulties, they also have specific difficulties in several areas of development and a number of different explanations have been proposed to explain the pattern of their difficulties. Finally, I shall consider children with **Down's syndrome (DS)**. Children with DS have learning difficulties. However, unlike children with autism where quite specific explanations have been proposed to explain their difficulties, the development of children with DS has been described by some as similar to that of typically developing children but delayed, although others argue that their development is different. In each case I shall describe some of the main effects of each disability on development and then relate this to our understanding of developmental processes.

The incidence of children with SVI and children with autism within the population is very low. About 1 in 10,000 children have SVI, although most of these children will be able to see *something*, about half will have had SVI from birth, and about half will have an additional disability. Obviously children with PVI from birth represent just a fraction of these children. The incidence of autism is about twice that of SVI, that is, about 2 to 3 per 10,000, although recently there is evidence of its incidence increasing. Given that children with SVI and children with autism form only a small proportion of the one in six children who are identified as having some sort of disability at some point in their development, it could be argued that they have attracted a disproportionate amount of attention from developmental psychologists. However, SVI is of particular interest because we think of vision as such a significant sense and yet it is clearly not crucial, since many people with SVI (including people with PVI) are highly competent. Autism presents rather a different picture, since it is the distinctive

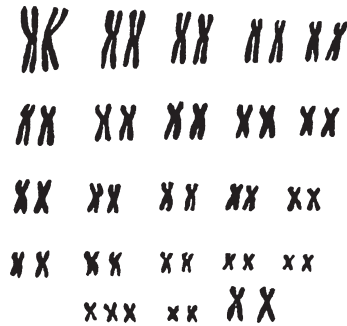


Figure 19.1 Most people with Down's syndrome have an extra number 21 chromosome [trisomy].

pattern of behavioral difficulties which characterize autism and the difficulties in explaining them that have captivated the interest of researchers.

In contrast, children with DS are the largest group of children with learning difficulties, with an incidence of about 16 to 17 in every 10,000 births. There are a number of physical features associated with DS which are often apparent from birth, although not all children with DS will have all of these features. The features include reduced muscle tone, a smaller nose with a flattened bridge, almond-shaped eyes which slant upwards, broad hands and short fingers with a single crease running from side to side across the palm. Because of these physical characteristics, children with DS are usually identified at birth, or very shortly after.

Children with DS also have a different pattern of **chromosomes** from other children: about 97 percent have an additional number 21 chromosome (see figure 19.1) and the others have chromosomal patterns in which part of a number 21 chromosome has fused with part of another chromosome. These distinct chromosomal patterns mean that a diagnosis of DS based on clinical features can be confirmed by chromosomal analysis. They also mean that DS can be detected before birth through various tests, the most common of which is an **amniocentesis**. In this test, a sample of the amniotic fluid surrounding the fetus, which contains fetal and maternal cells, is removed and the chromosomes of the cells in the fluid examined. Such prenatal testing is not routine but is usually restricted to women who have an increased risk of having a child with DS, for example older women. The fact that children with DS can be identified early in development, often before any learning difficulties are apparent, and their clinical identification can be confirmed chromosomally, has meant that of all children with learning difficulties, children with DS have attracted much research.



Children with Profound Visual Impairments

In this section I shall focus on children with PVI from birth. Such children may be able to perceive areas of light and dark but cannot perceive visually any forms or shapes. Fraiberg, in her excellent book *Insights from the Blind* (1977), points out that children who can see nothing and are not thought to have any other disability develop

differently from sighted children. However, perhaps rather surprisingly, unless a child has something visibly wrong with her eyes at birth, even a PVI may not be diagnosed for several months. This is because in the first few months after birth the behavior of infants with PVI may seem fairly similar to that of sighted babies: they may quieten when they hear a sound, they may smile selectively at their parents (though they are obviously smiling at the voice rather than the face of their parent), they can be comforted by being jiggled up and down, and so on. Indeed, in the first 6 months or so babies with PVI and their parents appear to interact in much the same way as sighted babies and their parents (e.g., Preisler, 1991). However, after the first few months, differences become more obvious.

KNOWING THAT OBJECTS AND PEOPLE ARE THERE

Probably the major challenge facing the baby with PVI is to understand that she is surrounded by objects and people. The sighted baby who sees a toy a few meters away from her “knows” that a toy is there. She does not need to understand anything about the permanence of toys – that objects continue to exist even when out of sight – to “know” this (**object permanence** is discussed in chapter 5). But the situation is very different for the baby with PVI. Unless she is holding a toy or can hear the noise it is making (and knows that this noise is associated with this particular toy), her senses will not tell her that the toy is there. And, although it is commonly assumed that when one sense is missing the other senses are heightened or even that such people might have a sixth sense, there is no evidence to support this.

In order for the baby with PVI to “know” that there is a toy a few meters away from her, she needs to have felt it, or heard it, *and* understood that it still exists even though she can no longer feel it or hear it. And, even when the baby with PVI does realize that there are objects and people in her environment, when she is not in contact with them, either tactually or auditorily, her experience of the environment will necessarily be different from that of a baby or young child who has the ability to perceive the form and shape of objects visually, even if his or her vision is not perfect. So how does this difference affect development?

A sighted baby typically begins to reach out for toys or toward her parent at around 4.5 months. In contrast, the baby with PVI may not show these behaviors until she is 10–11 months old, or in some cases even older (e.g., Bigelow, 1986). To reach out, the baby with PVI needs to “know” that there is something there, that the toy she was holding and dropped must be nearby, or that the footsteps she hears indicate that her parent is approaching her cot. This delay in reaching, or more importantly, the difficulty the child with PVI has in appreciating that there are things and people around her, has a number of consequences.

Children with PVI are often older than sighted children when they first show distress when their parent leaves the room they are in. Sighted children characteristically show this behavior first between 6 and 9 months of age, whereas children with PVI are usually 12 months on average before they first protest at a parent’s departure (e.g., Tröster & Brambring, 1992). They are also delayed in self-initiated movements such as crawling and walking, which are likely to be motivated in the sighted child by

the sight of something or someone on the other side of the room (e.g., Adelson & Fraiberg, 1974). If the child with PVI does not “know” what there is around her, why should she move from where she is? As a result, infants with PVI are often observed to be fairly passive in their movements, perhaps manipulating the things they feel around them, such as their own clothing, bodies, bedding, or floor covering. This may mark the beginning of stereotyped, repetitive behaviors (sometimes called **blindisms**) which can persist well into childhood and beyond. The most prevalent of these observed in children with PVI are eye poking, body rocking, repetitive hand and finger movements, and repetitive manipulation of objects (Tröster, Brambring, & Beelmann, 1991).

The delay in the child with PVI appreciating that there are objects and people around her affects the nature of her interaction with others. Prior to 9 months, sighted babies tend to interact with either people or objects but do not involve both in the same interaction. However, from about 9 months a sighted baby begins to involve others in her interactions with objects. She may see an object, point to it, look toward her parent, make a noise, initiating a preverbal vocal exchange, and through this involve her parent in her interaction with an object. Such exchanges indicate that she understands that both she and another can attend to the same object and that she can direct her parent’s attention. As a result of this understanding, the young sighted baby and her parent can engage in give-and-take routines. Such understanding, described as **secondary intersubjectivity**, was not observed by Preisler (1991) in children with PVI until they were about 21 months, when they began to share their environment with others through language.

DIFFERENCES IN UNDERSTANDING THE ENVIRONMENT

If the experience of the young child with PVI of her environment is restricted because she cannot see the things that surround her, it might be expected that her **cognitive development** will be impaired. For example, it has been argued that her understanding of space, of visual terms, and even of what it means to be able to see will be impaired (e.g., Bower & Wishart, 1979). However, others (e.g., Landau, 1991) have argued that children with PVI do develop an understanding of such concepts although, because their understanding is based on senses other than vision, there may be differences. This is an important point because it suggests that the cognitive development of children with SVI is not impaired or **developmentally delayed**, only different in certain respects, because it is based on nonvisual information. Certainly, in terms of intellectual ability, provided that tests are used that do not require vision or ask questions that rely on visual experiences, the average **IQ scores** for children with and without sight do not differ (e.g., Kolk, 1977).

A number of observations will serve to illustrate that children with PVI do develop an understanding of their environment that may differ from sighted children because of the difference in their modality of experience. Urwin (1981) gives a nice example of a 4.5-year-old with PVI who did not want to go into the coal shed because, she said, “It’s dark in there.” She was asked what she meant by dark and said, “Sort of still. And cold. Like when it’s raining.” Surely this is as rich an understanding of darkness as a sighted person could have, albeit drawing on different experiences?

Further intriguing observations were made by Bigelow (1988, 1991, 1992) in a series of studies exploring the understanding that two brothers, both of whom had PVI, had of what others could see. These boys, who were 4 and 6 years old at the outset of this **longitudinal study**, realized that when asked to show their brother a toy they had to give it to him, but seemed to think that objects had to be within about 5 feet of a sighted person in order for that person to be able to see it. If an object was more than 5 feet from a sighted person, the boys brought it closer so it could be “seen.” If an object couldn’t be moved to within 5 feet, the boys thought that it couldn’t be seen. When hiding a toy or themselves, they often only partially hid, using their hands or on other occasions just rolled up small and kept quiet. Further, when asked to position a toy so one part could be seen by another person, they often just touched the relevant part, rather than orienting the toy appropriately. Bigelow’s observations are consistent with these boys having made sense of the concept of “seeing” through their experience of touch.

This conclusion is also supported by an observation made of a 3-year-old with PVI by Landau and Gleitman (1985). When asked to look up, this child reached her arms above her head, whereas blindfolded sighted children tilted their heads back. Interestingly, Mills (1988) pointed out that words that are very visually oriented, such as “see” and “look,” may not only be interpreted tactually by the child with a PVI. For example, she observed children with PVI using “see” as if it meant “hear,” and suggested that the interpretation of a particular word may depend upon the context and possibly on the child’s individual preferences for particular modalities.

DEVELOPMENT OF PRETEND PLAY

A number of studies have reported that children with PVI are delayed in their play. For example, Hughes, Dote-Kwan, and Dolendo (1998), based on observations of 3- to 4-year-old children with PVI, reported that few of the children engaged in **pretend play** (such as pushing a brick along the floor as if it were a car being driven along; see chapter 13), and most of the play observed was exploratory or **sensorimotor** in nature. In this sense their play was more like the play of 1-year-old sighted children. However, despite these and other observations, some children with PVI can produce pretend play at the same age as sighted children. Lewis, Norgate, Collis, and Reynolds (2000) assessed the pretend play of 13 children aged between 2 and 7 years with SVI but no other problems, of whom 7 had PVI, using the Test of Pretend Play, and found they were able to pretend at the same level as sighted children of similar chronological age. This latter study also demonstrated a clear relationship between the amount of pretend play produced and assessments of both **expressive language** and **comprehension**, replicating findings in sighted children (e.g., Lewis, Boucher, Lupton, & Watson, 2000).

LANGUAGE DEVELOPMENT

Although children with PVI seem to reach the main language milestones in terms of vocabulary size at much the same age as sighted children (e.g., Mulford, 1988), there

are differences in the content of the earliest vocabularies of children with and without PVI (e.g., Bigelow, 1987; Dunlea, 1989; Pérez-Pereira & Castro, 1992), differences which can be understood in terms of their different experience of the environment. Thus, compared to sighted children, the early vocabularies of children with PVI are likely to contain more labels for specific objects and fewer labels for general categories of objects, more words referring to their own actions and fewer referring to what others are doing, fewer words qualifying the nature of objects (e.g., “big” cat), and no words describing the function of objects. Thus, children with PVI tend to use words to describe what they are doing and restrict their use of particular words to the context in which they were first heard, in comparison to sighted children who will comment on what others are doing and things they see, make demands for things, and so on.

Sighted children are able to attract their parents’ attention in many nonverbal ways, such as looking, waving, pointing, turning toward and moving in the direction of a desired object, and so on. This is obviously not possible for children with PVI and they also show a restricted repertoire of facial expressions (Tröster & Brambring, 1992). However, once they have acquired some language, they may use this means to attract their parents’ attention, perhaps asking incessant questions or repeating something that someone else has said.

Understanding pronouns

Many children with PVI, like sighted children, have difficulties using and understanding pronouns such as “I” and “you” correctly. Thus, they may refer to themselves as “you” or by name, rather than “I.” They may also make mistakes in understanding to whom a pronoun refers: for example, if her parent asks, “Where’s my mouth?,” the child may point to her own rather than to her parent’s. In sighted children these difficulties tend to be resolved around the age of 2 to 2.5 years, whereas for some children with PVI the difficulties may persist much longer, even beyond the age of 5 years. In the absence of vision, it takes far longer for a child to realize that the “I” she talks about is the same as the “you” that other people talk about.

REPRESENTATIONAL ABILITY

Many of the findings already discussed can be understood in terms of how the child with PVI represents the environment. **Representational ability** is necessary for pretense (e.g., imagining that a brick is a car) in much the same way as language is (e.g., realizing that the word “car” stands for a car). Similarly, understanding that objects and people continue to exist even when not in contact with her requires that the child with PVI has a representation of the object or person. But why should children with PVI show delays in behaviors that are dependent on representational ability? Is representational ability dependent on vision? Clearly this cannot be the case since most children with PVI eventually demonstrate these abilities. It just takes longer. But why?

It seems likely that vision facilitates the development of representational ability to a greater extent than the other senses. In particular, vision enables links to be made

between different experiences in different modalities more easily than any other sense. For example, in the first month, a sighted baby lying in her cot might experience the following: she hears a noise (= her parent talking in another room), the noise continues and then she sees a set of coordinated movements (= her parent entering the room), sees that movements of part of the form (= her parent's mouth) coincide with the noise (= her parent's voice), sees the form getting larger and the noise gets louder (= her parent approaches), and then she feels something (= her parent's hands) touch her body and her view of the world suddenly changes and she loses contact with the cot surface. The young baby with PVI in this situation would experience the following: she hears a noise (= her parent talking in another room), the noise continues and gets louder (= her parent approaches), and then she feels something (= her parent's hands) touch her body and suddenly she loses contact with the cot surface. In such a situation the sighted baby has many opportunities through the visual input, which is more continuously available than information from the other modalities, to discover how the different experiences are linked and so to build up a representation of her parent that involves auditory (her parent's voice), visual (what her parent looks like), and tactual (how her parent holds her) information. Without vision it seems very likely that it is harder for the child with PVI to link the different experiences and so develop a representation of her parent and other objects and people. It is harder, but clearly it is not impossible, as testified by the many children and adults with PVI who are demonstrably able to represent people and objects and make sense of their environment. Thus, it seems clear that although the development of children with PVI may be different from that of sighted children, it is not necessarily impaired or inferior.

AUTISTIC BEHAVIORS

However, while many children with PVI and no other disability develop into competent and effective adults, some children with PVI experience profound difficulties which they never seem to overcome. In particular, a significant proportion present quite marked behavioral difficulties that share many of the same characteristics as evident in children with autism. Clearly, it is not necessary to have PVI in order to have autism, since most children with autism can see. However, the fact that some children with PVI show such behaviors has led to some interesting speculation about the primary problem in autism. And this in turn has led to speculation about the developmental prerequisites of certain developments in sighted children, notably, theory of mind. I shall return to this at the end of the next section, which considers the development of children with autism.



Children with Autism

WING'S TRIAD OF IMPAIRMENTS

Autism was first described by Kanner in 1943 and consists of a set of clinical behaviors, characterized by **Wing's triad of impairments** (Wing, 1976) in: (1) social behavior;

(2) communication; and (3) behavior that is characterized by the presence of stereotyped, repetitive actions. In addition, the majority of children with autism have learning difficulties, with over half having IQs below 50, and with their verbal ability being more severely affected than nonverbal ability. Consequently, it is important to demonstrate that the behaviors which are characteristic of autism are found across the ability range, in the most able as well as in the least able; if this were not the case, then the behaviors could be a consequence of the learning difficulties. Because of this, much research has focused on relatively able children with autism. And to ensure that any learning difficulties that such children may have cannot account for their autistic behaviors, studies often compare the behavior of children with autism to the behavior of children who also have learning difficulties but not autism.

Over the years numerous theories have been put forward to account for the main impairments seen in children with autism and many different causes have been proposed. As yet, no single theory has been put forward that can adequately account for the range of difficulties observed and no specific cause or causes have been identified. One of the problems is that although children with autism will all show difficulties in specified areas, the extent and exact nature of their difficulties vary from relatively mild to extreme. In this section I shall describe the main characteristics of autism, and then outline some explanations that have been put forward.

Social aloofness

Autism is not usually diagnosed before the age of 2 or 3 years, although some retrospective accounts from parents suggest that children subsequently diagnosed as autistic may have behaved differently from birth. Home videos of infants in the age range 9–12 months who were later diagnosed with autism support this suggestion (Baranek, 1999), and a screening device for detecting infants with autism is now available (Baron-Cohen, Allen, & Gillberg, 1992; Charman et al., 2000). Some of the early differences reported include not lifting arms up in response to a parent's approach, not responding to a parent's voice, not pointing to draw another person's attention to something. All these are indicative of problems interacting with other people, and Kanner originally pointed to *social aloofness* as being the primary characteristic of autism.

However, many children with autism do interact with others and may demonstrate **attachment behaviors** (see chapter 6). Nevertheless, the nature of their interaction is likely to appear rather odd. They may show very little interest in other people or what they are doing, and fail to share their own interests with others, and instead endlessly engage, without any sign of boredom, in some apparently meaningless activity such as repeatedly twiddling a small object or piece of paper or just rocking backwards and forwards on the spot. They seldom initiate interactions with others. Their ability to recognize familiar people is impaired (e.g., Boucher, Lewis, & Collis, 1998), and they may show little or no reaction to the emotions of another person, or even respond inappropriately such as smiling when someone is clearly upset (e.g., Dissanayake, Sigman, & Kasari, 1996; Sigman, Kasari, Kwon, & Yirmiya, 1992). This all gives a very odd feel to their behavior.

Communication problems

Kanner also originally identified the absence of any intention to communicate meaningfully with other people as a further characteristic of autism. This is evident in both their nonverbal and verbal behaviors. About 50 percent of all children with autism never acquire any useful speech, and even those who do may not use either speech or nonverbal means to communicate specific things to others. The faces of children with autism often show little expression and they do not use gaze direction or gestures to indicate to another person that they are interested in something or someone. They may cry or scream, and this may signal that they want something, but they may give no indication as to what it is they want. Interestingly, with age, some children with autism may indicate what they want, but they may go about this in a very different way from children without autism. They may guide their parent's hand to the desired object, or they may actually point, but the point will not be accompanied by looking toward their parent to convey their intention to communicate something (e.g., Leekam, Baron-Cohen, Perrett, Milders, & Brown, 1997). This is in contrast to the typically developing child who, even before she has acquired any language, will gesture toward a desired object and look backwards and forwards between the object and her parent.

The absence of an intention to communicate is also apparent in those children with autism who speak. The onset of language is almost always delayed and this delay may be the first clear indication that something is wrong. Children with autism can develop a reasonable vocabulary and even adequate **syntax** (e.g., Tager-Flusberg, 1993). However, their language shows extreme **pragmatic** abnormalities. These show themselves as stilted and pedantic speech, abnormal **prosody**, **turn-taking** difficulties, inappropriate interruptions, and so on. The child with autism may repeat words or phrases she has heard others say in a meaningless and repetitive way, a behavior known as **echolalia**. She may say little else.

For children with autism who do talk spontaneously, rather than simply echoing what others have said, their conversations are very different from those of children without autism. They may talk nonstop about their particular interest, but fail to take account of what anyone else may say or indicate nonverbally. They do not seem to appreciate the two-way nature of conversations and contribute little by way of keeping the conversation going. They may have persisting difficulties using personal pronouns correctly (e.g., Lee, Hobson, & Chiat, 1994), difficulties which typically developing children also show but grow out of. Their language often focuses on concrete things and is literal, with idiom, metaphor, and allusion being noticeably absent. Similarly, they have difficulties understanding metaphor and irony (Happé, 1993).

Repetitive and stereotyped behavior

The third impairment of Wing's triad is repetitive and stereotyped behavior. This has already been alluded to in the examples given so far – the rocking, the twiddling of a small object, the echolalia. Children with autism are often fascinated by regular patterns of objects and may collect and arrange objects they find in a very systematic and repetitive way, but for no apparent reason. Yet they may show great distress if

these arrangements are disturbed. Related to this, they seldom play spontaneously, instead simply manipulating the toys and not engaging with them in any meaningful way.

ISLETS OF ABILITY: SAVANT SKILLS

In addition to this triad of impairments, there are other behaviors which are shown by a number of children with autism, although not necessarily all. Many children with autism are often particularly good at visual-spatial tasks. For example, they are often good at locating shapes embedded in a drawing (e.g., Shah & Frith, 1993), can complete jigsaw puzzles when the picture is face down, i.e., not visible, and are not susceptible to **visual illusions** (Happé, 1996). A few children with autism are exceptionally gifted artistically (e.g., Wiltshire, 1987) or in some other way, despite having a very low IQ. These isolated skills, associated with low IQ, have been labeled **savant skills**. Happé (1994b) has suggested that up to 10 percent of children with autism have such an **islet of ability**, whether in art, in music, or in calculating the day of the week of a particular date (e.g., O'Connor & Hermelin, 1988). They may also have exceptionally good rote memories, though what they remember may be of no obvious relevance.

EXPLANATIONS OF AUTISM

As can be seen from the above account, autism is a very complex disorder, with many aspects of development being affected. Perhaps, therefore, it is not surprising that an explanation of why these behaviors are manifest together has been evasive. However, recently, a number of explanations have emerged that go some way toward explaining many, though not all, of the behaviors. I shall now consider these explanations.

Theory of mind deficit

The first proposal stemmed from a study showing that about 80 percent of children with autism have difficulties understanding that the beliefs they hold may differ from those of others (Baron-Cohen, Leslie, & Frith, 1985). Such an understanding is referred to as a **theory of mind**, and chapter 10 gives an account of how typically developing children acquire this ability. The difficulties experienced by the child with autism can be demonstrated in tasks in which the child has to decide what a character, who holds a belief that is false, will do in a particular situation. In one version of this task, there are two dolls, Sally and Anne, together in a room with a basket, a box, and a marble. Sally hides the marble in the basket and then leaves the room. While Sally is out of the room, Anne takes the marble out of the basket and puts it in the box. Sally then returns, and the child's task is to say where Sally will look for the marble. The crucial point is that Sally was out of the room when the marble was moved from the basket to the box, and therefore she has a **false belief** since she believes, wrongly, that the marble is in the basket.

Most children with autism, and typically developing children of less than 4 years, say that Sally will look in the box. While this is where the marble actually is, it is not where Sally *believes* it to be. This finding has been confirmed in many subsequent studies, using a variety of different, and often ingenious, paradigms and focusing on a wide range of behaviors that are thought to depend on an understanding of minds. It led to a proposal that a difficulty with understanding minds is the primary deficit in autism. As an account, it is particularly good at explaining two of Wing's triad of impairments, specifically the impairments in social behavior and in communication. The argument is that if a child with autism is unable to comprehend what another person is thinking, feeling, believing, and so on, the child is very likely to behave inappropriately since appropriate behavior is dependent upon our understanding of others.

However, there are several limitations to this account. The first is that some children with autism, notably those with good verbal skills, do demonstrate an understanding of minds, albeit at an older age than typically developing children. To get around this limitation, it has been suggested that these children may solve so-called theory of mind tasks using strategies other than understanding what is going on in the minds of others. For example, Happé (1994b) suggests that the Sally–Anne task described earlier could be solved correctly if the child simply formed a person–object–place association (i.e., Sally–marble–basket) and drew on this information when answering the question. Such a strategy would not depend on the child appreciating Sally's belief about the marble's location.

Weak central coherence

A second limitation to the theory of mind account is that it cannot explain the third impairment of Wing's triad, the repetitive and stereotyped behavior that is characteristic of autism. However, this has been circumvented by arguing that children with autism have a difficulty in understanding minds *plus* a difficulty in drawing together different bits of information in order to construct an overall understanding of what is perceived. This latter difficulty has been described as **weak central coherence** (e.g., Frith, 1989). A consequence of this proposed weak central coherence is that children with autism pay more attention to the parts of, for example, a picture or an event, rather than to the whole. In other words, they see the individual trees but not the forest. If children with autism have a fragmented, as opposed to a coherent, view of the world, it is likely that their behavior will also be fairly meaningless, consisting of actions which are not integrated in any meaningful way. In addition, if their actions are responses to particular discrete perceptions and neither the perceptions nor actions are integrated in any way, their behavior is likely to be repetitive.

This idea of weak central coherence can also account for some of the islets of ability found in children with autism, such as their good visual-spatial skills. For example, I mentioned earlier that children with autism are often good at locating shapes embedded in a drawing. In this task the shapes do not represent a particular object, whereas the whole drawing is of a particular object. Weak central coherence argues that, unlike children without autism, children with autism do not attend to the overall meaning of the drawing; rather, they focus on the separate lines and shapes that make up the drawing. As a result, they are good at locating **embedded shapes**.

Deficit in executive functioning

A rather different challenge to the theory of mind account has come from studies indicating that children with autism have difficulties both disengaging from reality and inhibiting responses that are inappropriate to achieving a specified goal (e.g., Hughes, Russell, & Robbins, 1994; Ozonoff, Pennington, & Rogers, 1991). For example, if there are two boxes, one containing a chocolate, the other empty, and if the child only gets the chocolate if she points to the empty box, typically developing children very quickly learn to point to the empty box, whereas children with autism persist in pointing to the box containing the chocolate. Children with autism seem unable to inhibit this inappropriate behavior despite not getting any chocolate.

Thus, in the false belief task, it has been argued that children with autism say Sally will look in the box because that is where the marble is hidden. In other words, children with autism answer the question about where Sally will look on the basis of reality, i.e., where the marble really is, rather than on the basis of where Sally believes the marble is hidden. This difficulty is described as a deficit in **executive functioning**. Executive functioning enables the child to plan how to achieve a particular goal. Planning requires that current activity is put to one side and replaced by new activity. If children with autism lack executive control, then their attention may be captured by an object, or some aspect of an object or an action, and they will be unable to shift from this. Thus they point to the box containing the chocolate or say that Sally believes that the marble is where it actually is.

One of the attractions of the executive function account of autism is that as well as being able to account for many of the social and communicative difficulties associated with autism, it can also explain the repetitive and stereotyped behaviors. It is as though the child is locked into a simple activity or focused on a particular part of an object and cannot plan a way to move on to something else. Therefore, the behavior is repeated over and over again.

However, the executive function account has one major drawback. This is that deficits in the area of executive functioning are not confined to autism but are found in children with other disorders, notably children with damage to the frontal lobes (e.g., Pennington & Ozonoff, 1996). While the behavior of such children may be similar in some respects to that of children with autism, these children are not autistic. An executive function deficit on its own cannot therefore account for the specific nature of autism.

Deficit in social interaction

At the end of the section considering children with visual impairments I indicated that a number of children with PVI show behaviors that are reminiscent of autism. This raises the interesting question as to whether PVI and autism are independent in these children, or whether the two disorders are related. On the basis of the association of PVI and autism in some children, Hobson (e.g., 1993) has argued that the primary deficit in autism is not a difficulty in understanding that other people have minds. Rather, he has argued that a basic impairment in the biological capacity to engage in social interaction may be the primary difficulty in autism, proposing that

if interaction with others is impaired from early on, children with autism will have fewer opportunities to develop an understanding that other people have minds. As we have already seen, PVI poses problems for social interaction, particularly early on in development. If impairments in social interaction are the cause of autistic behavior, children with PVI who fail to discover about people and objects through other modalities and, consequently, do not interact with others, might be expected to show autistic behaviors.

One of the difficulties with this account is that although autism may be associated with the absence of certain social behaviors in the first couple of years, it is not usually associated with *severe* social difficulties from birth. Nevertheless, understanding the nature of the association between PVI and autism is important since the answer could well throw light on the role of vision in development, as well as the nature of autism.



Children with Down's Syndrome

Plate 19.1 shows a child with Down's syndrome (DS). Much research on the development of children with DS has been concerned with the question of whether their learning difficulties result from their development being similar to that of typically developing children and just slower, or because their development is actually different. The former view implies that similar processes underlie the development of both typically developing children and children with DS; the latter implies that the processes are different. If the former is correct, then study of children with DS would illustrate psychological development in slow motion and could therefore be used to elucidate relationships between different developments that may appear to coincide in typically developing children; on the other hand, if the underlying processes are different, this may suggest alternative routes to development. However, in reality, it is very difficult to distinguish between delay and difference.

DEVELOPMENT OF CHILDREN WITH DS

The development of most children with DS is delayed, in terms of the ages at which particular milestones are attained, from early on. Alongside marked *hypotonia*, or muscular floppiness, the time scale of the emergence and disappearance of certain reflexes is delayed, as well as the ages of gross **motor milestones** such as holding the head steady and sitting without support, and finer motor developments such as reaching, and building a tower of bricks (e.g., Cunningham, 1982). Children with DS also show delays in making eye contact, smiling, laughing, and vocalizing. As they get older, they show further delays in walking, in recognizing their reflection in a mirror, and in reacting to their parent leaving the room. They are slow to talk and, in general, their reactions tend to be less intense and they react more slowly than children without DS.

The slower reactions of children with DS have led to the suggestion that they may take longer to process information than children without DS. Certainly children



Plate 19.1 Despite their delayed, and different, cognitive development, children with Down's syndrome are usually very sociable.

with DS under 1 year of age look at objects and people and listen to auditory material for longer before responding than children without DS of a similar developmental level (e.g., Glenn & Cunningham, 1982; MacTurk, Vietze, McCarthy, McQuiston, & Yarrow, 1985). Further, Wishart (1991) has shown that children with DS under 2 years old take longer to learn a contingency, for example between something they do, such as reaching toward a desired object, and something that happens in the environment as a result of their action, such as their parent retrieving the object and giving it to them. Discovering about such contingencies is an important part of making sense of what is going on in the environment. Taking longer to respond and learn are assumed to be due to children with DS taking longer to process information and, it is argued, this slower processing of information results in their developmental delay.

One of the consequences of the slower reactions of infants with DS is that their interactions with adults seem to go less smoothly than when children do not have DS,

with many more overlaps or clashes occurring between the child's vocalizations and the parent's vocalizations (e.g., Berger, 1990).

Delays in the cognitive development of children with DS become more marked as the children get older (e.g., Carr, 1994), and this seems to be particularly noticeable in boys. Thus, in the first year, the mean **intelligence quotient (IQ)** of children with DS may be over 70, falling to just over 50 at 2 years and around 40 by the age of 11 years. Nevertheless, although the children's IQ is falling with age, this does not mean that their development is regressing. This is because IQ is a measure of the relationship between a child's developmental or **mental age** (equivalent to the age at which a child without DS would be expected to be showing the same developments) and the child's actual or **chronological age**. It is often expressed as

$$\text{IQ} = \frac{\text{mental age}}{\text{chronological age}} \times 100$$

If a child's mental age is going up but not keeping pace with her chronological age, the child will be developing as reflected by her increasing mental age, although her IQ will be falling. Thus, it has been demonstrated that young people with DS, despite falling IQs, continue developing certain skills, such as reading, well into their teenage years. (See box 3.1 in chapter 3 for a fuller account of IQ tests and the concepts of IQ and mental age.)

However, there is great variation in the ages at which children with DS achieve different developmental milestones. Cunningham reports an age range for walking of 13 to 48 months, in comparison to 9 to 17 months for typically developing children. Thus, while some children with DS begin walking some 2.5 years after the most delayed typically developing child, others achieve this motor milestone within the range observed for typically developing children. Similarly, Beeghly, Weiss-Perry, and Cicchetti (1990) examined the language development of 41 children with DS aged between 20 and 82 months and reported marked variability in the ages at which certain language milestones were observed. Four of the children, aged 20–30 months, had no spoken language; seven children, aged 24–66 months, had single words; 19 children, aged 26–74 months, were beginning to combine words; eight children, aged 60–82 months, were combining words fairly consistently; and three children, aged 61–76 months, were consistently combining words. In other words, among the children aged 61 months or more, language ability ranged from single words to words being combined most of the time.

INTELLIGENCE TEST SCORES

Wide variability in levels of intelligence achieved has also been noted for children and young people with DS. Carr (1988) reported a range of about 60 points in IQ at each age she studied from infancy through to adulthood, with an upper level in early adulthood of about 70. Interestingly, as well as variability in the cognitive ability of children with DS, it also appears that individual children with DS vary in what they are able to do on different occasions. Thus, Wishart and Duffy (1990) found that when

children with DS were tested on the same developmental test on two occasions, one or two weeks apart, the total number of items passed by each child on each occasion did not vary a great deal, but there was considerable variability in which items each child passed. In other words, the children with DS were not consistent in the items they passed and failed each time, passing some items on one occasion and failing them on the next, and vice versa. This observation suggests that children with DS may be more competent than their overall scores suggest; they just vary in the extent to which they engage with the tasks, engaging with certain items more on some occasions than on others. In fact, Wishart (1993) reported that, if performance was based on test items passed at least once over several test sessions, no decline in **developmental quotient** was found.

DELAYED OR DIFFERENT DEVELOPMENT?

These findings also suggest that the way in which children with DS develop may be different from children without DS, rather than simply delayed. Items within developmental tests are generally ordered from the easiest to the most difficult, based on the performance of typically developing children. If children with DS are failing some easy items and succeeding on some difficult items, this indicates that different processes may underlie their development. This is supported by evidence that children with DS do not pass Piagetian object permanence tasks in the same sequence as typically developing children and, in addition, they may fail tasks that they previously passed (e.g., Wishart & Duffy, 1990). This raises questions about Piaget's account of the sensorimotor period, since this assumed that development proceeds through a series of stages, each stage characterized by success on particular tasks, and success at each stage being prerequisite for the next stage (see chapter 2 for a full account of Piaget's theory of development).

Further evidence of possible differences in how children and young people with DS develop has come from studies of reading. In typically developing children, there is a well-demonstrated relationship between their **phonological skills** and reading ability. However, when children and young people with DS were compared with typically developing children who were reading at a similar level, it was found that the phonological skills of the children with DS were inferior to those of the typically developing children (Cossu, Rossini, & Marshall, 1993). Related to this, Buckley (1993) has suggested that children with DS may learn to read by linking print and meaning, rather than by linking print and sound. Support for this view comes from evidence that whereas the early reading errors of typically developing children are mostly phonological (e.g., reading "sun" for "bun"), those of children with DS are usually either visual, confusing words that look similar (e.g., reading "dog" for "bag"), or **semantic**, confusing words with similar meanings (e.g., reading "many" for "lots"). In further support of this idea, there is evidence that phonological **working memory** is limited in children with DS (Hulme & MacKenzie, 1992).

As well as showing evidence of delay overall, the language of children with DS, once acquired, is different in several ways from that of typically developing children. In particular, their **lexical** and **pragmatic skills** are considerably in advance of their

syntactic skills (e.g., Fowler, 1990). Thus, children with DS tend not to combine words until they have acquired about 100 words, whereas in typically developing children combinations usually start to appear once a vocabulary of about 50 words has been achieved. And although the syntactic skills of children with DS do develop, their language remains less mature than that of children with similar-sized vocabularies. Similarly, the pragmatic, or conversational, skills of children with DS have been found to be superior to those of typically developing children producing similar-length utterances.

In this brief overview I have suggested that the development of children with DS should not just be described as being delayed. Rather, the evidence indicates that they may develop in different ways from typically developing children. In particular, compared to typically developing children, children with DS take longer to process information, they progress through object permanence tasks in a different order, they make different reading errors, and the relationships between aspects of their language are different.

SUMMARY AND CONCLUSIONS

In this chapter I have considered the consequences of three very different disabilities for development – profound visual impairment, autism, and Down’s syndrome. In the absence of vision it is much more difficult for the young child to discover that there is a world of objects and people around her, and this has a marked impact on her early development. Nevertheless, this understanding can be gained through modalities other than vision, although this may result in the child with PVI having a different understanding of certain concepts. Children with autism present a rather different picture. They show a distinct pattern of behaviors which is difficult to explain. However, the evidence points strongly to the fact that they have difficulties planning their behavior and understanding that other people have minds. DS is characterized by learning difficulties. However, we have seen that children with DS have specific learning difficulties, rather than being delayed in all aspects of development. Although the evidence is not yet conclusive, it seems likely that the processes underlying the development of children with DS and typically developing children are different.

Consideration of the three disabilities discussed in this chapter indicates that much can be learned by studying the development of children with disabilities. Such studies can contribute to our understanding of the processes underlying development in general. Thus, study of children with PVI has helped to illuminate the role of vision in development and has indicated that there are alternative routes to development that do not require vision. Study of children with autism has demonstrated that having an understanding of minds is probably a critical achievement for typical development. Finally, study of children with DS has demonstrated that there may be a range of different processes underlying development.

Such understanding does not only have implications for our understanding of development in general. It also impacts on practice and intervention with children with disabilities, and this is particularly important. Effective therapies or interventions need to be premised on an understanding of how particular disabilities affect development, and this is a further reason for studying the development of children with disabilities.

DISCUSSION POINTS

- 1 Why is it relevant to understand how particular disabilities affect certain aspects of psychological development?
- 2 How do children with profound visual impairments know that there are people and objects in the environment? How do they understand space?
- 3 Children with autism are socially aloof, have problems communicating, and display repetitive and stereotyped behaviors. Can you think of examples of these behaviors?
- 4 What explanations have been put forward to account for autism?
- 5 What sort of problems do children with profound visual impairments, and those with autism, sometimes have in common?
- 6 Is the development of children with Down's syndrome delayed or different from that of typically developing children?

SUGGESTIONS FOR FURTHER READING

- Burack, J. A., Charman, T., Yirmiya, N., & Zelazo, P. R. (Eds.) (2001). *The development of autism: Perspectives from theory and research*. London: Erlbaum.
- Lewis, V. (2003). *Development and disability*. Cambridge, MA, and Oxford: Blackwell.
- Pérez-Pereira, M., & Conti-Ramsden, G. (1999). *Language development and social interaction in blind children*. Hove: Psychology Press.
- Weeks, D. J., Chua, R., & Elliott, D. (Eds.) (2000). *Perceptual-motor behavior in Down syndrome*. Champaign, IL: Human Kinetics.