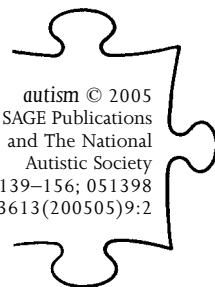


Attention, monotropism and the diagnostic criteria for autism

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ABSTRACT The authors conclude from a range of literature relevant to the autistic condition that atypical strategies for the allocation of attention are central to the condition. This assertion is examined in the context of recent research, the diagnostic criteria for autism in DSM-IV and ICD-10, and the personal experiences of individuals with autism including one of the authors of the article. The first two diagnostic criteria are shown to follow from the 'restricted range of interests' referred to in the third criterion. Implications for practice are indicated.

KEYWORDS
affect;
attention
strategies;
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monotropism;
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Introduction

The diagnostic criteria for autism make a perplexing set. However, atypical strategies for the distribution of attention seem to underlie both sets of diagnostic criteria currently in use, i.e. those in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV: American Psychiatric Association, 1994) and the *International Statistical Classification of Diseases* (ICD-10: World Health Organization, 1992). We argue that attention also underlies the patterns of subjective experience reported by individuals on the autism spectrum (for example, Blackburn, 2000; Grandin, 1995; Lawson, 1998; Williams, 1994). There is strong evidence that atypical patterns of attention are a feature of autism (see Goldstein et al., 2001 for an overview). We suggest that the 'restricted range of interests' referred to in the third part of both sets of diagnostic criteria, which we call monotropism (Murray, 1992), is central to the autistic condition.

Approach

We are not attempting to establish new facts about autism but trying to interpret what is already known. Our method is to integrate the known data using a conceptual model that is capable of informing practice.

Hypothesis

At any one moment the amount of attention available to a conscious individual is limited. The limited availability of attention plays a fundamental role in everyday life. The assumption that attention is quantitatively limited is supported by the finite supply of metabolites available to the brain. It is implicit throughout experimental psychology in the concept of task demand. The authors suggest competition between mental processes for scarce attention is an important factor in the shaping of the cognitive process.

It is generally accepted that focus is a quality of attention. However, this optical metaphor may be extended to parameterize focus of attention between diffused light at one extreme and a torch beam at the other. That is to say, attention may be broadly distributed over many interests or may be concentrated in a few interests. The authors propose that the strategies employed for the allocation of attention are normally distributed and to a large degree genetically determined.

We propose that diagnosis of autism selects those few individuals at the deep or tight-focus extreme of this distribution of strategies. Furthermore the authors propose that social interactions, the use of language, and the shifting of the object of attention are all tasks that require broadly distributed attention. Consequently these activities are inhibited by the canalization of available attention into a few highly aroused interests.

Our hypothesis is that the difference between autistic and non-autistic is a difference in the strategies employed in the distribution of scarce attention. That is to say, it is the difference between having few interests highly aroused, the *monotropic* tendency, and having many interests less highly aroused, the *polytropic* tendency. An aroused interest is an interest charged with feeling. We use the word 'interest' in a way that broadly coincides with common parlance.

Monotropism and other attempts to explain autism

Three 'cognitive explanations' of autism have been thoroughly researched in recent years. Here is how Russell sums them up:

the core cognitive deficit in autism is lack of (or delayed or deviant development of) an innately specified 'module' for conceptualizing mental states – the

so-called Theory of Mind mechanism . . . [or it is] impairment in integrating elements into wholes (Weak Central Coherence theory) [or] impaired executive functioning (executive dysfunction theory)'. (2002, p. 295)

Of these, 'weak central coherence' is the position closest to ours. This approach led to a variety of studies supporting the view that being poor at integrating material may mean having strengths in other areas (see Garner and Hamilton, 2001; Happé, 1999; Mottron and Burack, 2001; Plaisted et al., 1998a; 1998b; Shah and Frith, 1993). These positive results have tended to shift the description of the theoretical stance to the less negative 'detail focused' (Happé, 1999), emphasizing 'local' versus 'global' processing. Research results that favour 'central coherence' types of explanations in which the drawing together of information is treated as a core problem are generally equally well explained by monotropism in an interest model of mind. However, a number of studies such as those of Mottron et al. (1999) and Plaisted et al. (1999) have found that local processing does not necessarily take precedence over global. There may be no problems in integrating information when it is attended to.

Attention is the resource which is competed for by task demand, and a task is an enacted interest. In order to perform a task (as a task) any individual needs to

- see the point of the task – understand the goal
- value the point of the task – be motivated by it
- see how to perform that task – understand precisely what task it is, what steps must be taken to carry it out
- know how to take the identified steps.

Monotropic individuals are likely to have problems with each of these. It is important to make sure that any testing of individuals with autism spectrum disorders meets these requirements, or it may not measure what it purports to measure (for a relevant discussion see Bara et al., 2001). So long as the above criteria are fulfilled, it follows from the limited attention hypothesis that monotropic focus will mean both *tending to perform the task well* and *tending to lose awareness of information relevant to all other tasks*.

Temple Grandin, who has a diagnosis of autism, tells us that as a child she would be 'Intensely preoccupied with the movement of the spinning coin or lid, I saw nothing or heard nothing. People around me were transparent. And no sound intruded on my fixation. It was as if I were deaf' (Grandin and Scariano, 1986, p. 20). Several of Kanner's (1943) seminal case studies have similar descriptions from an observer's viewpoint, and frequently mention the satisfaction or even ecstatic joy which accompanies the achievement of self-generated tasks. For example, one child is described as 'always vivaciously occupied with something and seemed to be highly

satisfied unless someone made a persistent attempt to interfere with his self-chosen actions' (1943, p. 227). The intensity of emotion felt by many of these children is a conspicuous feature of Kanner's account: their problem is with affective contact, not with affect *per se*. This intense engagement is reflected in another recurrent feature of Kanner's cases: several are reported as finding failure unbearable. As Wing puts it, 'many children with autism are extremely distressed at any experience of failure and hate to be corrected if they make an error' (1996, p. 131). These children tend to be highly task focused, though their tasks may differ from ours.

Plaisted argues that, 'Narrower concepts and sharper category boundaries . . . would reduce the likelihood of activation by associative excitation of concepts that could be brought to bear on making sense of the current array of stimuli' (2001, p. 166). We consider those crucial features of monotropism, but would emphasize that these narrower concepts are highly charged with affect: individuals on the autism spectrum tend to be either passionately interested or not interested at all. According to our model a corollary of this tight focus is a lack of any generalized structured anticipation: these are people who live in a world in which sudden experiences repeatedly occur. As Ros Blackburn, who speaks about autism from an insider's perspective, often describes it, these may have the shocking force of a balloon bursting behind one's head. Equally, the few interests that are established will be formed by information that creates strong and definite expectations – which if confounded will tend to cause acute distress. Those strong and definite expectations, which have been gained with such effort, are likely to be exceptionally hard to override. What is sometimes referred to as 'top-down processing' (Engel et al., 2001), i.e. bringing prior information to bear on the interpretation of current experience, will be steeply restricted in monotropism, being confined to information gained in relation to the (criterially) narrow range of interests. It is not that 'top-down processing' is dispreferred, but that it will tend to be idiosyncratic and resistant to correction. For example, in Russell (2002) individuals with autism spectrum disorders are asked to suspend their hard-won 'reach-to-grasp' knowledge (Mari et al., 2003) in favour of an indirect procedure, and find this very difficult.

So, from our perspective there is no reason to expect a preference for 'local' rather than 'global', or for detail over a whole; rather there tends to be hyper-awareness within the attention tunnel, and a general lack of expectation, i.e. hypo-awareness, outside it. The pattern of unusual sensory responses in individuals on the autism spectrum – which Bogdashina (2003), following Asperger (1944, as translated by Frith, 1991), sums up as tending to be either hyper- or hypo-sensitive – reflects this. The general lack of preparedness crucially includes the shared expectations which

underpin typical awareness. Concepts about what might count for other people as a Gestalt may be absent. As a result of this, those 'sharp category boundaries' which Plaisted identifies may be highly idiosyncratic, and may not coincide with boundaries imposed by a shared language. That in turn may have the consequence that the quasi-automatic inferencing which the structured interrelated semantic categories of language make possible will not occur. As Jordan observed, the individual with autism tends to be 'a phenomenologist, trying to learn from what is seen, heard, felt, smelt, rather than from what can be implied or inferred from these sensations' (1990, p. 165). Donna Williams, who writes about autism from an insider's perspective, has examined these issues and postulates that implications and inferences and narratives use a language system that distances most people from the world they experience on a sensory level: 'The sensing person may not bother with the meaning, purpose, or function of people, creatures, places or things' (1998, p. 105). Those are part of an enculturation process which entrains people in similar behaviours, which people on the autism spectrum tend to miss. As Jordan et al. put it, 'Individuals with autism may be more different from one another than others because of their lack of socialisation into a common culture' (1999, p. 29).

Bryson et al. (1997), in their overview of the executive function approach, make a point of emphasizing the great variability of results in research involving individuals on the autism spectrum, both within and across study results. This variability contributes to the problems of developing a clear picture of autism spectrum differences, and may sometimes perplex researchers. We see the great variability as a result of the combination of individuals on the autism spectrum naturally having few, narrow interests, and during the developing years those interests not including an interest in being part of the social world. We suggest that the uneven skills profile in autism depends on which interests have been fired into monotropic superdrive and which have been left unstimulated by any felt experience. We expect to see this unevenness in every area and would be surprised to find uniform traits across populations with autism spectrum differences, except those that are inherent in monotropism. That is to say, we would expect *strong stable preferences for a narrow range of predictable attractors, and learning and thinking strategies which do not depend on simultaneous arousal of a number of distinct interests, such as comparisons, metaphors, contextualization and social motivation*. We would also predict difficulties with *shifting cognitive set* except where the target is a strong attractor for that individual: that is to say, where it appeals to one of that person's few prior interests. Monotropic individuals will benefit from being given more time to accommodate their set-shifting problems.

Problems with shifting cognitive set are one of the most robust findings in autism research: as Bryson et al. put it, 'the ability to rapidly and

accurately orient and shift attention would appear to require undue effort' (1997, p. 254; see also Courchesne et al., 1994; Hughes and Russell, 1993; Lovaas et al., 1971; Ozonoff et al., 1994). It is an 'executive function deficit', which research has repeatedly reaffirmed. We see this as a corollary of extreme task focus; indeed Bryson et al. (1997) also cite results showing 'if anything superior maintenance of set' in research subjects on the autism spectrum. We also see set-shifting problems as related to the points Plaisted (2001) makes about 'reduction in associative excitation' reducing 'generativity'. The general problem of 'getting stuck', of being unable to move on without prompts, is a result of this. It seems it is only when a current interest is in play that individuals on the autism spectrum know what to do, hence the difficulties with leisure time which are so often reported in autism.

Brock et al. (2002) note, as we do, the range of autistic processing differences that can be attributed to lack of simultaneous cognitive activity. They propose that 'breakdown in integration is caused by deficits in temporal binding between local [neural] networks' (2002, p. 220). Our own proposal is about cognition: we do not know its relevance to neuronal activity. We believe that a shortage of attention is key to the lack of simultaneous activity, rather than a lack of synchronization *per se*. From the perspective of monotropic cognition there seems no need to posit an additional 'temporal binding' mechanism. Brock et al. also propose that in 'low-functioning individuals the deficit will be pervasive, affecting integration even between proximal brain regions' (2002, p. 212); we suspect the consequences of monotropism will vary similarly.

The monotropism model posits that the co-activation of distinct interests is unlikely though not impossible: different overall quantities of attention may occur at different times in any individual. If the understanding and the motivation are present, even the least evidently able people with autism may be able to do some things strikingly well, although what they do may be outside the bounds of social acceptability. When higher levels of attention are available, for instance at times of high motivation, if greater numbers of interests are in play connections may be made or strengthened. Therefore we do not think it is appropriate when discussing the potential of individuals on the autism spectrum to suggest that they have 'an inability to' do this or that. We suggest that is more accurate to speak of individuals having difficulties with this or that, rather than incapacities. We think the root of the social problems sometimes regarded as core in autism is probably attentional, and we are certain that those problems are worsened by the profundity of monotropism.

For an in-depth overview of psychological theories of autism, which highlights the complexity of issues around awareness of self and other in

autism, see Jordan (1999); and see also Hobson (1990) and Lee and Hobson (1998). Problems with understanding the social process and identifying other people as creatures with their own independent thoughts and hopes were encapsulated for a while in the idea that 'a module devoted to theory of mind' was missing in autism, leaving the rest of cognition intact (Baron-Cohen et al., 1985). However, several studies (for example, Bowler, 1992; Dahlgren and Trillingsgaard, 1996; Roeyers et al., 2001) support the view that when theory of mind tasks are fully understood by participants with autism there are no problems in carrying them out, but in real-life situations the task demands tend to be too great (Bara et al., 2001). A great many separate tasks are rapidly integrated in reacting adaptively to other people: 'In real-life situations, many crucial social cues occur very rapidly. Failure to notice them may lead to a general failure in assessing the meaning of entire situations, thus precluding adaptive reactions to them' (Klin et al., 2003, p. 345). It has also become apparent that 'theory of mind' skills tend to be correlated with general understanding of life in a shared world, as Dahlgren and Trillingsgaard conclude: 'the probability that children with autism and Asperger's syndrome will solve theory of mind tasks increases with the level of intelligence, verbal intelligence and chronological age' (1996, p. 762).

Monotropism and the diagnostic criteria for autism

We believe that our use of the concept of an interest both conforms closely to colloquial use and corresponds with the use of interest that appears in the diagnostic criteria of DSM-IV and ICD-10. (The numbering of criteria here matches that in the original rather than the order in which they appear in this article.) First:

Criterion 3 Restricted repetitive and stereotyped patterns of behaviour, interests and activities, as manifested by . . . the following:

- I. encompassing preoccupation with one or more stereotyped and restricted patterns of interest [to here DSM-IV = ICD-10] that is abnormal either in intensity or in focus [DSM-IV only].

We suggest that the restricted, repetitive and stereotyped patterns of behaviour and activities and the restricted interests mentioned in this criterion follow from the monotropic tendency. DSM-IV affirms Kanner's (1943) view that the interests of people on the autism spectrum tend to be distinctively intense or focused. For example:

It's as if I am tuned in to watching out for the birds. If a bird flies past, over or in front of me, it 'catches' my attention immediately. It doesn't matter what

else is going on, within or without me, my interest is the birds. I can watch them for hours, and during this time I am in a state of intense joy. Sometimes this intensity makes me cry.¹

Polytropism implies the existence of many co-aroused interests constantly establishing and reinforcing connections between each other. Monotropism results in large areas of potential information not being registered.

I have many of the pieces of information stored within my memory and I can list them, but I cannot locate the connections that enable me to piece them together in a tangible way and lead me into action.

In individuals on the autism spectrum, interests will tend to be unconnected or idiosyncratically connected. As Allen and Lesser (1993) argue in their article about error making and discovery in evolution, idiosyncratic qualities are valuable to the species, if not the individual. While multiple connections between interests require time to develop in autism, connections within interests, for example calculations, may appear instantaneous (Hermelin, 2001).

I can name the many birds with their variety of calls and bird song around me during a countryside walk. However, I find it difficult to answer a single question about what I might like for lunch.

A monotropic interest is much more closed than a typical interest. Typical interests flow into each other through so many connections that their only stable distinctions may be culturally acquired. By contrast, monotropic interests are deep basins of attraction where attention gets caught, and may be expressed in a thought or action over and over again. No alternative attractor may be apparent.

Criterion 3 (cont.)

- II. apparently inflexible adherence to specific, nonfunctional routines or rituals
- III. stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting or complex whole-body movements)
- IV. persistent precoccupation with parts of objects.

To illustrate:

Although so many of us have phenomenal memories for facts and figures, these are secondary to our need for order. When it comes to matters of our well-being, we are utterly focused upon the need for order, familiarity and reassurance. For example, I cannot 'move on' unless certain ritualistic expectations are met (meals, words, events). At times, even though specific things have been told to me, I lose the feeling of their reality and am desperate to know them again. I may ask the same question to gain reassurance or I may

not know how to do this. I may simply sit in a dark room for hours rocking and feeling terrified.

Repeated failure to meet their own and other people's expectations (Lawson, 1998) may lead to dread, a dominant emotion for many people with autism (Grandin, 1995; Lawson, 2001).

To a person in an attention tunnel every unanticipated change is abrupt and is truly, if briefly, catastrophic: a complete disconnection from a previous safe state, a plunge into a meaningless blizzard of sensations, a frightening experience which may occur many times in a single day. Following such an episode it may take a long time for any other interest to emerge. The first basin of attraction to draw the interest is likely to be a familiar action which may replace any inclination to repeat the failed attempt (Cesaroni and Garber, 1991; Lawson, 2001).

I realized that she was upset with me but I didn't know why. I immediately began to rub my fingers together rhythmically and walked about in small circles in an attempt to make the bad feelings go away.

These familiar and reassuring actions include a variety of those behaviours sometimes referred to as 'stimming', e.g. humming, rocking, handflapping.

We are now in a position to consider the bearing of monotropism on the other diagnostic criteria.

Criterion 1 Qualitative impairment in social interaction, as manifested by at least two of the following:

- I. marked impairments in the use of multiple non-verbal behaviours such as eye-to-eye gaze, facial expression, body posture, and gestures to regulate social interaction
- II. failure to develop peer relationships appropriate to developmental level
- III. a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g. by a lack of showing, bringing, or pointing out objects of interest to other people)
- IV. lack of social or emotional reciprocity [note: the description gives the following as examples: not actively participating in simple social play or games, preferring solitary activities, or involving others in activities only as tools or 'mechanical' aids].

All of these 'qualitative impairments in social interaction' concern the absence of the usual acquired behaviour of aligning or coordinating one's emotions and actions with those of other people (Jordan, 1999). In social discourse people take turns in determining, moment by moment, the current common interest (Murray, 1986). Monotropic individuals may never learn how to participate, for a number of reasons. The basic reason

is the patchy and partial awareness that results from monotropic focus. It appears that it may take children on the autism spectrum many years longer than it does typical children to recognize the separate existence of other people (Attwood, 1992; Hobson, 1990; Lawson, 1998).

Although I certainly understand the concept of 'friend' now, as a child I didn't understand this. Even the concept that other people were separate to me, was not considered. If I thought a thought I believed others would know what I was thinking. Therefore, they must have known what I needed. Failure to meet my needs resulted in my feeling angry, hurt and unimportant. Even now, as an adult, I need to frequently check this out.

In a monotropic child, recognition of the existence of others will occur only in so far as other people are engaged with fulfilling the interests which preoccupy that child. Otherwise the existence of other people, like the existence of everything outside the tightly focused monotropic attention tunnel, may not impinge at all. Once the crucial step of noticing other people has occurred there are still several further steps to be taken before social understanding and motivation adequate to true participation in discourse can develop. In a social world in which rules were simple, clear and invariant, monotropism might not be a hindrance (Segar, 1997).

It is so good when I know (because the person has told me) what an individual is feeling. I can then adapt my behaviour accordingly. I must say, though, that this is less likely to occur with individuals I am not directly mindful of.

Because learning a skill entails having an interest in doing so, and because monotropism yields a very fragmentary view of the world, an uneven skills profile inevitably develops. Both awareness and motivation are affected by monotropism. Monotropism makes it exceptionally hard to make sense of the continuous flux of social discourse. Further, the cognitive effects of monotropism inhibit simultaneous awareness of different perspectives and limit the modelling of other people's interests, so that the monotropic individual does not know how to fit in with them. In monotropic individuals, awareness of other viewpoints is an achievement rather than a natural occurrence, and may not occur until well on in adult life, if ever.

'This should not be happening. They said they would be able to do it. I don't think it is useful being "friends" with someone. I really trusted them and now they have disappointed me.' 'Well, actually,' said the teacher, 'they are allowed to change their mind. Sometimes life does disappoint us. This doesn't mean it's not good or useful to have a friend, it just means that sometimes people have other things happening for them and they cannot always be all we expect.'

For me it was a revelation that people are 'allowed' to change their mind. They may have good ideas, good intentions and lots of motivation; however, they

may become aware of some other important event or understanding that acts as a new direction and veers them away from their original course. This was one of the first occasions that I realized other people were truly separate to me, had their own thoughts, and were sometimes not thinking the same thing that I was. I was forty years old at the time.

Any achievement requires expenditure of effort and attention, and will certainly not occur without motivation. Being aware that there are other people with distinct viewpoints is a necessary but not sufficient condition for modelling others. The individual must also – consciously or not – perceive a value in expending the effort required to model others. Once again, monotropism is a hindrance in more ways than one. While in an attention tunnel, perceiving the value of anything outside that tunnel is hard or impossible. The need to model other people can only arise within the active interest, otherwise it will not occur – will not be manifest at all. Hence, if this need to model others is to arise then it will be because other people have chosen to enter the individual's attention tunnel and have played an effective role there (Lawson, 2001; Webster et al., 2002).

For a monotropic thinker, if something does not work out as anticipated there are no alternatives available as there would be for a polytropic thinker. Instead of the projected outcome there is total disaster (Lawson, 1998). Total disaster is strongly demotivating. People with a patchy understanding of the world at large, and especially of the world of fluid social discourse, are unlikely to succeed in judging when and how to join in. Attempts to participate socially can be among the most disheartening experiences for individuals on the autism spectrum.

I remember being around the table on a number of occasions. Sometimes it is to eat a meal, at other times it is to be part of some discussion group. These occasions can be very difficult because in order to comprehend well what is happening, I need to focus all my attention on a number of activities all at once. For example, I need to look at what people's bodies are doing and at their facial expressions. I need to hear their words and process the whole event. I also need to consider my part in any interaction and then I need to decide if I should respond to something. After all of this I have to work out what my response should be. I often get this wrong because at times my attention is elsewhere focused and I miss the content and context of events. Due to these difficulties I avoid social situations that are not within my control. I often feel very stupid when I realize that whole aspects of conversation have been going on all around me and I hadn't noticed their importance. I think I feel this sense of injustice because it will lead to people thinking I'm not very intelligent, which isn't true.

Finally, difficulties with communication, including speech, as discussed in criterion 2, also obstruct social relations.

Criterion 2 Qualitative impairments in communication as manifested by at least one of the following:

- I. delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
- II. in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
- III. stereotyped and repetitive use of language or idiosyncratic language
- IV. lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.

These unusual features of communication can be traced back to monotropic perceptions and thought patterns that fragment understanding, so that features of the environment which seem obvious to people with diffuse rather than tightly focused attention may be entirely missed. Monotropic individuals will tend not to recognize sequences of events, because no cognitive connection has been made between elements of the sequence. Another aspect of these difficulties is the resistance to change which Kanner (1943) identified as a central aspect of autism, which in our view follows from the presence of deep, self-determined, attention tunnels: every unanticipated change seems abrupt and requires time for adjustment (Lawson, 2001). Yet, if the current leading interest is not strongly enough engaged, there may be instability in which tiny stimuli keep drawing the attention (Lawson, 1998).

In order to hear what others are saying I often need to look away from them. I do this because if I look at them, whilst they are talking to me, my listening to what is being said is interfered with by my attending to their facial expressions.

Conversations are sequences of events on several levels: phonetic (sound), phonological (rule-governed sound), syntactic (grammar), semantic (word and sentence meanings), and pragmatic (adjusted to each other's current interests) (Green, 2001; Lyons, 1968; Murray, 1986). On the phonetic level, sounds heard may not be identified as connected with each other, but may be perceived as merely some among many noises in an unfiltered, undifferentiated aural environment. Unless language becomes an object of interest it will take monotropic individuals longer to realize that language is meaningful. Necessarily, it will take longer to learn how to use language effectively in a conversation.

In communicating with prelinguistic infants, people tend to use one- or two-word utterances, articulate clearly and with some force, and refer to objects in which the infant is showing an interest. For example, when the baby has noticed a cat, we might say, 'Cat! Cat! Pussy cat!!' We naturally

use the infant's current interest to promote language learning. However, a number of features of monotropism may affect language acquisition. In monotropic infants with auditory hypo-sensitivity (Bogdashina, 2003) the attention tunnel may be so impervious that the stimulus does not register. Those with auditory hyper-sensitivity (Blackman, 1999; Bogdashina, 2003) may find the stimulus overwhelming and seek to avoid it. These children may not learn to speak at all. Other monotropic infants may fix on language itself as a prime object of interest and attend to it single-mindedly, at the expense of other areas of interest. Since acquisition of spatial and bodily awareness in infants occurs at the same time as language acquisition, the development of spatial and bodily awareness may also be affected in children who later attract a diagnosis of autism or Asperger's syndrome.

I didn't use language until I was four years old. However, when I did decide language was helpful I used it in a pedantic way with words beyond my years. For example, 'these food substances do not fulfil my culinary requirements'.

In some infants on the autism spectrum, complete language regression is reported after an initial period of lexical growth (Blackman, 1999; MRC, 2001). Such infants may start to learn speech as a way of expressing interest, and then be put off language by a change in how it is used in relating to them. As the infant's vocabulary gradually increases, other people start to use words as a way of seizing the infant's interest. For instance a child may be looking at a ball but an adult may think the child should be interested in the cat. Instead of looking at the ball and saying 'ball!', the adult points at the cat and says 'cat!'. Once the infant has learnt the word 'cat', the adult possesses a tool for manipulating the infant's interest system. Disruption of the attention tunnel is a painful experience. Language may suddenly become unattractive for a deeply monotropic infant.

Speech imposes interest on the hearer. Speech is used between individuals to align interests (Murray, 1986). This is how speech is typically used, and for most people it is an agreeable experience. Just as some people perceive tickling as painful and invasive while most see it as entertaining and funny, so some people find the manipulative use of language painful and invasive.

The rules of discourse are fluid, complex, unclear, inexplicit and charged with shifting social meanings. How do we know when people have paused so as to give other people their turn? Why have people been saying what they have been saying? How does their intonation fit with the meanings of the words used? When is it appropriate to pause to let someone else speak, and why? It is painfully difficult for monotropic individuals to learn the answers to these questions (Lawson, 2001). When there

is so much to go wrong, the highest motivation is needed to persist with language.

There was a time when I gave up talking for nearly a year because it just seemed to get me into trouble.

Many monotropic people are unwilling to participate in conversation because they find it both demotivating and painfully demanding. Those monotropic people who have mastered semantic and syntactic rules and are confident in their knowledge of some area of interest may nevertheless be slow to notice restlessness or lack of interest in their listeners. Some people may go through life without perceiving the pragmatic flaws in their style of address: others may start to notice these inadequacies at any time in their development. Depression is a likely outcome of this realization, and is frequently reported: for several personal reports see Willey (2003), and for a review see Ghaziuddin et al. (2002).

Furthermore, monotropic persons may see little point in communicating due to confusion about autonomy and personal identity and consequent difficulties in recognizing the boundaries between self and others (Jordan, 1999; Murray, 1996).

Conclusion: implications for practice

I think that for many of us diagnosed as being on the spectrum of autism, the demand of having to 'pay attention' to so many things, simultaneously, is a nightmare. We tend to focus upon one thing at a time and this might mean we 'miss' lots of superficial information that gives context to much of life (conversation, expectation, realization). However, when one understands this, it should make relating to us less troublesome. When I am upset I may give out signals that can be misinterpreted as 'difficult'. Most of the difficult behaviour, however, seen in autism, is due to fear and discomfort. Learning to recognize this is the first step to helping us all to develop more appropriate communication systems.

In order to work effectively and appropriately, practitioners need to have some understanding of the enigma of autism. Correspondingly, people with autism need to have some understanding of the enigmas of day-to-day existence. For people with autism, understanding is specific, context free and dependent on awareness that tends to be highly focused and thus easily misses much relevant information.

There are several implications for practice. In monotropic individuals emotions are extreme – terror, ecstasy, rage and desolation alternate with detachment. Judgements are also extreme, so the acceptance of uncertainty and unpredictability and the existence of categorical uncertainty need to be

taught. Emotional rewards are crucial to motivation; being aware of having one's emotions in tune with another's is rewarding, and as with all emotional states, is intensely felt by people on the autism spectrum. The reward for neurotypical people for the effort of tuning in to the interests and emotional states of monotropic individuals may be equally intense. For all concerned, skills that are acquired through the pursuit of the individual's own interests tend to endure and be valued by them.

The following heuristics have emerged, which we consider to be useful irrespective of the level of functioning of the individuals concerned:

- Motivate connections with other people, and positive views about society, through the individual's interests: 'Start where the child is.'
- Ensure connections are acquired through the pursuit of an individual's own interests; endogenously motivated links will be stronger and more stable.
- Improve understanding in order to correct false or partial connections.
- Reduce task demands in complexity, time pressure and irrelevant stimuli.
- Make tasks meaningful: if tasks and ideas are conveyed in small portions, ensure that the overall relatedness of the parts is understood.

We would like to see more research into monotropism and ways of both coping with it and maximizing its value.

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Note

- 1 Where her comments appear as here, in smaller type and indented, Lawson, who has a diagnosis of autism, is writing specifically from a subjectively autistic viewpoint. Elsewhere she contributes as a fellow researcher.

References

- ALLEN, P.M. & LESSER, M.J. (1993) 'Evolution: Cognition, Ignorance and Selection', in E. LAZLO, I. MASULLI, R. ARDIGIANI & V. CSANYI (eds) *The Evolution of Cognitive Maps*. London: Gordon and Breach.

- AMERICAN PSYCHIATRIC ASSOCIATION (1994) *Diagnostic and Statistical Manual of Mental Disorders*, 4th edn (DSM-IV). Washington, DC: APA.
- ASPERGER, H. (1944) ‘“Autistic Psychopathy” in Childhood’, trans. U. Frith in U. FRITH (ed.) *Autism and Asperger Syndrome*, pp. 37–93. Cambridge: Cambridge University Press, 1992.
- ATTWOOD, T. (1992) ‘Managing the Unusual Behaviour of Children and Adults with Autism’, professionals section, *Communication* 26 (2).
- BARA, B.G., BUCCIARELLI, M. & COLLE, L. (2001) ‘Communicative Abilities in Autism: Evidence for Attentional Deficits’, *Brain and Language* 77: 216–40.
- BARON-COHEN, S., LESLIE, A.M. & FRITH, U. (1985) ‘Does the Autistic Child Have a “Theory of Mind”?’’, *Cognition* 21: 37–46.
- BLACKBURN, R. (2000) ‘Within and Without Autism’, *Good Autism Practice* 1 (1): 2–8.
- BLACKMAN, L. (1999) *Lucy’s Story: Autism and Other Adventures*. Brisbane: Book in Hand. London: Jessica Kingsley, 2001.
- BOGDASHINA, O. (2003) *Sensory Perceptual Issues in Autism and Asperger Syndrome: Different Sensory Experiences – Different Perceptual Worlds*. London: Jessica Kingsley.
- BOWLER, D.M. (1992) ‘“Theory of Mind” in Asperger’s Syndrome’, *Journal of Child Psychology and Psychiatry* 33: 877–93.
- BROCK, J., BROWN, C.C., BOUCHER, J. & RIPPON, G. (2002) ‘The Temporal Binding Deficit Hypothesis of Autism’, *Developmental Psychopathology* 14: 209–24.
- BRYSON, S.E., LANDRY, R. & WAINWRIGHT, J.A. (1997) ‘A Componential View of Executive Dysfunction in Autism: Review of Recent Evidence’, in J.A. BURACK & J.T. ENNS (eds) *Attention, Development, and Psychopathology*, pp. 232–59. New York: Guilford.
- CESARONI, L. & GARBER, M. (1991) ‘Exploring the Experience of Autism through Firsthand Accounts’, *Journal of Autism and Developmental Disorders* 21 (3): 303–13.
- COURCHESNE, E., TOWNSEND, J., AKSHOOMOFF, N.A., SAITOH, O., YEUNG-COURCHESNE, R., LINCOLN, A.J., JAMES, H.E., HAAS, R.H., SCHREIBMAN, L. & LAU, L. (1994) ‘Impairment in Shifting Attention in Autistic and Cerebellar Patients’, *Behavioral Neuroscience* 108 (5): 848–65.
- DAHLGREN, S.O. & TRILLINGSGAARD, A. (1996) ‘Theory of Mind in Non-Retarded Children with Autism and Asperger’s Syndrome. A Research Note’, *Journal of Child Psychology and Psychiatry* 37: 759–63.
- ENGEL, A.K., FRIES, P. & SINGER, W. (2001) ‘Dynamic Predictions: Oscillations and Synchrony in Top-Down Processing’, *Nature Reviews: Neuroscience* 2: 704–16.
- FRITH, U. (ed.) (1991) *Autism and Asperger Syndrome*. Cambridge: Cambridge University Press.
- GARNER, I. & HAMILTON, D. (2001) ‘Evidence for Central Coherence: Do Children with Autism Experience Visual Illusions?’, in *Autism: The Search for Coherence*, pp. 75–85. London: Jessica Kingsley.
- GHAZIUDDIN, M., GHAZIUDDIN, N. & GREDEN, J. (2002) ‘Depression in Persons with Autism: Implications for Research and Clinical Care’, *Journal of Autism and Developmental Disorders* 32 (4): 299–306.
- GOLDSTEIN, G., JOHNSON, C.R. & MINSHEW, N.J. (2001) ‘Attentional Processes in Autism’, *Journal of Autism and Developmental Disorders* 31 (4): 433–40.
- GRANDIN, T. (1995) *Thinking in Pictures*. New York: Vintage/Random House.
- GRANDIN, T. & SCARIANO, M.M. (1986) *Emergence, Labelled Autistic*. Novato, CA: Arena.
- GREEN, J. (2001) *Language*. Milton Keynes: Open University Press.

- HAPPÉ, F.G.E. (1999) 'Autism: Cognitive Deficit or Cognitive Style?', *Trends in Cognitive Sciences* 3: 216–22.
- HERMELIN, B. (2001) *Bright Splinters of the Mind: A Personal Story of Research with Autistic Savants*. London: Jessica Kingsley.
- HOBSON, R.P. (1990) 'On the Origins of Self and the Case of Autism', *Development and Psychopathology* 2: 163–81.
- HUGHES, C. & RUSSELL, J. (1993) 'Autistic Children's Difficulties with Mental Disengagement from an Object: Its Implications for Theories of Autism', *Developmental Psychology* 29: 498–510.
- JORDAN, R.R. (1990) 'Me and You: A Problem for Autism?', in *Experimental Psychology*, pp. 157–71. Originally presented at the Durham Conference, UK. Proceedings obtainable from Autism Research Unit, School of Health Sciences, The University of Sunderland, Sunderland SR2 7EE, UK.
- JORDAN, R.R. (1999) *Autistic Spectrum Disorders: An Introductory Handbook for Practitioners*. London: Fulton.
- JORDAN, R.R., MACLEOD, C. & BRUNTON, L. (1999) 'Making Special Schools Specialist: A Case Study of the Provision for Pupils with Autism in a School for Pupils with Severe Learning Difficulties', in *Good Autism Practice*, April, pp. 27–43. The School of Education, The University of Birmingham, UK.
- KANNER, L. (1943) 'Autistic Disturbances of Affective Contact', *Nervous Child* 2: 217–50.
- KLIN, A., JONES, W., SCHULTZ, R.T. & VOLKMAR, F.R. (2003) 'The Enactive Mind. From Actions to Cognition: Lessons from Autism', *Philosophical Transactions of the Royal Society of London, Series B* 358: 345–60.
- LAWSON, W. (1998) *Life Behind Glass: A Personal Account of Autism Spectrum Disorder*. Lismore, NSW: Southern Cross University Press. London: Jessica Kingsley.
- LAWSON, W. (2001) *Understanding and Working with the Spectrum of Autism*. London: Jessica Kingsley.
- LEE, A. & HOBSON, R.P. (1998) 'On Developing Self-Concepts: A Controlled Study of Children and Adolescents with Autism', *Journal of Child Psychology and Psychiatry* 39: 1131–44.
- LOVAAS, O.I., SCHREIBMAN, L., KOEGEL, R. & REHM, R. (1971) 'Selective Responding by Autistic Children to Multiple Sensory Input', *Journal of Abnormal Psychology* 77 (2): 211–22.
- LYONS, J. (1968) *Introduction to Theoretical Linguistics*. Cambridge: Cambridge University Press.
- MARI, M., CASTIELLO, U., MARKS, D., MARRAFFA, C. & PRIOR, M. (2003) 'The Reach-to-Grasp Movement in Children with Autism Spectrum Disorder', in *Autism, Mind and Brain*, special issue of *Philosophical Transactions: Biological Sciences* 358 (1430): 393–403.
- MOTTRON, L. & BURACK, J. (2001) 'Enhanced Perceptual Functioning in the Development of Autism', in J.A. BURACK, T. CHARMAN, N. YIRMIYA & P.R. ZELAZO (eds) *The Development of Autism: Perspectives from Theory and Research*, pp. 131–48. Mahwah, NJ: Erlbaum.
- MOTTRON, L., BURACK, J., STAUDER, J. & ROBAEY, P. (1999) 'Perceptual Processing among High-Functioning Persons with Autism', *Journal of Child Psychology and Psychiatry* 40 (2): 203–12.
- MURRAY, D.K.C. (1986) 'Language and Interests', unpublished thesis, University of London.

- MURRAY, D.K.C. (1992) 'Attention Tunnelling and Autism', in *Living with Autism: The Individual, the Family, and the Professional*. Originally presented at the Durham Conference, UK. Proceedings obtainable from Autism Research Unit, School of Health Sciences, University of Sunderland, Sunderland SR2 7EE, UK.
- MURRAY, D.K.C. (1996) 'Shared Attention and Speech in Autism', in *Therapeutic Intervention in Autism*. Originally presented at the Durham Conference, UK. Proceedings obtainable from Autism Research Unit, School of Health Sciences, University of Sunderland, Sunderland SR2 7EE, UK.
- OZONOFF, S., STRAYER, D.L., MCMAHON, W.M. & FILLOUX, F. (1994) 'Executive Function Abilities in Autism and Tourette Syndrome: An Information Processing Approach', *Journal of Child Psychology and Psychiatry* 35: 1015–32.
- PLAISTED, K.C. (2001) 'Reduced Generalization in Autism: An Alternative to Weak Central Coherence', in J.A. BURACK, T. CHARMAN, N. YIRMIYA & P.R. ZELAZO (eds) *The Development of Autism: Perspectives from Theory and Research*, pp. 131–48. Mahwah, NJ: Erlbaum.
- PLAISTED, K.C., O'RIORDAN, M. & BARON-COHEN, S. (1998a) 'Enhanced Discrimination of Novel, Highly Similar Stimuli by Adults with Autism During a Perceptual Learning Task', *Journal of Child Psychology and Psychiatry* 39 (5): 765–75.
- PLAISTED, K.C., O'RIORDAN, M. & BARON-COHEN, S. (1998b) 'Enhanced Visual Search for a Conjunctive Target in Autism: A Research Note', *Journal of Child Psychology and Psychiatry* 39 (5): 777–83.
- PLAISTED, K.C., SWETTENHAM, J. & REES, L. (1999) 'Children with Autism Show Local Precedence in a Divided Attention Task and Global Precedence in a Selective Attention Task', *The Journal of Child Psychology and Psychiatry* 40 (5): 742–54.
- ROEYERS, H., BUYSSE, A., PONNET, K. & PICHAL, B. (2001) 'Advancing Advanced Mindreading Tests: Empathic Accuracy in Adults with a Pervasive Developmental Disorder', *Journal of Child Psychology and Psychiatry* 42 (2): 271–8.
- RUSSELL, JAMES (2002) 'Cognitive Theories of Autism', in J. HARRISON & A. OWEN (eds) *Cognitive Deficits in Brain Disorders*. London: Dunitz.
- SEGAR, M. (1997) *Coping: A Survival Guide for People with Asperger Syndrome*. Nottingham: Early Years Diagnostic Centre. A version is also available at: <http://www.autismandcomputing.org.uk>
- SHAH, A. & FRITH, U. (1993) 'Why Do Autistic Individuals Show Superior Performance on the Block Design Task?', *Journal of Child Psychology and Psychiatry* 34 (8): 1351–64.
- WEBSTER, A., WEBSTER, V. & FEILER, A. (2002) 'Research Evidence, Polemic and Evangelism: How Decisions Are Made on Early Intervention in Autistic Spectrum Disorder', *Educational and Child Psychology* 19 (3): 54–67.
- WILLEY, L.H. (ed.) (2003) *Asperger Syndrome in Adolescence*. London: Jessica Kingsley.
- WILLIAMS, D. (1994) *Somebody Somewhere*. London: Doubleday.
- WILLIAMS, D. (1998) *Autism and Sensing: The Unlost Instinct*. London: Jessica Kingsley.
- WING, L. (1996) *The Autistic Spectrum: A Guide for Parents and Professionals*. London: Constable.
- WORLD HEALTH ORGANIZATION (1992) *The International Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines*, 10th rev. edn (ICD-10). Geneva: WHO.