

Autism, early narcissistic injury and self-organization: a role for the image of the mother's eyes?

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Abstract: Holland elucidated the new paradigm of self-organization in complex adaptive systems. This paradigm holds for all living systems, including the personality. In conjunction with the theory of archetypes, self-organization suggests two radical hypotheses, one about early development, the other about the origins of autism. Autism is associated with several medical conditions, with genetic markers, and with infant visual deprivation. However none of these factors is either necessary or sufficient to cause autism. It is hypothesized that each of these factors increases the likelihood of a primary *psychological* deficit: failure to acquire, or retain, the image of the mother's eyes. This hypothesis was initially derived from analytic work with patients who have early narcissistic injury and with patients who have mild autistic traits. Both diagnoses may arise from the same initial disturbance: Symington argued that autism is an extreme form of infantile narcissism. Indirect evidence for the image-of-the-eyes hypotheses comes from the evolution of primates, from infant-mother observations, from observations of infant vision, and from experiments on vision in other vertebrates. Byrd recently confirmed that the incidence of autism is increasing dramatically. The image-of-the-eyes hypotheses suggest that this increase may be linked to increased use of non-maternal childcare for young infants.

Key words: archetypal image, autism, eye contact, narcissistic injury, newborn, primary deficit, self-organization.

Introduction

My personality¹ is a synthesis of instincts, impulses, feelings, images², memories, ideas and attitudes, some conscious and some unconscious. It is a living psychological system which co-exists with my physical system. Like every

¹ By 'personality' I mean all the processes and systems which comprise the psychological life of a person.

² By 'image' I usually mean a representation, within the brain, of an external pattern or process which has been perceived via the senses. When the context requires it, 'image' may mean an external visual pattern, or an image in a patient's material.

other living system, the personality must *self-organize* (McDowell 1999; Saunders & Skar 2001, p. 318; Hogenson 2001, p. 607). It is not ordered from above, like a platoon in an army, but from within, like a group of people who gather together spontaneously around a common interest.

Though self-organization is spontaneous, it is not random: it leads to predictable forms. In a group that gathers around a common interest predictable patterns emerge. One person may accept responsibility, for example, and others may depend on that person to do so. This pattern expresses a pre-existing mathematical (spiritual) principle: the principle ‘guides’ the formation of the pattern. Each principle is specific and the total number of principles is limited. I argue that a pre-existing principle is what Jung called an *archetype-as-such* (for more explanation and evidence, see McDowell 2001a; for another view of archetypes, see Knox 1999, pp. 524–5; 2001, pp. 628–31; 2003 pp. 65–6).

I visualize such a principle not as an abstraction but as an internalized image. I may see the principle of responsibility as an image of a father. This is what Jung called an *archetypal image*. In part the principle guides my personality *by means of the internalized image*. When I need to organize myself for responsibility, I imagine myself as a father.

The foregoing suggests a novel question. The most important stage in the self-organization of the personality is the earliest stage. All subsequent development depends upon it. Can we identify a principle (and its internalized image) which operates very early? You may be sceptical. How could something as complex as the human personality begin with a few images? But the paradigm of self-organization has radical implications. Enormous complexity arises from the interactions of a few simple components. This is consistent with Jung’s view that archetypes generate the personality.

This theoretical paper proposes two related hypotheses. The first hypothesis is that *the acquisition of an internalized image of the mother’s eyes is a critical very early step in development. Once acquired, the image is associated with and therefore begins to represent (evoke) the feeling of being contained, that is, the principle of containment* (McDowell 2001b).

This first hypothesis is supported by data on the ontology and ontogeny of social gaze. (The second hypothesis comes later.)

The evolution of social gaze

We can deduce an evolutionary sequence by comparing modern primates. Humans evolved from ancestral monkeys and apes, which were very like modern monkeys, and apes. Within that evolutionary sequence social gaze became increasingly important.

In most primates the visible eye consists mainly of dark iris with only a very small proportion of sclera. The sclera is almost always brown or light brown rather than white. But in humans the visible eye has a large expanse of white sclera which provides a sharp contrast to the dark iris (Emery 2000, pp. 583,

585). This helps an observer to determine the precise direction of a human's gaze.

When viewing faces, a monkey shows an extreme bias for looking at the eyes and the small region surrounding the eyes. The eyes play a central role in a primate's facial expression and thus in emotional communication (ibid., pp. 585–6). Staring and frequency of eye contact are key social signals. The direction of one monkey's attention, coupled with its facial expression, conveys crucial information to a second monkey about the object of attention (*joint attention*). It may inform the second monkey about the social status of a third, or about food or about danger.

Apes, but not monkeys, appear to use the direction of another's gaze as a clue to the other's intended behaviour. This is more complex than joint attention because it requires an awareness of the other as a repository of potential behaviour. It seems that only humans, however, practise *shared attention* (ibid., pp. 588, 594), in which two individuals are each aware of the direction of the other's gaze (I know that she sees it and she knows that I see it). Shared attention is a component of *theory of mind*. In psychoanalytic terms its equivalent is *intersubjectivity*.

These observations are direct evidence that, as the primate's eye has evolved in appearance (towards more visual contrast between iris and sclera and hence towards a better signal of gaze direction), so it has evolved in psychological function (towards enabling intersubjectivity).

This is supported by experiments with human subjects (Baron-Cohen et al. 1997, pp. 323–5). Subjects were asked to identify complex emotional states (scheme, admire, interest, thoughtful, arrogant) from photographs of the whole face, from cropped photographs showing only the mouth, and from cropped photographs showing only the eyes and eyebrows. When the whole face or the eyes alone were seen, accuracy of identification was equally high. When the mouth alone was seen, accuracy was low. Thus the other's complex subjective state is conveyed by the image-of-the-eyes. This last conclusion is confirmed by the work of Klin et al. (2002, p. 809).

The development of intersubjectivity

Bion (1962/77, p. 36) described the breast-feeding mother's 'reverie... [which is] imparted to the channels of communication'. Winnicott (1971/86, p. 112) said:

when [the baby] looks at the mother's face... what the baby sees is himself or herself... the mother is looking at the baby and what she looks like is related to what she sees there.

Stern (1985, p. 139) described how the infant develops a sense of self within the infant-mother interaction. At the *intersubjective* phase, beginning around eight months, the infant senses that infant and mother each have inner mental states which they can share (I want that toy, and she knows that I want it.)

The mother contains the infant not only physically but also psychologically. Just as the infant's body develops 'within' the physical container of the mother's body and her actions, so the infant's sense of self develops 'within' the psychological container of the mother's inner life. That is, it develops 'within' the mother's awareness of and inner response to the infant. This is particularly the case for the intersubjective sense of self. If the infant could speak the infant might say:

I see that my mother sees me as lovable, so I see myself that way too.

In the words of Stern et al. (1998, pp. 907–8):

...the intersubjective goal...[is] a mutual recognition of each other's motives, desires, and implicit aims that direct actions, and the feelings that accompany this process...[This] also implies a signaling or ratifying to one another of this sharing... The work is asymmetrical, with the caregiver... doing the lion's share.

Stern's model of development suggests why the eyes are important. The mother senses the presence of the infant's inner life in part through the infant's eyes. Likewise, the infant senses the mother's inner life in part through the mother's eyes.

Infant and mother also engage each other through smell, taste, touch and sound. An infant has remarkable cross-modal perception. Infants recognize the smell of their own mother's milk (Stern 1985, pp. 39–40). Beebe, Lachman and co-workers have shown that by four months the infant-and-mother pair have developed vocal-rhythm coordination, the degree of which predicts both attachment and cognition at twelve months (Jaffe et al., 2001; for a review see Beebe, B. et al., 1997; for examples of mother and five-week-old infant interactions, *ibid.*, pp. 153–4; see also Gergely & Watson 1996.)

If the baby is born blind then it must detect the mother's inner life through the other senses. Infant-observation studies by Fraiberg (1977, pp. 3–9) and Als et al. (1980) compared groups of blind and sighted infants (all mothers were sighted):

For the blind infant, containment is more difficult. The visual focus is missing. Closer tactile contact, nuzzling, and more continuous enveloping with the mother's voice make up for it... The sighted infant's interaction with the mother is similarly structured, yet not as explicit, nor are the cycles repeated as often, as containment and goal attainment are facilitated by visual feedback... the process of implementation is much more conscious for the mother of the blind infant

(*ibid.*, pp. 198, 201)

Considerations of space prevent further discussion of non-visual modalities. The above observations demonstrate that, for a sighted infant, a visual image of containment is central.

You may object that the infant internalizes the image of the mother's whole face, not just the eyes. Visually, however, the eyes are highlighted in the face

by virtue of their duplication, intense colour, extreme light–dark contrasts, sharpness of edge, regular shape (which is echoed by moving curved lashes and brows), and rapid movements. That the movements of the mother’s eyes *follow* (are contingent with) the infant’s movements must make the eyes the more compelling. Gergely (2001, p. 411) notes that ‘young infants are very sensitive to the contingent relationships between their motor responses and consequent stimulus events’. The mother also follows her infant with ears and nose, but these are visually undistinguished and they give no evidence of following. Even to an adult the eyes are visually compelling; as an infant first learns to distinguish forms, the eyes are likely to be the first image the infant masters. The primacy of the image-of-the-eyes is also supported by evolutionary evidence (*v.s.*). Later in this paper I adduce further evidence: failure to make eye contact is characteristic of autism. Distortions in eye contact are also characteristic of early narcissistic injury. A newborn distinguishes between eyes averted and eyes gazing directly at the infant: the infant looks more often at the latter.

Self-organization

The new paradigm of self-organization in *complex adaptive systems* has been elucidated by Holland (1998, pp. 229–31) and others. In complex adaptive systems (including all living systems) a limited number of simple elements spontaneously assemble themselves into a hierarchy of increasing levels of complexity. The personality, therefore, must organize itself from simple psychological elements (McDowell 2001a, p. 653). Any sensory image which is reliably acquired very early in development would comprise one of these initial elements.

You may object that the latter is mere assertion unless I can show that the image-of-the-eyes is acquired *because* it represents a self-organizing principle. But self-organization is not teleological (*ibid.*, p. 644). It is the spontaneous coming together of whatever elements happen to be present. What the image-of-the-eyes represents would be determined by the infant’s association of simultaneous events.

At birth the infant emerges from a container, the womb, which had previously met many needs. The infant’s personality must then organize itself to ensure continued physical and psychological containment. Stern (1977, pp. 18, 37–8) has shown that at about six weeks, for example, the infant learns to make *continuous eye contact* with the mother. Stern observed that continuous eye contact stimulates the mother to play more with the infant: she plays with facial expression, with voice, with face presentations, with head movements, and with proximity games. In this manner she contains her infant’s impulse to play. For more than 70% of playtime a mother gazes at her infant’s face; her average gaze duration is extremely long (20 seconds).

To establish continuous eye contact the infant must learn to recognize the mother’s eyes. This means that the infant must, in some sense, acquire an internal image-of-the-eyes. (In order to recognize something I must have a stored

internal image to compare it with.) Several lines of biological evidence show that a cerebral cortical image which is peculiar to humans cannot be genetically pre-wired: the total number of genes is too small, human evolution is too fast relative to genetic change, and most wiring in the cortex is determined by sensory input (McDowell 2001a, pp. 640–2). If the internal image of the mother's eyes is not pre-wired in the cortex, then it must be acquired from the environment.

Failure to internalize the image

Bion, Winnicott and Stern (*v.s.*) have all shown that an infant's personality cannot develop without containing. If the infant fails to acquire the image-of-the-eyes in the first weeks of life, the likely result, I propose, would be a pervasive cascade of developmental failure. This leads to my second hypothesis: *failure to acquire (or to retain) the image of the mother's eyes is the primary deficit in autism*. A corollary is that *mild* autistic traits may originate in a *disturbance* in the internalized image-of-the-eyes.

Gomberoff et al. (1990, p. 252) surveyed psychoanalytic studies which support their view that 'the emergence of an autistic object... [represents] consolidation of more extended phenomena described as narcissistic'. Symington (1993, pp. 81, 105) argued that 'infantile autism is closely allied to infantile narcissism... autism is another way of describing an extreme form of narcissism'. A person with autism tends to ignore the other's gaze. A person with early narcissistic injury tends to seek the other's gaze insatiably. For both there is a diminished capacity to take in, and be satisfied by, the other's gaze. If these two syndromes represent different positions on the same spectrum then, I propose, they both originate in a disturbance of the internalized image-of-the-eyes. This suggests that the unconscious productions of an adult with narcissistic symptoms may include disturbed images of the eyes.

In the next sections I discuss the incidence of autism and the biological factors which are statistically associated with it. Then I present the case of 'Francesca', who had symptoms of early narcissistic injury and produced a series of images of the eyes. Next I illustrate, in the case of 'Sean', the combination of mild autistic traits and symptoms of early narcissistic injury. Then I discuss experiments on vision in human infants and in other vertebrates. Finally I discuss more severe autism.

The incidence of autism is increasing

In America and Europe the number of children diagnosed with profound autism has increased drastically. For California in 1987, 1998, and 2002 the numbers are 2,778, 10,360, and 20,377. Byrd et al. (2002) showed that the increase from 1987 to 1998 cannot be accounted for by changes in diagnostic criteria, by mis-classification, or by the immigration of autistic children. Huff et al. (2003) estimate that among children born in California in 1976 the

incidence of autism was one in 2,500, while among children born in 1997 the incidence was one in 323.

Genetic changes cannot account for this sudden increase. (This contradicts recent suggestions that autism is caused by a genetic defect in a specialized brain module—see Gergely 2001, p. 418; Trevarthan & Aitken 2001, pp. 3–4, 30; see also Elman et al. 1998, p. 368). The increase must, therefore, be caused by an as-yet-unknown change in environmental factor(s). There must be a vigorous new effort to identify these factor(s). The problem should be debated across disciplinary lines. This paper makes a timely contribution to that debate.

A biological primary deficit?

Autism is without question a pervasive developmental disorder: a primary deficit in the foetus or infant begins (to a greater or lesser degree) a cascade of secondary developmental failures. After several decades of research, however, the primary deficit has not been identified (Ungerer 1989, pp. 85–8). A variety of biological factors are statistically linked to autism. In current literature the overwhelming weight of opinion is that the primary cause (deficit) of autism is biological. Rodier (2000, p. 59), however, who argued for a biological cause, said that:

In utero exposure to rubella (German measles) or to birth-defect-causing substances such as alcohol . . . increases the chances that autism will develop. People with certain genetic diseases, such as phenylketonuria and tuberous sclerosis, also have a greater chance of developing autism. None of these factors, however, is present frequently enough to be responsible for many cases.

Rodier's group have identified an allele (a mutation) which plays a role in autism:

The allele's . . . presence does not guarantee that autism will arise. The variant allele occurs in about 20 percent of the people who do not have autism, and in about 40 percent of those who do. The allele doubles the risk of developing the condition. But in about 60 percent of people with autism, the allele is not present.

(*ibid.*, p. 63)

In identical twins, one twin may be autistic and the other not.

Thus many biological factors are associated with autism. A true primary cause, however, would be both necessary (without it, no autism) and sufficient (when present, so is autism). None of the biological factors is either necessary or sufficient.

Cascades

The logic of causation in a cascade is relevant here. The event which sets a cascade in motion, the primary cause, is *the same in kind* as the events which comprise the cascade.

The following example shows why this distinction is important. Death results from a cascade of bodily failure. Households with handguns show an increased frequency of death. But households with a high-cholesterol diet also show an increased frequency of death. A gunshot wound is neither necessary nor sufficient to cause death. A high-cholesterol diet is likewise neither necessary nor sufficient. The cessation of the heartbeat, however, is both necessary and sufficient. It is also the same in kind as the other bodily failures which lead to death. It is the primary deficit which begins the cascade. When we identify the primary deficit we can see how other factors (gunshot and cholesterol) increase the frequency of the primary deficit.

None of the suspected biological factors is the same in kind as the cascade of developmental failures which is autism. It follows that none of the biological factors can be the primary deficit; the primary deficit should be a very early failure in *psychological* development.

Tracking the caregiver's face

The following is further evidence that a biological factor is not the primary deficit. The correlation between autism and congenital infant blindness is stronger than the correlation between autism and any other biological factor (Brown et al. 1997, p. 701; Hobson et al. 1999, p. 54). If the mother of a blind baby relates to it actively by means of touch and sound then her baby's development may be close to normal; if the mother does not do so then her baby is very likely to develop autism (Als et al. 1980, pp. 198–201). These autistic children do not have higher-than-normal rates of any other biological factor. What they have in common is blindness and a consequent failure to relate to the mother in infancy. Tustin (1966, p. 54) provides the clinical example of 'John', a young boy with autism, whose newborn behaviour had resembled that of a blind newborn: he was 'a poor sucker and... for one week after birth he did not open his eyes'.

There is also a high incidence of autism in children who were institutionalized at birth (Fraiberg 1977, pp. 185–187). There was a high incidence, for example, in children who were adopted in the U.K. from orphanages in Romania (Rutter et al. 2001, p. 101). The Romanian children are normally sighted but were neglected in cribs during infancy. They do not have higher-than-normal rates of any biological factor. Infants who have cranial nerve palsy with consequent paralysis of eye muscles are also liable to develop autism (Stromland 2002, p. 35).

These three different groups, congenitally blind children, children institutionalized at birth, and children with cranial nerve palsy, share one common deficit: they are all unable to track a caregiver's face. In the absence of any biological cause, therefore, it seems that early deprivation in visual stimulus by a caregiver's face often leads to autism.

The lack of early visual stimulus by a caregiver's face is neither necessary nor sufficient to cause autism. While not itself the primary deficit, it must increase the incidence of a primary deficit.

A very early step in development

Mahler and co-workers (1975, pp. 42–6) observed that face-to-face interaction between infant and mother, especially 'the eye-to-eye encounter', helps an infant to develop beyond the initial *normal autistic phase*. Fordham argued (1976, pp. 88, 90–2) that autism represents the

failure of the self to deintegrate... [because] there has been a basic catastrophe in the relation between the baby and the breast-mother... Sometimes the mother can recognize that... apart from the physical acts involved in feeding... there is no effort to relate to her, *no play, no looks, no smiles* (my italics).

Mahler's and Fordham's observations are consistent with the image-of-the-eyes hypotheses. Bergman's compelling demonstration (1985, pp. 91–120) that autism can sometimes be cured by analytic treatment is also evidence that its cause is developmental.

An autistic child seems not to know that his or her mother has a subjective self. Hobson et al. (1999, p. 55) suggested that the 'final common pathway' (primary deficit) is a failure to develop a *theory of mind*. A theory of mind (or the lack thereof) may be inferred from a child's visual behaviour. An autistic child makes little eye contact, pays little attention to the mother's face, and ignores the mother's facial expressions. Consequently the child lacks *social referencing*: it cannot evaluate an ambiguous situation by checking the mother's expression. The child also lacks *shared attention*: it cannot follow the mother's eyes, see what she is seeing, nor point to share feelings about something with the mother. Such deficits have recently been demonstrated at less than six months. These studies used home movies of infants who were later diagnosed as autistic (Maestro et al. 2001). Since some form of eye contact begins at birth (Farroni et al. 2002), a deficit in eye contact may also begin at birth.

Klin et al. (2002, p. 809) have shown that an autistic person looks preferentially at the mouth rather than the eyes in another's face. A normal person does the opposite. Klin et al. suggest that this preference may represent a core social deficit in autism. From evidence of this kind, Trepagnier (1998, p. 158) proposed that brain differences in autism are secondary. She suggested that a failure in face processing is the key.

The image-of-the-eyes hypothesis

Both Hobson and Trepagnier have proposed that developmental deficits cause autism. I propose that the primary deficit is the failure to acquire or

retain the internalized image of the mother's eyes. A blind infant who is actively mothered acquires an equivalent image through the other senses. A blind infant who is not actively mothered may fail to acquire an equivalent image. A sighted infant who is neglected may also fail to acquire or retain the image. The other biological factors associated with autism all increase the risk that the infant will not acquire or retain the image. As I suggested earlier, the acquisition or functioning of the image may be disturbed to varying degree.

The case of Francesca

I saw Francesca twice a week for individual sessions, face-to-face. Throughout the clinical work described here I did not at any time mention to Francesca the image-of-the-eyes. (I believed that any comment on her use of eye contact might interfere with her archaic transference needs—see below.) Nor did Francesca herself interpret her images in terms of the eyes. Because the image functions at an archaic level, I argue, its meaning is likely to be repressed. Images suggesting the mother's eyes recurred, nevertheless, over five years of analytic treatment.

Had I shared with Francesca my interpretations of her images, any subsequent productions would have been influenced by my suggestion. Since I did not, her productions are objective evidence. Any assent she might have given to my interpretations would not have constituted objective evidence.

Francesca was Hispanic. She had a supervisory job in a big hospital. When she began her analysis she complained of depression, insomnia, and muscle pain. She was plagued by self-criticism. She would flinch at her own destructive images and opinions of herself. She was taking an antidepressant and a sleeping drug. Her insomnia and muscle pain were consistent with poor early holding: she seemed to be holding herself stiff with wakeful tension. In time symptoms of early narcissistic injury (Kohut 1971, pp. 25–8) became apparent: Francesca was controlling, had an exaggerated desire for attention, was self-referential, tended to remain in autoerotic fantasy rather than to engage with others, and was negatively grandiose (see below).

Francesca's father was often fearful. He repeatedly failed at his job. The family could not pay for health care and feared losing their home. Francesca's mother was severely narcissistic. She would not *mirror* Francesca. (To be 'mirrored... is to be looked upon with joy and basic approval by a delighted parental self-object' [Kohut 1984, p. 143]). Rather, Francesca's mother demanded that Francesca mirror her: she complained incessantly to Francesca about Francesca's father and about her own frustrated hopes. She had not developed her own considerable creative talents and now she wanted to fulfil these through Francesca. She complained repeatedly that Francesca was not creative enough. She told Francesca she was ugly and resembled no one in her family, asking, 'Where did you get your features from?'

Kohut (1971, pp. 25–8; 1978, pp. 489–94) argued that mirroring supports *healthy grandiosity*, a sense of being powerful, admirable, and desirable. Under favourable circumstances such feelings are gradually internalized to create a vigorous sense of self.

A narcissistically wounded mother, deficient in her own sense of self, may react to her infant with envy and rage and may withhold mirroring. Unable to develop a healthy sense of self the infant compensates with archaic defences. These may translate, in adult life, to feeling grandiose, boundlessly important, or negatively grandiose, boundlessly worthless.

If my parent withholds mirroring, then I experience my parent (or my parent's eyes?) as a vortex into which I put more and more of myself, seeking in vain for affirmation. If, as an analyst, I am unconscious of my own narcissism, then I may withhold mirroring and thus deepen my patient's narcissistic injury.

A related image occurred in the case of Rachel (McDowell 2001a, pp. 637–8). Like Francesca's mother, Rachel's mother was severely narcissistic. Rachel dreamt that her mother was a witch who flew over the town and burnt up the lawns. Green lawns suggest new life. There are similar images in mythology. In Egyptian myth Sekhmet, the avenging *eye* of the sun god, flew over the desert and burnt up the people, turning them into pools of blood which she meant to drink. Thus the eye both burned and devoured. In Indian myth Kali burns up the world with her third eye. There is also the myth of the evil eye (of envy), which must be averted. These myths constitute objective evidence that the image-of-the-eye is universally important in human psychology, and that it sometimes symbolizes devouring narcissistic envy and rage.

Francesca was not allowed to have her own needs or to complain. She became prematurely controlled and self-reliant. She began her life-long habit of self-criticism. Though this served to guard her from even greater attacks by her mother, it was also a manifestation of negative grandiosity.

At high school Francesca excelled for one year. She acted in a play that was a hit and also won academic prizes. But at the prize giving her father wept. She believed he wept because her success made him feel more of a failure. She said she knew then that her role in the family was to fail like her father. She said she never excelled again.

After eight months of analysis Francesca dreamt:

I am looking at a photograph of myself floating on my back in a river. There had been a swimming accident. Then I am presented with a certificate or an old-fashioned report card. I have won a prize for assisting others. But a check mark on the report also shows that I was drowned.

To this dream Francesca associated her father's tears at her prize giving. Unlike a bathtub or a swimming pool, a river tends more to devour than to contain: this is confirmed in the dream by Francesca's drowning. A certificate reflects achievement in the outer world, the father's realm. This dream and Francesca's associations to it suggested that her ability to win prizes was

drowned in her father's tears. She sacrificed herself to take care of him. Thus Francesca's healthy narcissism was undermined not only in her mother's eyes but also in her father's eyes.

Archaic mirroring

Sometimes Francesca would look at me with a particular fixity of gaze. She would talk and I could only listen. I had to meet her gaze continuously. I could not move. If I moved or spoke she would show by a frown, or a shake of the head, or by pointedly noticing my movement that I was intruding. With some patients these intervals of fixed gaze last the whole session. 'Mary' sat mostly in silence, three sessions a week, for months. If my gaze wandered she would protest silently with a smile and use her eyes to bring my gaze back to her. If this goes on too long my eyes ache; I want to rub them and let them move around freely. My physical eye strain is real but it is also a metaphor for psychological strain. My attention is fixed. In the countertransference I may feel panic and claustrophobia. Perhaps I envy the attention my patient is getting. I imagine that a mother sometimes feels this way with her newborn baby. I am describing what Kohut (1984, pp. 66–67) called an *archaic mirroring transference*. Francesca's healthy grandiosity had been injured. At these intervals of fixed gaze Francesca showed an archaic 'need for immediate and perfect mirroring'. Everything I did had to reflect her being; there could be no evidence of my independent being.

My impression in the room with Francesca was that she was immersing herself and finding herself in my eyes. Listening and understanding were essential to the mirroring, but seeing her with my eyes seemed to be primary. A narcissistic wound often begins in infancy and Francesca's somatic problems suggested pre-verbal injury. Thus it makes sense that a non-verbal interaction was primary in the healing process. Francesca needed me to 'have eyes only for her'. She could then internalize the image of my admiring eyes and thereby transform her internalized image of her mother's rejecting eyes.

We also analysed how her parents, her ex-husband, her brother, and her previous therapist had failed to see her. Her previous therapist said he saw her as a 'thin head on a stick'. Francesca worked through anguish and fury over these failures. She said: 'I feel safe with you because I feel that you see me without projections'.

Francesca had loved dancing to salsa, but she had given it up abruptly in her twenties when her then-husband told her that he was embarrassed by the way she looked when she danced. After a year-and-a-half of treatment, Francesca brought tapes to several sessions and danced to the music while I watched and admired her. She could take this risk only because she felt truly seen, both physically and emotionally. Francesca's dancing also suggested that, in the transference/countertransference, a 'father/daughter' erotic playback (Samuels 1985, p. 29) helped to heal her narcissistic injury.

Bathing in the mother's eyes

In addition to other body-work, Francesca swam several times a week. She said that through swimming she was learning to relate to her own body. After two-and-a-half years of treatment she had a recurrent fantasy:

I am swimming underwater, in a dark, rock-enclosed quarry or lagoon. You sit on the side. You help me out of the water when I am tired. You wrap me in dry towels, like receiving blankets, and I cry.

Francesca said:

It's about layers of pain. I've never felt safe before. Mother was always anxious. You are the safe place she never was.

In a later version of this fantasy, Francesca imagined:

I can raise my arms and disappear beneath the water. It is quite safe as long as you are watching over me.

This image suggested baptism, perhaps drowning and rebirth. The image of the receiving blanket also suggested rebirth. Francesca interpreted the lagoon as an image of the womb.

But a pool of water sometimes symbolizes an eye. Narcissus saw himself reflected in, that is, was 'seen by' a pool of water. Thus Francesca's image of the dark, rock-enclosed lagoon suggested an eye in its bony orbit. Francesca seemed to be immersing herself in my mothering eye and thus repairing a developmental arrest.

After two years, Francesca's depression had lifted and her somatic problems were diminished. After three years she achieved a major promotion in her job, in part because she could imagine herself as grand enough. For the first time in her life she could, in her words, 'be somebody in the world'. Thus Francesca's healthy grandiosity could emerge. (While the image of the mother's eyes seemed to be crucial it was not the only somatic image which aided these developments. Erotic images, particularly of the analyst's phallus, were also important in the first three years.)

Francesca had dreamt that she was bathing (swimming and then being wrapped in towels), watched over by her analyst, in a dark, rock-enclosed lagoon. This dream occurred when she was, in sessions, demanding that I watch her with an unblinking gaze. I suggest, therefore, that the lagoon was a symbol of the mother/analyst's eye. Accordingly, I call Francesca's image 'bathing in the mother's eyes'.

Every child needs to be seen with love and approval by his or her mother. If my interpretation of Francesca's image is correct, then related images should appear in the analyses of other patients for whom being seen is crucial. Mary, she who earlier had demanded that I gaze at her in silence for the whole of each session, dreamt repeatedly that she took showers with older women ('bathing in their eyes'). Another patient, 'Heather' had large

breasts as a teenager. Her mother had repeatedly molested her by ‘grabbing at them’. She dreamt that, while showering, she was exposing her breasts without fear while a man (analyst/mother?) admired her for her beauty. Another patient told me of her thirteen-year-old daughter. Her daughter took prolonged showers and wanted her mother to stand beside her as she did so. Her mother had to hand her the soap and the flannel, and talk to her, and witness her pubescent body. At a time when her new sense of self had to be consolidated by her mother’s gaze, she too was ‘bathing in her mother’s eyes’.

The image also appears in myth. Aphrodite would return to her temple to be bathed by the three female graces. This restored her youthful beauty and virginity, that is, her feminine self. In Celtic myth, warriors who had been wounded in battle would be healed, no matter how serious the wound, if they immersed themselves in the ‘Cauldron of Rebirth’ (Green 1993, p. 76). The healing of warriors is a metaphor for the healing of an injured capacity for self-assertion. Such healing requires mirroring. Like the rocky lagoon, the hard-edged, liquid-filled cauldron resembles the mother’s eye.

Thus Francesca’s image seems to be repeated independently in other patients, in an adolescent girl, and in myth. This is evidence that it is an archetypal image, one that recurs in many places and at many times.

The devouring eye

For the first three years Francesca’s transference was mainly positive. Then I raised her fee and my negotiation was clumsy: I mentioned one fee and then settled, with her agreement, on a fee \$5 higher than that! This was no hardship for Francesca but it stimulated a negative transference. She imagined me as a big spider waiting for her in the centre of a web. She had a horror of big spiders. A web-with-spider is a container that devours. The orb of a web with a spider at its centre resembles the orb of the eye with its pupil. Thus Francesca’s image suggested that she felt trapped in the mother’s devouring eye.

I asked myself to what extent I was entrapping Francesca in order to meet my own needs. Certainly Francesca’s mother had used Francesca to feed her own narcissism. I asked Francesca if she felt I was feeding at her expense. Francesca said:

I’m afraid that you’ll accept me for a while and then lose patience; you’ll get tired of me. Or you’ll decide it’s not appropriate for me to continue. Then you’ll discard me.

Francesca said that these thoughts ‘opened an abyss of pain’. She had recreated this programme repeatedly in previous relationships. I said: ‘In all of this there was no good mother to take care of you’.

Next session Francesca wept. She said:

I decided then never to rely on my mother. It was too dangerous. I decided not to want anything so I wouldn’t be hurt when I didn’t get it.

Francesca then developed muscle pain in her shoulder. She was holding tension in her shoulder in an attempt, it seemed, to hold (mother) herself. Francesca then dreamt that

I have a cut or fissure in my skin, with a black spot at the bottom of it. It will not heal. The spot needs to be removed.

For the next week the image recurred obsessively. In her imagination:

I keep trying to fix it but nothing works. It is an open wound. Probing it was too painful. The idea makes me ill. The wound becomes disembodied, much too deep to be on my finger.

Such a fissure would necessarily be widest in the middle and taper towards each pointed end, like an eye. This shape, together with the black central spot, suggests a frightening image of the eye and its black pupil. Tustin's autistic patient 'John' (1966, p. 60) described a similar image. He said he avoided looking at people's eyes 'because of the black hole in the middle.' Stockdale-Wolfe (1993, pp. 14, 18–9) also reported frightening images of the eyes.

Francesca's interpretation of the fissure-with-black-spot image was consistent with mine: she said it represented 'my narcissism'. I have argued that a threatening image of the eye is central to narcissistic injury. Francesca said she was angry about her own self-referencing and self-preoccupation:

I fault my mother for her narcissism, but I fight it in myself. Very few things take me out of myself. I judge it harshly in my mother and also in myself. Is anybody looking? What are they seeing? What are they thinking?

Again, Francesca associated the fissure-with-black-spot image to seeing, the function of the eye. Francesca was beginning to work through pathological narcissism. A year later Francesca would report that she could accept herself more, that she was no longer plagued by self-criticism. Her negative grandiosity had diminished.

Commentary

The (sometimes disturbed) image of the mother's eyes seemed to reappear in several different analyses. That the image sometimes represents an archaic transference is consistent with it being acquired early. For Francesca, Mary, and Heather the image seemed to be evoked by the analyst's mirroring, as the narcissistic injury was beginning to heal.

Narcissistic injury coupled with mild autistic traits

The autism-spectrum quotient

Baron-Cohen et al. (2001, pp. 8, 10–1) argued that autism represents an extreme on a continuum of normal psychological styles. They designed a

screening instrument which measures the autism-spectrum quotient. Individuals tested themselves. Scores were grouped. Averages for each group were: females 15.4; males 17.8; humanities students 16.7; science students 18.5; gifted mathematics students 24.5; subjects diagnosed with Asperger's syndrome 35.8. When the subjects diagnosed with Asperger's syndrome were retested by one of their parents, scores averaged 2.8 points higher.

Sean

Sean had symptoms of early narcissistic injury: he was controlling, continually fantasized being 'number one' amongst others, and continually desired that others admire his (flamboyantly dressed) person. He felt global rage when others failed to attend to his needs. Sean's parents, like Francesca's, refused to mirror him but demanded that he attend to them. When alone as a child (he was often alone) he would wear his mother's tight clothing.

After seven years of treatment, Sean's autism-spectrum quotients were measured at 20 (by himself) and 27.5 (by his wife). These scores were similar to the averages for gifted mathematicians as measured by Baron-Cohen et al. Sean was a gifted botanist. His mild autistic traits included social deficits, a tendency to focus upon details, patterns, and categories and a tendency to pursue impersonal activities obsessively. These included computer chess, painting, and collecting exotic objects. Sean's narcissistic and autistic symptoms changed significantly with analysis and group therapy.

In the first year of his analysis Sean painted an image of a gryphon with glaring, threatening eyes. The gryphon guarded stones or eggs which resembled suns, on an alien planet under a huge sun (thus his painting depicted an alien solar system). A series of subsequent paintings included an oppressive outsized sun. The image of a solar system is like an image of the orb of the eye with the sun as its pupil. As discussed above a sun is sometimes a metaphor for a devouring eye. Sean's 'alien' images of gryphon's eyes, suns, sun-like stones, and strange solar systems may express the psychological alienation from the other's eyes which is characteristic of autism. I have observed images of solar systems in the material of two other autistic patients.

How the infant 'chooses' the image-of-the-eyes

If, for normal sighted infants, one image is associated with containment, then there must be a reliable mechanism which guides the infant towards that image. Here I discuss that mechanism.

The inheritance of reflexes

As noted earlier, neither a cortical image nor a pattern of behaviour which is peculiar to humans can be genetically inherited. A *reflex*, however, is genetically

inherited. A reflex is not peculiar to humans but is intrinsic to the function of an organ. Blinking and coughing are examples. When the eyelid evolved in reptiles it necessarily had a movement reflex (Gans & Parsons 1973, p. 104). A reflex is a simple element of behaviour involving only a few muscles which is hard-wired into the nervous system. I will show that reflexes help to predetermine the image which a newborn chooses to represent containment.

Visual edges in the image-of-the-eyes

In a newborn infant some behaviours seem to precede learning. For example, Spitz and Wolf (1946) found that an infant gazed preferentially at a human face or at a schematic drawing of a face. A line drawing of two eyes, a nose, and a mouth was sufficient. They suggested that the infant inherits a schematic image of the human face and seeks a match for that image in its immediate environment.

Friedman (1964) and Haaf and Bell (1967) proved, however, that the infant gazed preferentially only at some elements of the face. It made no difference if the elements were scrambled in the drawing. The infant gazed preferentially at moving edges. The most attractive moving edges within the mother's face were the sharp angles at the corner of the eyes (two edges intersecting), the light/dark contrasts between the pupil and the white sclera of the eye (an edge), and the contrast between eyebrow and skin (an edge) (Stern 1977, p. 37). There are also edges around the lips and around the outer rim of the head.

Haith (1966, p. 242), Karmel et al. (1974, pp. 45–7), and Salapatek (1975, p. 226) proved that, from birth to about one month, an infant seeks out any visual stimuli which includes both movement and 'edge density', that is, the concentration of edges in a given space. By two months the infant's vision is beginning to mature: the infant begins to recognize when facial features are scrambled and shows a preference for naturally ordered features.

Farroni et al. (2002) found that when a human newborn is presented two photographs of the same face, one gazing directly at the infant, the other with eyes averted, the newborn looks preferentially at the direct gaze. These authors argue that their results support theories of an innate 'eye-direction detector' or of a face-detection mechanism in newborns (see McDowell 2001a, p. 639). But, when one compares their direct-gaze and averted-gaze photographs (on line), it is vividly apparent that the former provides more visual edges. Their conclusion notwithstanding, Farroni et al.'s results support the hypothesis that a newborn detects eye contact via his or her preference for visual edges.

Visual edges and the cortex

Research on the vision of adult vertebrates (fish, frogs, cats, and monkeys) helps to explain the human infant's preference for visual edges (Michael 1969,

pp. 109, 114). All vertebrates analyse visual input primarily into a series of moving edges. The analysis is done by neurons in the retina of the eye and by neurons in areas of the visual cortex which are adjacent (closely connected) to the retina. This means that the brain does not initially 'see' a whole image. Rather it initially 'sees' a series of moving edges.

A computer analyses an image into a stream of digits, zeros and ones, which it records. The stream of digits contains the information needed to recreate the image but is not itself a spatial analogue of the image. In a similar fashion the retina and the adjacent visual cortex analyse the image into multiple streams of moving edges. Elsewhere within the brain, this data must be 'synthesized' in some way to form an 'internal image'. I imply nothing about the mechanism by which this is accomplished, nor about the nature of the internal image. These are not known. It is logically necessary, however, that an internal image is not achieved whole, like a photograph, but by synthesis.

The experiments of Friedman and Haaf and Bell (*v.s.*) distinguished a stage through which the infant must pass before it learns to see like an adult. Since the newborn recognizes moving edges, we know that the neurons in the newborn's retina and adjacent cortex are pre-wired (or very quickly wired) to analyse visual input into edges. The newborn also has functioning muscle reflexes which enable it to focus its eyes, to fix upon an object, and to track an object (Stern 1977, p. 34; 1985, p. 40). All this pre-wiring provides for the visual reflexes by which the newborn tracks the visual edges in its mother's face.

Cortical neurons have been identified which only fire when the infant recognizes a face (Elman et al. 1998, p. 116). Only after the infant has learned to 'synthesize' an internal image of the face could the infant discriminate between naturally ordered and scrambled images of the face. This explains what Salapatek (*v.s.*) observed experimentally, that at two months infants begin to distinguish between scrambled and ordered features.

Although the newborn can focus its eyes, it can only do so within a limited focal range. When it feeds, therefore, it cannot see the breast. But when the infant feeds, the mother's eyes are within the infant's focal range, provided that the mother is looking at the infant. Stern (1997, pp. 35-6) observed that, during breast-feeding, a mother spends about 70% of her time gazing at her infant's face. Thus the human infant-mother pair is designed to ensure that the newborn will stare at the sharp, high-contrast, moving edges of its mother's eyes. Hence, through learning, the infant must synthesize a cortical image of the mother's eyes (and face) and associate that image with breast-feeding.

It is perhaps my conscious sense of self which most distinguishes me, as a human, from other mammals. It is remarkable, therefore, that my sense of self may be initiated by the geometry of human breast-feeding. A cat's eyes are equally sensitive to moving edges but, because of the way the kitten feeds, it does not begin life gazing at its mother's eyes.

Temple Grandin: an autistic person's view

Sean had mild autistic traits. Grandin has more severe autism. She is an international expert on sensory stimulation in livestock. Grandin (1996, pp. 52–4, 65–81) argued that an autistic person suffers primarily from over-sensitivity which leads to sensory over-stimulation. In particular visual and auditory sensations are often overwhelming (ibid pp. 67, 73). 'Rapid shifting of attention between two different stimuli is very difficult'. For a related description of autistic symptoms see Stockdale-Wolfe (1993, pp. 9, 18). Grandin (1996, p. 76) quoted another autistic writer:

Reality to an autistic person is a confusing interacting mass of events, people, places, sounds and sights. There seem to be no clear boundaries, order, or meaning to anything. A large part of my life is spent just trying to work out the pattern behind everything. Set routines, times, particular routes and rituals all help to get order into an unbearably chaotic life.

Touch may also be overwhelming but 'touch is often their most reliable sense' (ibid., pp. 54, 65, 150). Smell is usually not overwhelming (ibid., p. 75). Grandin and Stockdale-Wolfe both argue that an autistic person withdraws in part to reduce sensory over-stimulation.

Grandin believes that the primary deficits in autism are biological. Her descriptions, however, suggest the contrary. Stern (*v.s.*) has shown that at six weeks the mother engages her infant in a dialogue, signalling with her eyes, face and voice. The mother both initiates stimulation and regulates its intensity. The infant must *learn* to modulate stimulation. The eye-and-voice dialogue would aid this learning. *Failure* of eye contact is characteristic of autism and may begin at birth. If the infant fails to enter the eye-and-voice dialogue then the modulation of visual and auditory stimulation may be compromised. Because the eye-and-voice dialogue does not rely upon touch or smell, failure of the eye-and-voice dialogue might compromise the modulation of touch and smell to a lesser degree. Thus early failure of eye contact might cause the symptoms Grandin describes. (As discussed earlier, there may be predisposing organic factors.)

The symptoms which Grandin describes resemble those of non-autistic adults who had been blinded from birth by cataracts and, in adult life, had their cataracts surgically removed. These adults 'found the visual world confusing, nonsensical, and a painful sensory experience. Many wished to be blind again' (Stern 1977, p. 34). They had to learn as adults to modulate their visual input. They could do so more readily than an autistic person, I argue, because their developmental deficit was not pervasive.

Future research

This paper suggests that we may identify some of the initial elements from which the personality organizes itself.

Autism may be investigated via the analyses of adults with mild autistic traits. Several questions may be answered objectively: Does the material of other narcissistic or autistic patients include disturbed images of the mother's eyes? Amongst people diagnosed with early narcissistic injury, is there a higher incidence of mild autism?

As noted earlier the incidence of autism in California has increased dramatically, apparently because of an environmental factor. It seems improbable that the physical or chemical environment has deteriorated rapidly enough to account for this increase. The image-of-the-eye hypothesis suggests an explanation. We know that the use of childcare, especially childcare soon after birth, has increased rapidly over this time period. Early non-maternal childcare has been shown to predict problem behaviour at 54 months (National Institute of Child Health and Development 2003). On average, childcare must afford less eye contact than parental care. (Childcare includes the use of television and video [Rideout et al. 2003].) Thus childcare may increase the risk of failure to acquire the image of the mother's eye. A prediction which can readily be tested is that the diagnosis of autism can be statistically linked to the use of early childcare.

TRANSLATIONS OF ABSTRACT

Holland a mis à jour un nouveau modèle pour l'organisation du soi dans des systèmes d'adaptation complexes. Ce modèle est valable pour tout système vivant, y compris la personnalité. Conjuguée avec la théorie des archétypes, l'idée d'une organisation du soi ouvre sur deux hypothèses radicales, l'une concernant les tous débuts du développement, l'autre concernant les origines de l'autisme. L'autisme est associé à plusieurs conditions médicales, aux marqueurs génétiques, et à une privation visuelle précoce. Cependant aucun de ces facteurs n'est nécessaire ou suffisant pour provoquer l'autisme. L'hypothèse avancée est que chacun de ces facteurs rend plus grande la possibilité de l'installation d'un des déficits psychologiques primaires qui est l'incapacité à acquérir ou retenir l'image des yeux de la mère. Cette hypothèse a été faite à partir du travail analytique avec d'une part des patients portant des blessures narcissiques précoces et d'autres part des patients ayant des traits autistes légers. Les deux pathologies pourraient dériver de la même perturbation initiale: Symington développe l'idée que l'autisme est une forme extrême de perturbation du narcissisme infantile. On trouve des preuves indirectes venant corroborer l'hypothèse de l'importance de l'image des yeux de la mère, dans ce que l'on sait de l'évolution des primates, dans des observations de la relation mère-nourisson, dans des observations de la mise en place de la vision chez le nouveau né, et dans des expériences faites sur la vision chez d'autres vertébrés. Byrd a récemment confirmé que l'incidence de l'autisme augmente de façon dramatique. L'hypothèse de l'image des yeux de la mère donne une explication et permet une étude prévisionnelle statistiquement mesurable de cet accroissement.

Holland erlaeuerte die neue Auffassung der Selbstorganisation innerhalb komplexer, anpassungsfahiger Systeme. Diese Auffassung trifft auf alle Lebenswesen zu, einschliesslich jener der Persoenlichkeiten. Zusammen mit der Theorie der Archetypen, koennte es sich bei Selbstorganisation um zwei radikale Hypothesen handeln, die der fruehen Entwicklung und die der Urspruenge des Autismus. Autismus wird mit mehreren medizinischen Zustaenden, genetischen Markierungen und visuellen Saeglingsentbehrungen verbunden. Jedoch ist keiner dieser Faktoren notwendig, oder genug, um Autismus zu verursachen. Es wird hypothesiert, dass jeder dieser Faktoren die Wahrscheinlichkeit eines primaeren *psychologischen* Defizit erhoehen kann: ein Versagen in der Entstehung und Beibehaltung des Imagos der Augen der Mutter. Diese Hypothese wurde urspruenglich aus analytischer Arbeit mit Patienten abgeleitet, die eine fruehe narzisstische Verletzung oder milde autistische Veranlagungen aufwiesen. Beide Diagnosen entstehen durch die selben anfaenglichen Stoerungen: Symington argumentierte, dass Autismus eine extreme Form des infantilen Narzissismus ist. Indirekter Beweis fuer die Bild-der-Augen Hypothese kommt aus der Evolution der Primaten, aus Mutter-Saegling Beobachtungen, durch Beobachtung von Saeglingsvision und durch Experimente an der Vision anderer Vertebraten. Byrd hatte kuerzlich bestaetigt, dass Autismus drastisch zugenommen hat. Die Bild-der-Augen Hypothese liefert eine Erklaerung dieses Zuwachses durch testfaehige statistische Voraussagung.

Holland ha delucidato il nuovo paradigma dell'organizzazione del sé in sistemi complessi adattivi. Tale paradigma vale per tutti gli organismi viventi, inclusa la personalità. Unita alla teoria degli archetipi, l'organizzazione del sé suggerisce due ipotesi radicali, una sullo sviluppo precoce e l'altra sull'origine dell'autismo. L'autismo è associato con varie condizioni mediche gravi, con condizioni genetiche e con la privazione visiva infantile: Tuttavia nessuno di questi fattori è sia necessario che sufficiente a causare l'autismo. L'ipotesi è che ognuno di questi fattori accresce la probabilità di un deficit psicologico primario: il fallimento nell'acquisire o nel mantenere l'immagine degli occhi della madre. Tale ipotesi deriva inizialmente dal lavoro analitico con pazienti con problemi di ferite narcisistiche precoci e con pazienti con leggeri tratti artistici. Entrambe le diagnosi possono sorgere dallo stesso disturbo iniziale: Symington sostiene che l'autismo è una forma estrema di narcisismo infantile: Prove indirette per 'l'immagine degli occhi' vengono dall'evoluzione dei primati, dall'osservazione madre-bambino, dall'osservazione della visione infantile e da esperimenti sulla visione in altri vertebrati. Byrd ha recentemente confermato che l'incidenza dell'autismo sta crescendo drammaticamente. L'ipotesi sull'immagine degli occhi fornisce una spiegazione per, e una attendibile previsione statistica su, tale aumento.

Holland elucidó el nuevo paradigma de la auto-regulación de los complejos sistemas de adaptación. Este paradigma sostiene todos los sistemas de vida, incluyendo la personalidad. En conjunción con la teoría de los arquetipos, la auto-regulación sugiere dos hipótesis radicales, una sobre el desarrollo temprano y, la otra, sobre los orígenes del autismo. El autismo está asociado a varias condiciones médicas, a los marcadores genéticos y a la privación visual del infante. Sin embargo, ninguno de estos factores es necesario ni suficiente para causar el autismo. Se ha supuesto que cada uno de estos factores aumenta la probabilidad de un déficit psicológico primario: la imposibilidad

de adquirir o de retener la imagen de los ojos de la madre. Esta hipótesis fue, inicialmente, derivada, deducida del trabajo analítico con pacientes con una herida narcisista primaria y con pacientes de leves rasgos autistas. Ambos conflictos pueden emanar, surgir de un mismo conflicto inicial: Symington argumenta que el autismo es una forma extrema de narcisismo infantil. Evidencia indirecta para la hipótesis de la imagen de los ojos llega desde la evolución de los primates, de las observaciones madre-infante, de las observaciones de la visión del infante, y de los experimentos sobre la visión de otros vertebrados. Recientemente, Byrd confirmó que la incidencia de autismo ha aumentado dramáticamente. La hipótesis de la imagen de los ojos ofrece una explicación y una probable predicción estadística para este aumento.

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