



## Frameworks for behavioral interventions

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The diagnostic criteria for Asperger disorder as outlined in DSM IV TR [1] includes in criterion A a description of some of the qualitative impairments in social interaction. The list of characteristics includes:

- Marked impairment in the use of multiple nonverbal behaviors, such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
- Failure to develop peer relationships appropriate to developmental level
- Lack of social or emotional reciprocity

Clinical experience and autobiographies confirm that such individuals have considerable difficulty with the understanding and expression of nonverbal behaviors and social reciprocity. Regarding peer relationships, when we observe and assess the social play and friendship skills of children with Asperger disorder, we recognize a delay in the conceptualization of friendship. The child may have an overall intellectual ability within the normal range, but their understanding of friendship skills resembles a much younger child. It is not simply a matter of developmental delay, however. There are aspects that are conspicuously unusual for any of the developmental stages [2]. At present, we can only speculate what the consequences may be for a child who fails to develop peer relationships that are appropriate for their developmental level, but inevitably there will be lasting effects in several aspects of cognitive, social, and emotional development. When playing in a group, children learn the value of alternative perspectives and solutions in problem solving. They acquire increasingly sophisticated and successful strategies to resolve conflict and the interpersonal and team skills valued by employers. Many of the characteristics valued in a close friend become the attributes associated with lasting personal relationships. Clinical experience also suggests that the social isolation of children with Asperger disorder in the school playground can increase the child's vulnerability to being teased and bullied and a lack of close friends also can be a contributory factor in the development of

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childhood depression. A delay in social knowledge also can lead to anxiety in social situations that may develop into social phobia, school refusal, and agoraphobia. Thus, we achieve cognitive and affective growth within our circle of friends. It is inevitable that impaired peer relationship skills can result in significant psychopathology.

The DSM IV description of Asperger disorder includes reference to an association between Asperger disorder and several secondary mental disorders, including depressive and anxiety disorders. The presence of a secondary mood disorder unavoidably adds to the already considerable difficulty coping with everyday life for people with Asperger disorder. We are, however, only just beginning to develop effective remedial programs to improve peer relationships, emotional reciprocity, nonverbal communication, and mood [3]. This article examines two frameworks for behavioral interventions, namely the developmental stages in friendship skills, with remedial strategies for each stage, and modifications to Cognitive Behavior Therapy, to accommodate the unusual profile of cognitive skills of people with Asperger disorder.

### **The developmental stages in the concept of friendship**

Before considering programs to improve the general understanding of the concept of friendship and specific friendship skills, it is important to determine the child's stage of friendship development [4,5]. Unfortunately, there are no standardized tests to measure friendship skills as there are for language skills, motor development, and cognitive abilities. Assessments can be made by analysis of the person's answers to specific questions, however, and observation of their interactions with peers. The questions can include:

- Who are your friends at school?
- Why is (*name*) your friend?
- What do friends do?
- How do you make friends?
- Why do we have friends?
- What makes a good friend?
- What makes you a good friend?

Before the age of 3 years, children interact with members of their family, but their concept of peers is often one of rivalry for possessions rather than friendship. If another child comes to their house, they may hide their favorite toys or become agitated if they have to take turns and share. There may be some parallel play, imitation, and intellectual curiosity in observing and copying what other children are doing, as it may be fun and may impress a parent, but the child does not have the interpersonal insights and skills we associate with the reciprocal elements of being a friend. The first indicators of friendship occur at approximately the age of 3 years.

### **Stage 1: 3–6 years**

From the ages of 3 to 6 years there is a functional and egocentric conceptualization of friendship. When asked why a particular child is their friend, a child's reply usually is based on proximity (lives next door, sits at same table) or possessions (they have toys that the child admires or wants to use). Toys and play activities are the focus of friendship and the child gradually moves from engaging primarily in parallel play to recognizing that some games and activities cannot happen unless there is an element of sharing and turn taking. Cooperation skills are limited, however; the main characteristic of this age group is one-way and egocentric (he helps me or she likes me). Conflict is typified by demands, ultimatums, and physical force.

If a child from 3–4 years is asked what they did today, they tend to describe what they played with, whereas after the age of approximately 4 years they start to include who they played with. Social play gradually becomes more than just the construction and completion of the activity. Friendships are transitory, however, and the child has their own agenda of what to do and how to do it.

#### *Remedial programs for stage 1*

If one uses behavioral or learning theory terms, children with Asperger disorder need to identify the relevant stimuli or cues and appropriate responses [6]. For example, in stage one, children learn the cues to join a group of children without causing disruption or annoyance. An activity can be to brainstorm with the child the entry cues, such as someone giving a welcoming gesture or facial expression, a pause in the activity or conversation, or an appropriate act such as returning the ball. These 'acts' of the social 'play' can be 'rehearsed' by identifying a few children who are keen to help the friendship skills of the child with Asperger disorder. They can be informed that he or she is learning the cues and rules for joining in their play. The child with Asperger disorder will be trying to join in (under the guidance of an adult) and to recognize the relevant cue. When this occurs they can help the child with Asperger disorder identify the cue and intellectually process the response by momentarily freezing their actions, thereby isolating the cue. This gives the child time to identify the cue (which can be pointed out by the adult) and to decide what to say or do in response, perhaps with a prompt and encouragement from the adult. Their response and the entry are then successfully completed. The procedure of identifying the cues in contrived settings and practicing appropriate responses (rehearsal) can be used for many friendship skills. The adult acts as a mentor or stage director, giving guidance and encouragement. It is important that the attitude from adults is one of discovery and guidance so that the child with Asperger disorder does not perceive the activity as being critical of their ability and a public recognition of their social errors.

Young children with Asperger disorder may demonstrate more mature interaction skills with adults than with their peers. It is important that adults, especially parents, observe the natural play of the child's peers, noting the games,

equipment, rules, and language. They can then practice the same play with the child but with an adult ‘acting’ as their peer. This includes using what the author describes as ‘child speak,’ namely the speech of children rather than adults. It is important that the adult role-plays examples of being a good friend, and also situations that illustrate unfriendly acts, such as disagreements and teasing. Appropriate and inappropriate responses can be enacted to provide the child with a range of responses. Parents can borrow or buy duplicate equipment that is used at school or is popular with their peers. Once the child has rehearsed with an adult who can easily modify the pace of play and amount of instruction, they can have a ‘dress rehearsal’ with another child, perhaps an older sibling or mature child in their class who can act as a friend to provide further practice before the skills are used openly with their peer group. Another strategy to learn the relevant cues, thoughts, and behavioral script is to write Social Stories that can be used by the child to improve their social understanding and abilities [7].

## **Stage 2: 6–9 years**

At this stage the child starts to recognize that they need a friend to play certain games and that that friend must like those games. They become more aware of the thoughts and feelings of their peers and how their actions and comments can hurt, physically and emotionally. The child is prepared to sometimes inhibit their intentions and to accept and incorporate the influences, preferences, and goals of their friends in their play. There is less of a dominant/submissive quality, and helping, especially mutual help, is one of the indices of friendship at this stage. A friend may be chosen because of similar interests, and aspects of their friend’s character are recognized (he’s fun to be with); yet when asked who is their friend, they may nominate someone who is known to be popular rather than a mutually recognized friendship. The concept of reciprocity (she comes to my party and I go to hers) and the genuine sharing of resources and being fair become increasingly important. When managing conflict, the child’s view is that the offender must retract the action and a satisfactory resolution is perhaps described as “an eye for an eye.” The concept of responsibility and justice is based on who started the conflict, not what was subsequently done or how it ended. At approximately 8 years of age, the child develops the concept of a best friend as not only their first choice for social play, but also as someone who helps in practical terms (he knows how to fix the computer) and in times of emotional stress (she cheers me up when I’m feeling sad).

### *Remedial programs for stage 2*

In stage 2, children develop greater cooperation skills when playing with their peers and develop more constructive means of dealing with conflict. It is important that the child with Asperger disorder experiences more cooperative than competitive games. In competitive games there are winners and losers and

strict rules. The child with Asperger disorder can require considerable tuition using Social Stories to understand the concepts of being fair and gracious in defeat. Clearly the child's recognition of the relevant cues and responses for cooperative play are acknowledged and encouraged. Specific aspects of cooperative play that need to be recognized, however, are identifying and contributing to the common goal, accepting suggestions rather than being autocratic or indifferent, and giving guidance and encouragement. The child acknowledges that when functioning as a cooperative and cohesive group, some activities and goals are easier and quicker to achieve. Role play games can be used to illustrate appropriate and inappropriate actions with some time taken to explain why, in a logical and empathic sense, certain actions are considered friendly or not friendly. The unfriendly actions that are particularly relevant for children with Asperger disorder are interruptions, failure to recognize personal body space, inappropriate touch, and coping with mistakes.

During stage 2, there is an increase in social cognition that enables the child to benefit from published training programs designed to improve Theory of Mind skills [8]. Programs on Theory of Mind skills also can help the child distinguish between accidental and intentional acts. The child may consider only the act from their perspective and not consider the cues that would indicate it was not deliberate. Educational programs on emotions also can help the child identify the cues that indicate the emotional state of their friend and themselves. The intention is to develop their empathy skills so that they can be recognized as a caring friend.

Finally in stage 2, the author has noted that there can be different coping mechanisms used by girls with Asperger disorder in comparison with boys. Girls with Asperger disorder are more likely to be interested observers of the social play of other girls and to imitate their play at home using dolls, imaginary friends, and by adopting the persona of a socially able girl. This solitary practice of the social play of their peers can be a valuable opportunity to analyze and rehearse friendship skills. Some girls with Asperger disorder can develop a special interest in reading fiction that may be age-appropriate or classic literature. This also provides an insight into thoughts, emotions, and social relationships. It is also noticeable that other girls can be more maternal than boys and can facilitate the inclusion of a girl with Asperger disorder within an established group of friends. Their social difficulties can be accommodated and guided by peers who value the role of mother or educator. The girl with Asperger disorder also may be popular because she is honest and consistent and less likely to be spiteful.

### **Stage 3: 9–13 years**

In the third stage, a friend is not simply someone who helps; they are chosen because of special attributes in their abilities and personalities. A friend is someone who genuinely cares and has complimentary attitudes, ideas, and

values. There is a strong need to be liked by their peers and a mutual sharing of experiences and thoughts. With such self-disclosure, there is the recognition of being trustworthy and seeking advice not only for practical problems but also for interpersonal issues. There is a need for companionship and greater selectivity and durability in the friendship alliances. At this stage, there is a distinct gender split and peer pressure becomes increasingly important. Peer group acceptance and values become more important than the opinion of parents. Friends also support each other in terms of managing emotions. If the child is sad, close friends will cheer them up, or if angry, calm them down to prevent the person from getting into trouble.

When conflicts occur, friends will use more effective repair mechanisms. They can be less “heated,” with reduced confrontation and more disengagement, admitting making a mistake and recognizing it is not simply a matter of winner and loser. A satisfactory resolution can actually strengthen the relationship. The friend is forgiven and the conflict is put in perspective. These qualities of interpersonal skills that are played out in friendships are the foundation of interpersonal skills for adult relationships.

### *Remedial programs for stage 3*

In stage 3, there is usually a clear gender preference in the choice of friends. The activities and interests of boys, who may be playing team games or sports, may be considered of little value to the boy with Asperger disorder. They also are likely to be less able than their peers in team games and ball skills that may lead to teasing and bullying by boys who can be notoriously intolerant of someone who is different. When the boy with Asperger disorder approaches girls, they can be more readily included in their activities, and girls can be more patient, maternal, and supportive. One of the consequences of being more welcomed by girls than by boys and spending more time playing with girls than boys is that the boy with Asperger disorder can imitate the prosody and body language of their female friends. This can result in further isolation and torment from male peers. The child needs a balance of same and opposite gender friends, and some social engineering could be necessary to ensure acceptance by both groups.

During stage 3 there is a strong desire for companionship rather than functional play, and the child with Asperger disorder can feel lonely and sad if their attempts at friendship are unsuccessful [9,10]. They need tuition and guidance, but this may be achieved by discussion with supportive peers and adults. Individual children who have a natural rapport with a child with Asperger disorder can be guided and encouraged to be a mentor in the classroom, playground, and in social situations. Their advice may be accepted as having greater value than that of parents or a teacher. It is also important to encourage their friends or peers to help them regulate their mood, stepping in and helping the person calm down if they are becoming agitated or tormented. Friends may need to provide reassurance if the person is anxious and to cheer them up when sad. The child with Asperger disorder also needs advice and encouragement to be

reciprocal with regard to emotional support, and must be taught how to recognize the signs of distress or agitation in their friend and how to respond.

At this stage, the existing remedial programs use strategies to develop teamwork rather than friendship skills. To be attending a program on teamwork skills for sports or employment may be considered more acceptable to the young teenager with Asperger disorder, who may be sensitive to any suggestion that they need remedial programs to have friends. Another strategy to help the adolescent who is sensitive to being publicly identified as having few friends is to adapt speech and drama classes.

Liane Holliday-Wiley, in her book *Pretending To Be Normal*, describes how she improved her social skills by observation, imitation, and acting [11]. This is an appropriate and effective strategy, especially in stage 3. The person with Asperger disorder can learn and practice conversational scripts, self-disclosure, body language, facial expression, and tone of voice for particular situations, and role-play people they know who are socially successful. The adolescent or adult with Asperger disorder sometimes uses this strategy naturally; however, it is important to ensure that they choose good role models to portray.

#### **Stage 4: 13 years to adult**

In the previous stage there can be a small core of close friends, but in stage 4 the breadth and depth of friendship increases. There can be different friends for different needs, such as comfort, humor, or practical advice. A friend is defined as someone who “accepts me for who I am” or “we think the same way about things.” A friend provides a sense of personal identity and is compatible with one’s own personality. An important aspect of the quality of friendship is the ability to accept the self before being able to relate to others at an adult level; otherwise friendships can be manipulated as a means of resolving personal issues. There are less concrete and more abstract definitions of friendship with what may be described as autonomous interdependence. The friendships are less possessive and exclusive and conflict resolved with self-reflection, compromise, and negotiation.

#### *Remedial programs for stage 4*

Because of the developmental delay in the conceptualization of friendship, when the person with Asperger disorder reaches stage 4, they have usually left high school and seek friends through work and recreational pursuits. Attempts to change a relationship from colleague or work mate to friend can present some challenges to the young adult with Asperger disorder. A mentor at work who understands their unusual profile of friendship skills can provide guidance and act as a confidante and advocate. The mentor also can help determine the degree of genuine interest in friendships from the colleague. Sometimes people with Asperger disorder assume that a friendly act, smile, or gesture has greater

implications than was intended. There can be a tendency to develop an intense interest or infatuation with a particular person. This topic may dominate their time and conversation and can lead to behavior such as stalking. Conversely, the person with Asperger disorder can be desperate to have a friend and may become the recipient of financial, physical, or sexual abuse, through failing to recognize that the other person's intentions are not honorable. The two-way misinterpretation of signals and intentions can lead to mutual confusion. Relationship counseling can be suggested, but at present counselors often have limited knowledge and experience regarding Asperger disorder [12]. An interesting development in recent years is older and more mature adults with Asperger disorder providing guidance and counseling through group counseling sessions organized by adult support groups. These groups are often formed by concerned parents and individuals with Asperger disorder who want to meet like-minded individuals. They meet on a regular basis to discuss topics that range from employment issues to personal relationships.

The Internet has become the modern equivalent of the dance hall in terms of an opportunity for young people to meet. The great advantage of this form of communication to the person with Asperger disorder is that they often have a greater eloquence to disclose and express their inner self and feelings through typing rather than conversation. In social gatherings, the person is expected to be able to listen to and process the other person's speech (often against a background of other conversations), to immediately reply, and simultaneously analyze non-verbal cues, such as gestures, facial expression, and tone of voice. When using the computer, the person can concentrate on social exchange using a visual rather than auditory medium. As in any other situation, the person with Asperger disorder may be vulnerable to others taking advantage of their social naivety and desire to have a friend. The person with Asperger disorder needs to be taught caution and to not provide personal information until they have discussed the Internet friendship with someone they trust. Genuine and long-lasting friendships can develop over the Internet based on shared experiences, interests, and mutual support. It is an opportunity to meet like-minded individuals who accept the person because of their knowledge rather than their social persona. The person with Asperger disorder is somewhat egocentric and eccentric but can prove an honest, loyal, and knowledgeable friend.

### **Mood disorders**

When one considers the diagnostic criteria for Asperger disorder and the effects of the disorder on the person's adaptive functioning in a social context, one would expect such individuals to be vulnerable to the development of secondary mood disorders. The current research indicates that approximately 65% of adolescent patients with Asperger disorder have an affective disorder that includes anxiety disorders [13–18] and depression [16]. There is also evidence to suggest an association with delusional disorders [19], paranoia [20], and conduct

disorders [21]. We know that comorbid affective disorders in adolescents with Asperger disorder are the rule rather than the exception, but why should this population be more prone to affective disorders?

Research has been conducted on the family histories of children with autism and Asperger disorder and has identified a higher than expected incidence of mood disorders [22–25]. Individuals with Asperger disorder could be vulnerable to a genetic predisposition to mood disorders. When one also considers their difficulties with regard to social reasoning, empathy, verbal communication, profile of cognitive skills, and sensory perception, however, they are clearly prone to considerable stress as a result of their attempts at social inclusion. Chronic levels of stress can precipitate a mood disorder. Thus, there may be constitutional and circumstantial factors that explain the higher incidence of affective disorders.

The theoretic models of autism developed within cognitive psychology and research in neuropsychology also provide some explanation as to why such individuals are prone to secondary mood disorders. The extensive research on Theory of Mind skills confirms that individuals with Asperger disorder have considerable difficulty identifying and conceptualizing the thoughts and feelings of other people and themselves [26–30]. The interpersonal and inner world of emotions seems to be uncharted territory for people with Asperger disorder.

Research on executive function in subjects with Asperger disorder suggests characteristics of being disinhibited and impulsive, with a relative lack of insight that affects general functioning [31–34]. Impaired executive function also can affect the cognitive control of emotions. Clinical experience indicates there is a tendency to react to emotional cues without cognitive reflection. Research with subjects with autism using new neuroimaging technology also has identified structural and functional abnormalities of the amygdala [35–38], which is known to regulate a range of emotions, including anger, fear, and sadness. Thus, we also have neuroanatomic evidence that suggests there will be problems with the perception and regulation of the emotions.

### **Managing anxiety, depression, and anger**

When clinicians diagnose a secondary mood disorder, they need to know how to modify standard psychologic treatments to accommodate the unusual cognitive profile of people with Asperger disorder. As the primary psychologic treatment for mood disorders is cognitive behavior therapy (CBT), this article now examines such modifications based on our knowledge of the disorder and preliminary clinical experience.

CBT has been designed and refined over several decades and has proven to be effective in changing the way a person thinks about and responds to feelings such as anxiety, sadness, and anger [39,40]. CBT focuses on aspects of cognitive deficiency in terms of the maturity, complexity, and efficacy of thinking, and cognitive distortion in terms of dysfunctional thinking and incorrect assumptions.

Thus, it has direct applicability to patients with Asperger disorder who are known to have deficits and distortions in thinking.

The therapy has several components, the first being an assessment of the nature and degree of mood disorder using self-report scales and a clinical interview. The subsequent stage is affective education with discussion and exercises on the connection between cognition, affect, and behavior, and the way in which individuals conceptualize emotions and construe various situations. Subsequent stages are cognitive restructuring, stress management, self-reflection, and a schedule of activities to practice new cognitive skills. Cognitive restructuring corrects distorted conceptualizations and dysfunctional beliefs. The person is encouraged to establish and examine the evidence for or against their thoughts and build a new perception of specific events. Stress management and cue controlled relaxation programs are used to promote responses incompatible with anxiety or anger. Self-reflection activities help the person recognize their internal state, monitor and reflect on their thoughts, and construct a new self-image. A graded schedule of activities is also developed to allow the person to practice new abilities that are monitored by the therapist.

## **Assessment**

There are several self-rating scales that have been designed for children and adults with specific mood disorders that can be administered to patients with Asperger disorder. There are specific modifications that can be used with this clinical group, however, as they may be more able to accurately quantify their response using a numeric or pictorial representation of the gradation in experience and expression of mood. Examples include an emotion “thermometer,” bar graphs, or a “volume” scale. These analogue measures are used to establish a baseline assessment and are incorporated in the affective education component. To minimize word retrieval problems, multiple-choice questions can be used in preference to open-ended, sentence-completion tasks. A pictorial dictionary of feelings also can be used as additional cues for a diary or logbook completed during the therapy by the patient.

The assessment includes the construction of a list of behavioral indicators of mood changes. The indicators can include changes in the characteristics associated with Asperger disorder, such as an increase in time spent engaged in solitude or their special interest, rigidity, or incoherence in their thought processes, or behavior intended to impose control in their daily lives and over others. This is in addition to conventional indicators such as a panic attack, comments indicating low self worth, and episodes of anger. It is essential to collect information from a wide variety of sources, as children and adults with Asperger disorder can display quite different characteristics according to their circumstances. For example, there may be little evidence of a mood disorder at school but clear evidence at home. Parents and teachers also can complete a daily mood diary to determine whether there is any cyclical nature to, or specific triggers for, mood changes.

The clinician also needs to assess the coping mechanisms and vocabulary of emotional expression of the person with Asperger disorder. Although there are no standardized tests to measure such abilities, some characteristics have been identified by clinical experience. For example, discussion with parents can indicate that the child displays affection, but the depth and range of expression is usually limited and immature for their chronologic age. Their reaction to pleasure and pain can be atypical, with idiosyncratic mannerisms that express feeling excited, such as hand flapping, or a stoic response to pain and punishments. Examples of characteristics that parents may be concerned about are a lack of apparent gratitude or remorse and paradoxical and atypical responses to particular situations. For example, the child may giggle when expected to show remorse [41] and be remarkably quick in resolving grief. They also may misinterpret gestures of affection, such as a hug, with the comment that the squeeze was perceived as uncomfortable and not comforting. Their emotional reactions also can be delayed, unhelpful with an expression of anger some days or weeks after the event.

Their coping or emotional recovery mechanisms need to be assessed and can include characteristics such as retreating into solitude, increasing time spent engaged in a special interest, reading fantasy literature, and playing computer games. Some individuals internalize their reaction with self-blame and low self-esteem, whereas others externalize their reaction, becoming critical of others and developing an arrogant and intolerant personality. The former may show signs of depression and anxiety, whereas the latter are often referred for problems with anger management. Different emotions can prevail at particular times of the day, however, for example, being anxious before school and angry when returning home. It is also valuable to assess not only how the child repairs their own feelings but also how they repair the feelings of others. Research suggests that people with Asperger disorder use fewer of the available cues in facial expression and body language to infer emotional states [42]. The clinician needs to assess the client's ability to identify the cues of emotional states in others and to know when specific words and actions are anticipated, for example, providing gestures and words of affection when a family member or friend is sad or reassurance when they are anxious. Questions can be asked, such as "How would you know when your mother is feeling sad?" and "What would you do if she were crying?" Another area of assessment is their awareness of the impact of their own mood state and associated behavior on the thoughts and feelings of others, namely an assessment of empathy. Unfortunately we do not have any standardized tests to measure empathy; accordingly, most information is obtained from discussion with the person with Asperger disorder and their family for examples of a relative lack of empathic response.

### **Affective education**

Affective education is the next stage in a course of CBT and an essential component for those with Asperger disorder. The main goal is to learn why we

have emotions, their use and misuse, and the identification of different levels of expression. A basic principle is to explore one emotion at a time as a theme for a project. The choice of which emotion to start with is decided by the therapist, but a useful starting point is happiness or pleasure. A scrapbook can be created that illustrates the emotion. For young children, this can include pictures of people expressing the different degrees of happiness or pleasure, but can be extended to pictures of objects and situations that have a personal association with the feeling, for example, a photograph of a rare lizard for a person with a special interest in reptiles. For adults, the book can illustrate the pleasures in their life, with a list based on the song *My Favorite Things*. The content also can include the sensations that may elicit the feeling, such as aromas, tastes, and textures. The scrapbook can be used as a diary to include compliments, and records of achievement, such as certificates and memorabilia. At a later stage in therapy, the scrapbook can be used to change a particular mood but it also can be used to illustrate different perceptions of a situation. If the therapy is conducted in a group, the books can be compared and contrasted. Talking about trains may be an enjoyable experience for one participant but perceived as remarkably boring or dominating for another. Part of the education is to explain that although this topic may create a feeling of well being in the one participant, their attempt to cheer up another person by talking about trains may not be a successful strategy, perhaps producing a response that they did not expect. One of the interesting aspects that the author has noticed is that clients with Asperger disorder tend to achieve enjoyment primarily from knowledge, interests, and solitary pursuits, and less from social experiences, in comparison with other client groups. They are often at their happiest when alone.

The affective education stage includes the therapist describing and the client discovering the salient cues that indicate a particular level of emotional expression in facial expression, tone of voice, body language, and context. The face is described as an information center for emotions. The typical errors include not identifying which cues are relevant or redundant, and misinterpreting cues. The therapist uses a range of games and resources to “spot the message” and explain the multiple meanings; for example, a furrowed brow can mean anger or bewilderment, or may be a sign of aging skin. A loud voice does not automatically mean that a person is angry.

Once the key elements that indicate a particular emotion have been identified, it is important to use an “instrument” to measure the degree of intensity. The therapist can construct a model “thermometer,” “gauge,” or volume control, and can use a range of activities to define the level of expression. For example, they can use a selection of pictures of happy faces and place each picture at the appropriate point on the instrument. During the therapy it is important to ensure the client shares the same definition or interpretation of words and gestures and to clarify any semantic confusion. Clinical experience has indicated that some clients with Asperger disorder can use extreme statements such as “I am going to kill myself” to express a level of emotion that would be more moderately

expressed by another client. During a program of affective education, the therapist often has to increase the client's vocabulary of emotional expression to ensure precision and accuracy.

The education program includes activities to detect specific degrees of emotion in others but also in oneself, using internal physiologic cues, cognitive cues, and behavior. Technology can be used to identify internal cues in the form of biofeedback instruments such as auditory EMG and GSR machines. The client and those who know them well can create a list of their physiologic, cognitive, and behavioral cues that indicate their increase in emotional arousal. The degree of expression can be measured using one of the special instruments used in the program, such as the emotion thermometer. One of the aspects of the therapy is to help the client perceive their "early warning signals" that indicate emotional arousal that may need cognitive control; perhaps, using a metaphor, they can be the warning lights and instruments on a car dashboard.

When a particular emotion and the levels of expression are understood, the next component of affective education is to use the same procedures for a contrasting emotion. After exploring happiness, the next topic explored would be sadness; feeling relaxed would be explored before a project on feeling anxious. The client is encouraged to understand that certain thoughts or emotions are "antidotes" to other feelings, for example, some strategies or activities associated with feeling happy may be used to counteract feeling sad.

Some individuals with Asperger disorder can have considerable difficulty translating their feelings into conversational words. There can be a greater eloquence, insight, and accuracy using other forms of expression. The therapist can use prose in the form of a "conversation" by typing questions and answers on a computer screen or techniques such as comic strip conversations that use figures with speech and thought bubbles [7]. When designing activities to consolidate the new knowledge on emotions, one can use a diary, e-mail, art, or music as a means of emotional expression that provides a greater degree of insight for client and therapist.

Other activities to be considered in affective education are the creation of a photograph album that includes pictures of the client and family members expressing particular emotions, or video recordings of the client expressing their feelings in real-life situations. This can be particularly valuable to demonstrate their behavior when expressing anger. Another activity entitled "Guess the message" can include the presentation of specific cues, such as a cough as a warning sign or a raised eyebrow to indicate doubt. It is also important to incorporate the person's special interest in the program. For example, the author has worked with individuals whose special interest has been the weather and has suggested that their emotions are expressed as a weather report. There are several children's reading books that have a particular emotion as a theme and self-help books for adolescents with specific mood disorders that can be used as a form of bibliotherapy. We also now have books and computer programs that provide a social and emotional curriculum that includes activities for affective education for children with Asperger disorder [43,44].

## **Cognitive restructuring**

Cognitive restructuring enables the client to correct distorted conceptualizations and dysfunctional beliefs. The process involves challenging their current thinking with logical evidence and ensuring the rationalization and cognitive control of their emotions. The first stage is to establish the evidence for a particular belief. People with Asperger disorder can make false assumptions of their circumstances and the intentions of others. They have a tendency to make a literal interpretation, and a casual comment may be taken out of context or may be taken to the extreme. For example, a young teenage boy with Asperger disorder was once told his voice was breaking. He became extremely anxious that his voice was becoming faulty and decided to consciously alter the pitch of his voice to repair it. The result was an artificial falsetto voice that was incongruous in a young man. A teenage girl with Asperger disorder overheard a conversation at school that implied that a girl must be slim to be popular. She then achieved a dramatic weight loss in an attempt to be accepted by her peers. We are all vulnerable to distorted conceptualizations, but people with Asperger disorder are less able to put things in perspective, seek clarification, and consider alternative explanations or responses. The therapist encourages the client to be more flexible in their thinking and to seek clarification, using questions or comments such as “Are you joking?” or “I’m confused about what you just said.” Such comments also can be used when misinterpreting someone’s intentions such as, “Did you do that deliberately?” and to rescue the situation after the patient has made an inappropriate response with a comment such as, “I’m sorry I offended you,” or “Oh dear, what should I have done?”

To explain a new perspective or to correct errors or assumptions, comic strip conversations can help the client determine the thoughts, beliefs, knowledge, and intentions of the participants in a given situation [7]. This technique involves drawing an event or sequence of events in storyboard form with stick figures to represent each participant, and speech and thought bubbles to represent their words and thoughts. The client and therapist use an assortment of fibro-tipped colored pens, with each color representing an emotion. As they write in the speech or thought bubbles, the person’s choice of color indicates their perception of the emotion conveyed or intended. This can clarify the client’s interpretation of events and the rationale for their thoughts and response. This technique can help the client identify and correct any misperception and determine how alternative responses might affect the participants’ thoughts and feelings.

One common effect of misinterpretation is the development of paranoia. Our knowledge of impaired Theory of Mind skills in the cognitive profile of children with Asperger disorder suggests a simple explanation. The child can have difficulty distinguishing between accidental or deliberate intent. Other children will know from the context, body language, and character of the person involved that the intent was not to cause distress or injury. Individuals with Asperger disorder, however, can focus primarily on the act and the consequences: “He hit me and it hurt, so it was deliberate,” whereas other children would consider the circum-

stances: “He was running, tripped, and accidentally knocked my arm.” There may need to be training in checking the evidence before responding and developing more accurate “mind reading” skills.

Cognitive restructuring also includes a process known as “attribution retraining.” The person may blame others exclusively and not consider their own contribution, or they can excessively blame themselves for events [2]. One aspect of Asperger disorder is a tendency for some clients to adopt an attitude of arrogance or omnipotence where the perceived focus of control is external. Specific individuals are held responsible and become the target for retribution or punishment. These people have considerable difficulty accepting that they themselves have contributed to the event. The opposite can occur, however, when the client has extremely low self-esteem and feels personally responsible, which results in feelings of anxiety and guilt. There also can be a strong sense of what is right and wrong and conspicuous reaction if others violate the social “laws” [2]. The child may be notorious as the class “policeman,” dispensing justice but not realizing what is within their authority. Attribution retraining involves establishing the reality of the situation, the various participants’ contributions to an incident, and determining how the person can change their perception and response.

Cognitive restructuring also includes activities that are designed to improve the person’s range of emotional repair mechanisms. The author has extended the use of metaphor to design programs that include the concept of an emotional toolbox to “fix the feeling.” Patients know that a toolbox usually includes a variety of tools to repair a machine, and discussion and activities are used to identify different types of “tools” for specific problems associated with emotions.

One type of emotional repair tool can be represented by a hammer, which signifies physical “tools” such as going for a walk or run, bouncing on a trampoline, or crushing empty cans for recycling. The intention is to repair emotions constructively by a safe physical act that increases the heart rate. One client explained how a game of tennis “takes the fight out of me.” A paintbrush can be used to represent relaxation tools that lower the heart rate, such as drawing, reading, or listening to calming music. A two-handle saw can be used to represent social activities or individuals who can help repair feelings. This can include communication with someone who is known to be empathic and able to dispel negative feelings. This can be by spoken conversation or typed communication, enabling the client to gain a new perspective on the problem and providing some practical advice. A picture of a manual can be used to represent thinking tools that are designed to improve cognitive processes. This includes phrases that encourage reflection before reaction. Evan, a young man with Asperger disorder, developed his “antidote to poisonous thoughts.” The procedure is to provide a comment that counteracts negative thoughts, for example, “I can’t cope” (negative or poisonous thought) “but I can do this with help” (positive thought or antidote). The person also is taught that becoming emotional can inhibit their intellectual abilities in a particular situation that requires good problem-solving skills. When frustrated, one needs to become “cool” and less rigid in one’s thinking to solve the problem, especially if the solution requires social cognition.

There is a discussion of inappropriate tools (with the comment that one would not use a hammer to fix a computer) to explain how some actions, such as violence and thoughts such as suicide, are not appropriate emotional repair mechanisms. For example, one client would slap himself to stop negative thoughts and feelings. Another tool that could become inappropriate is to retreat into a fantasy world (perhaps imagining they are a superhero), or to plan retaliation. The use of escape into fantasy literature and games can be a typical tool for ordinary adolescents but is of concern when this becomes the exclusive coping mechanism; the border between fantasy and reality may be unclear and the thinking becomes delusional. Cognitive restructuring can be used to return to concrete thinking. Also of concern is when daydreams of retaliation to teasing and bullying are expressed in drawings, writing, and threats. Although this is a conventional means of emotional expression, there is a concern that the expression is misinterpreted as an intention to carry out the fantasy or indeed may be a precursor to retaliation using weapons. Unusual tools also are discussed. For example, during a group CBT session on sadness, a teenage girl explained that, “Crying doesn’t work for me, so I get angry.” Clinical experience suggests that tears may be rare as a response to feeling sad, with a more common response to sadness being anger. The program includes the development of a range of conventional means of emotional expression and repair mechanisms and an explanation as to why some of their reactions are misinterpreted by others.

Clinical experience also has indicated that humor and imagination can be used as thinking tools. Those with Asperger disorder are not immune to the benefits of laughter, can enjoy jokes typical of their developmental level, and can be remarkably creative with puns and jokes [45]. One tool or mechanism that seems to be unusual is that of being quick at resolving grief and serious tragedies. This characteristic can be of concern to the person’s family, who expect the classic signs of prolonged and intense grieving; they consider the person as uncaring, yet the rapid recovery is simply a feature of Asperger disorder. Other interesting characteristics are the inclusion of talking to pets as a social tool, sometimes in preference to talking to friends, and the positive effects on mood from helping someone. This strategy can be effective for clients with Asperger disorder who also need to be needed and can improve their mood by being of practical assistance. Finally, the concept of a toolbox can be extremely helpful in enabling the person with Asperger disorder not only to repair their own feelings but also to repair the feelings of others. They often benefit from tuition in learning what tools to use to help friends and family and which tools others use, so that they may borrow tools to add to their own emotional repair kit.

### **Stress management**

Individuals with Asperger disorder are prone to greater stress in their daily lives than their peers. Social interaction, especially with more than one person, in which they have to identify, translate, and respond to social and emotional cues

and cope with unexpected noise levels, inevitably increases stress to a point where the person's coping mechanisms may collapse. A stress assessment based on our knowledge of Asperger disorder will help the clinician determine what are the natural and idiosyncratic stressors for the client [46]. Subsequently, an effective stress management program can be designed as an essential component of CBT.

Traditional relaxation procedures using activities to encourage muscle relaxation and breathing exercises can be taught to clients with Asperger disorder as a counter conditioning procedure, but one must also consider the circumstances in which they are particularly prone to stress. Environmental modification can significantly reduce stress. This can include reducing noise levels, minimizing distractions, and having a safe area for periods of solitude to relax or concentrate on schoolwork. If the clinician recognizes that a particular event is a major cause of stress, then it would be wise to consider whether the source of stress could be avoided, for example, recommending the temporary suspension of homework. At school, one option for the child who becomes stressed in the playground is to be able to withdraw to the school library, or for the worker who is anxious about socializing during the lunch break, to complete a crossword puzzle or go for a walk. Another source of stress for children and adults is unexpected changes in work demands or circumstances. They may need advance preparation and time to adjust their work schedule.

Cue-controlled relaxation is also a useful component of a stress management plan. One strategy is for the client to have an object in their pocket that symbolizes or has been classically conditioned to elicit feelings of relaxation. For example, a teenage girl with Asperger disorder was an avid reader of fiction, her favorite book being *The Secret Garden*. She kept a key in her pocket to metaphorically open the door to the secret garden, an imaginary place where she felt relaxed and happy. A few moments touching or looking at the key helped her to contemplate a scene described in the book and to relax and achieve a more positive state of mind. Adults can have a special picture in their wallet such as a photograph of a woodland scene, which reminds the person of the solitude and tranquility of such a place

### **Self-reflection**

In conventional CBT programs, the client is encouraged to self-reflect to improve insight into their thoughts and feelings, promoting a realistic and positive self-image and enhancing the ability to self-talk for greater self-control. The concept of self-consciousness may be different for individuals with Asperger disorder, however. There may be a qualitative impairment in the ability to engage in introspection. Research evidence, autobiographies, and clinical experience have confirmed that some clients with Asperger disorder and high functioning autism can lack an "inner voice" and think in pictures rather than words [47,48]. They also have difficulty translating their visual thoughts into words. As an

adolescent with Asperger disorder explained in relation to how visualization improves his learning (a picture is worth a thousand words), “I have the picture in my mind but not the thousand words to describe it.” Some have an “inner voice” but have difficulty disengaging mind and mouth, and vocalize their thoughts to the confusion or annoyance of those near them. Obviously, the therapy needs to accommodate such unusual characteristics.

The modifications include a greater use of visual material and resources using drawings, role-play, and metaphor, and less reliance on spoken responses. It is interesting that many clients have a greater ability to develop and explain their thoughts and emotions using other expressive media, such as typed communication in the form of e-mail or a diary, music, art, or a pictorial dictionary of feelings [3].

When talking about themselves, young adults with autism and Asperger disorder do not anchor their self-attributes in social activities and relationships or use as wide a range of emotions in their descriptions as their peers [49]. They are less likely to describe themselves in the context of their relationships and interactions with other people. The self-reflection component of CBT may have to be modified to accommodate a concept of self primarily in terms of physical, intellectual, and psychologic attributes.

The therapy includes programs to adjust the client’s self image to be an accurate reflection of their abilities and the neurologic origins of their disorder. Some time needs to be allocated to explaining the nature of Asperger disorder and how the characteristics account for their differences. The author recommends that as soon as the child or adult has the diagnosis of Asperger disorder, the clinician needs to carefully and authoritatively explain the nature of the disorder to their family, but the child also must receive a personal explanation. This is to reduce the likelihood of inappropriate compensatory mechanisms to their recognition of being different and concern as to why they have to see psychologists and psychiatrists. They also may be concerned as to why they have to take medication and receive tuition at school that is not given to their peers. Over the last few years, there have been several publications and programs developed specifically to introduce the child or adolescent to their diagnosis. The choice of which book or program to use is determined by the clinician, but it is important that the explanations are accurate and positive. The client will perceive the diagnosis as it is presented. If the approach is pessimistic, the reaction can be to trigger a depression or to reject the diagnosis and treatment. The clinician also can recommend the client read some of the autobiographies written by children [50,51] and adults [52,53]. The subsequent discussion is whether and how to tell other people of the diagnosis, especially extended family, neighbors, friends, and colleagues.

When an accurate perception of self has been achieved, it is possible to explore cognitive mechanisms to accommodate their unusual profile of abilities, which the author describes as their talents and vulnerabilities, and to consider the directions for change in self-image. One approach is using the metaphor of a road map with alternative directions and destinations [54], and a Personal Construct Assessment [55].

## **Practice**

Once the client has improved their cognitive strategies to understand and manage their moods at an intellectual level, it is necessary to start practicing the strategies in a graduated sequence of assignments. The first stage is for the therapist to model the appropriate thinking and actions in role-play with the client, who then practices with the therapist or other group members, vocalizing thinking to monitor their cognitive processes. A form of graduated practice is used, starting with situations associated with a mild level of distress or agitation. A list of situations or triggers is created from the assessment conducted at the start of the therapy, with each situation written on a yellow Post-It note. The client uses the thermometer or measuring instrument originally used in the affective education activities to determine the hierarchy or rank order of situations. The most distressing are placed at the upper level of the instrument. As the therapy progresses, the client and therapist work through the hierarchy using fading or systematic desensitization using a schedule of graduated exposure to encourage the client to be less emotionally reactive [56]. After practice during the therapy session, the client has a project to apply their new knowledge and abilities in real-life situations. The therapist obviously needs to communicate and coordinate with those who are supporting the client in real-life circumstances. After each practical experience, therapist and client consider the degree of success, using activities such as comic strip conversations to debrief, reinforcement for achievements, and a “boasting book” or certificate of achievement. It also helps to have a training manual for the client that includes suggestions and explanations. The manual becomes a resource for the client during the therapy but is easily accessible information when the therapy program is complete. One of the issues during the practice will be generalization. People with Asperger disorder tend to be rigid in terms of recognizing when the new strategies are applicable in a situation that does not obviously resemble the practice sessions with the psychologist. It is necessary to ensure that strategies are used in a wide range of circumstances and no assumption made that once an appropriate emotion management strategy has proved successful, it will continue to be used in all settings.

The duration of the practice stage depends on the degree of success and list of situations. Gradually the therapist provides less direct guidance and support to encourage confidence in independently using the new strategies. The goal is to provide a template for current and future problem, but it will probably be necessary to maintain contact with the client for some time to prevent relapse.

Aspects of CBT can be incorporated into conventional family therapy [57] and social skills groups [58], and can be conducted as the primary psychological treatment. Other specialists may be consulted during the program, especially if the client has signs of attention deficit disorder, Tourette syndrome, and specific learning problems. Predictors of a successful outcome may include the complexity and degree of expression of the mood disorder and diagnostic characteristics, the intellectual capacity of the client, and their circumstances and support. Two

positive predictors that have been recognized by the author from clinical experience are a sense of humor and imagination.

Finally our scientific knowledge in the area of psychologic therapies and Asperger disorder is remarkably limited. We have case studies [59], but at present, no systematic and rigorous independent research studies that examine whether CBT is an effective treatment with this clinical population. This is despite the known high incidence of mood disorders, especially among adolescents with Asperger disorder. As a matter of expediency, a clinician may decide to conduct a course of CBT based on the known effectiveness of this form of psychologic treatment in the general population. We have yet to establish whether it is universally appropriate, however, and to confirm the modifications to accommodate the unusual characteristics and profile of abilities associated with Asperger disorder.

## References

- [1] American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th edition, text revision. Washington, DC; 2000
- [2] Church C, Alisanski S, Amanullah S. The social, behavioural and academic experiences of children with Asperger disorder. *Focus on Autism and Other Developmental Disabilities* 2000; 15(1):12–20.
- [3] Attwood T. *Asperger's syndrome: a guide for parents and professionals*. London: Jessica Kingsley Publishers; 1998.
- [4] Roffey S, Taurant T, Majors K. *Young friends: schools and friendship*. London: Cassell; 1994.
- [5] Rubin KH. *The friendship factor*. New York: Viking; 2002.
- [6] Klin A. Attributing social meaning to ambiguous visual stimuli in higher-functioning autism and Asperger syndrome: the social attribution task. *J Child Psychiatry* 2000;41:831–46.
- [7] Schopler E, Mesibov GB, Kuncze LJ. *Asperger syndrome or high-functioning autism?* New York: Plenum Press; 1998. p. 167–98.
- [8] Howlin P, Baron-Cohen S, Hadwin J. *Teaching children with autism to mind-read: a practical guide*. Chichester: Wiley; 1999.
- [9] Bauminger N, Kasari C. Loneliness and friendship in high functioning children with autism. *Child Dev* 2000;71:447–56.
- [10] Carrington S, Graham L. Perceptions of school by two teenage boys with Asperger syndrome and their mothers: a qualitative study. *Autism* 2001;5:37–48.
- [11] Holliday-Willey L. *Pretending to be normal*. London: Jessica Kingsley Publishers; 1999.
- [12] Aston MC. *The other half of Asperger's syndrome: a guide to living in an intimate relationship with a partner who has Asperger syndrome*. London: The National Autistic Society; 2001.
- [13] Kim JA, Szatmari P, Bryson SE, Streiner DL, Wilson F. The prevalence of anxiety and mood problems among children with autism and Asperger disorder. *Autism* 2000;4:117–32.
- [14] Ghazuddin M, Wieder-Mikhail W, Ghaziuddin N. Comorbidity of Asperger syndrome: a preliminary report. *J Intellect Disabil Res* 1998;42:279–83.
- [15] Gillot A, Furniss F, Walter A. Anxiety in high-functioning children with autism. *Autism* 2001; 5(3):277–86.
- [16] Green J, Gilchrist A, Burton D, Cox A. Social and psychiatric functioning in adolescents with Asperger disorder compared with conduct disorder. *J Autism Dev Disord* 2000;30(4): 279–93.
- [17] Tantam D. Psychological disorder in adolescents and adults with Asperger disorder. *Autism* 2000; 4:47–62.

- [18] Tonge B, Brereton A, Gray K, Einfeld S. Behavioural and emotional disturbance in high-functioning autism and Asperger disorder. *Autism* 1999;3:117–30.
- [19] Kurita H. Delusional disorder in a male adolescent with high-functioning PDD-NOS [brief report]. *J Autism Dev Disord* 1999;29(5):419–23.
- [20] Blackshaw AJ, Kinderman P, Hare DJ, Hatton C. Theory of mind, causal attribution and paranoia in Asperger disorder. *Autism* 2001;5(2):147–63.
- [21] Tantam D. Psychological disorder in adolescents and adults with Asperger disorder. *Autism* 2000;4:47–62.
- [22] De Long GR, Dwyer JT. Correlation of family history with specific autistic subgroups: Asperger's disorder and bipolar affective disease. *J Autism Dev Disord* 1988;18:593–600.
- [23] Bolton P, Pickles A, Murphy M, Rutter M. Autism affective and other psychiatric disorders: patterns of familial aggregation. *Psych Med* 1998;28:385–95.
- [24] Ghaziuddin M, Greden J. Depression in children with autism/pervasive developmental disorders: a case-control family history study. *J Autism Devel Disord* 1998;28:111–5.
- [25] Piven J, Palmar R. Psychological disorder and the broad autism phenotype: evidence from a family study of multiple-incidence autism families. *Am J Psychiatry* 1999;156:557–63.
- [26] Baron-Cohen S, Loffliff T. Another advanced test of theory of mind: evidence from very high functioning adults with autism or Asperger disorder. *J Child Psychol Psychiatry* 1997;38:813–22.
- [27] Baron-Cohen S, O'Riordan M, Stone V, Jones R, Plaisted K. Recognition of faux pas by normally developing children and children with Asperger disorder or high functioning autism. *J Autism Devel Disord* 1999;29:407–18.
- [28] Heavey L, Phillips W, Baron-Cohen S, Rutter M. The awkward moments test: a naturalistic measure of social understanding in autism. *J Autism Dev Disord* 2000;30:225–36.
- [29] Kleinman J, Marciano J, Ault R. Advanced theory of mind in high-functioning adults with autism. *J Autism Dev Disord* 2001;31:29–36.
- [30] Muris P, Steerneman P, Meesters C, Merckelbach H, Horselenberg R, Van Den Hogan T, et al. The TOM test: a new instrument for assessing theory of mind in normal children and children with pervasive developmental disorders. *J Autism Dev Disord* 2001;29:67–80.
- [31] Eisenmajer R, Prior M, Leekman S, Wing L, Gould J, Welham M, et al. Comparison of clinical symptoms in autism and Asperger's disorder. *J Am Acad Child Adolescent Psychiatry* 1996;35:1523–31.
- [32] Pennington BF, Ozonoff S. Executive functions and developmental psychopathology. *J Child Psychol Psychiatry Ann Res Rev* 1996;37:51–87.
- [33] Ozonoff S, South M, Miller J. DSM-IV defined Asperger disorder: cognitive, behavioural and early history differentiation from high-functioning autism. *Autism* 2000;4:29–46.
- [34] Nyden A, Gillberg C, Hjelmsquist E, Heiman M. Executive function/attention deficits in boys with Asperger disorder, attention disorder and reading/writing disorder. *Autism* 1999;3:213–28.
- [35] Adolphs R, Sears L, Piven J. Abnormal processing of social information from faces in autism. *J Cognitive Neurosci* 2001;13:232–40.
- [36] Baron-Cohen S, Ring HA, Wheelwright S, Bullmore ET, Brammer MJ, Simmons A, et al. Social intelligence in the normal autistic brain: an fMRI Study. *Eur J Neurosci* 1999;11:1891–8.
- [37] Fine C, Lumsden J, Blair RJR. Dissociation between theory of mind and executive functions in a patient with early left amygdala damage. *Brain J Neurol* 2001;124:287–98.
- [38] Critchley HD, Daly EM, Bullmore ET, Williams SCR, Van Amelsvoort T, Robertson DM, et al. The functional neuroanatomy of social behaviour. *Brain* 2000;123:2203–12.
- [39] Graham P. *Cognitive behaviour therapy for children and families*. Cambridge: Cambridge University Press; 1998.
- [40] Kendall PC. *Child and adolescent therapy cognitive behavioural therapy procedures*. New York: The Guildford Press; 2000.
- [41] Berthier ML. Hypomania following bereavement in Asperger's disorder: a case study. *Neuropsychiatr Neuropsychol Behav Neurol* 1995;8:222–8.
- [42] Koning C, Magill-Evans J. Social and language skills in adolescent boys with Asperger's disorder. *Autism* 2001;5(1):23–36.

- [43] McAfee J. Navigating the social world. A curriculum for individuals with Asperger's syndrome, high-functioning autism and related disorders. London: Jessica Kingsley Publishers; 2001.
- [44] Moyes R. Incorporating social goals in the classroom. A guide for teachers and parents of children with high-functioning autism and Asperger syndrome. London: Jessica Kingsley Publishers; 2001.
- [45] Werth A, Perkins M, Boucher J. Here's the weavery looming up. *Autism* 2001;5(2):111–25.
- [46] Groden J, Diller A, Bausman M, Velicer W, Norman G, Cautella J. The development of a stress survey schedule for persons with autism and other developmental disabilities. *J Autism Dev Disord* 2001;31(2):207–17.
- [47] Grandin T. Thinking in pictures. New York: Doubleday; 1995.
- [48] Hurlburt RT, Happe F, Frith U. Sampling the form of inner experience in three adults with Asperger's disorder. *Psychol Med* 1994;24:385–95.
- [49] Lee A, Hobson RP. On developing self-concepts: a controlled study of children and adolescents with autism. *J Child Psychol Psychiatry* 1998;39:1131–44.
- [50] Hall K. Asperger syndrome, the universe and everything. London: Jessica Kingsley Publishers; 2001.
- [51] Jackson L. Freaks, geeks and Asperger syndrome: a user guide to adolescence. London: Jessica Kingsley Publishers; 2002.
- [52] Lawson W. Life beyond glass. A personal account of autism spectrum disorder. London: Jessica Kingsley Publishers; 1998.
- [53] Holliday-Willey L. Pretending to be normal. London: Jessica Kingsley Publishers; 1999.
- [54] Ronen T. Cognitive developmental therapy with children. Sussex: Wiley and Sons; 1997.
- [55] Hare DJ, Jones JPR, Paine C. Approaching reality: the use of personal construct assessment in working with people with Asperger syndrome. *Autism* 1999;3:165–76.
- [56] Luiselli JK. Case demonstration of fading procedure to promote school attendance of a child with Asperger's disorder. *J Pos Behav Inter* 2000;2(1):47–53.
- [57] Stoddart K. Adolescents with Asperger disorder: three case studies of individual and family therapy. *Autism* 1999;3:255–71.
- [58] Howlin P, Yates P. The potential effectiveness of social skills groups for adults with autism. *Autism* 1999;3:299–307.
- [59] Hare DJ, Paine C. Developing cognitive behavioural treatments for people with Asperger's syndrome. *Clin Psychol Forum* 1997;110:5–8.