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Mary E. Stewart, Louise Barnard, Joanne Pearson, Reem Hasan and Gregory O'Brien

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Presentation of depression in autism and Asperger syndrome

A review

MARY E. STEWART *Heriot-Watt University, UK*
LOUISE BARNARD *University of Newcastle, UK*
JOANNE PEARSON *University of Northumbria, UK*
REEM HASAN *University of Newcastle, UK*
GREGORY O'BRIEN *University of Northumbria, UK*

ABSTRACT Depression is common in autism and Asperger syndrome, but despite this, there has been little research into this issue. This review considers the current literature on the prevalence, presentation, treatment and assessment of depression in autism and Asperger syndrome. There are diagnostic difficulties when considering depression in autism and Asperger syndrome, as the characteristics of these disorders, such as social withdrawal and appetite and sleep disturbance, are also core symptoms of depression. Impaired verbal and non-verbal communication can mask the symptoms of depression. Symptoms associated with autism and Asperger syndrome such as obsessionality and self-injury may be increased during an episode of depression. There is a clear need to develop specific tools both for diagnostic purposes and for measurement of depression in autism and Asperger syndrome in order to help alleviate the distress caused by this treatable illness.

KEYWORDS *Asperger syndrome; autism; depression; review*

ADDRESS *Correspondence should be addressed to:* DR MARY E. STEWART, *Applied Psychology, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, UK. e-mail: m.e.stewart@hw.ac.uk*

Introduction

Autism and Asperger syndrome are associated with an increased prevalence of psychiatric disorders; the most commonly reported are depression and anxiety (Howlin, 1997). Prevalence estimates of comorbid depression in autism and Asperger syndrome vary widely, from 4 to 38 percent (Lainhart, 1999). The cardinal features of autism and Asperger syndrome make the

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assessment and diagnosis of depression within these disorders particularly difficult. There is considerable overlap between the symptoms of autism and Asperger syndrome and those of depression, and the characteristics of autism and Asperger syndrome may affect the expression of depressive symptoms.

Many individuals with autism and Asperger syndrome will not have sufficient language skills to verbalize changes in mood and feelings of depression; therefore carers and clinicians must be relied upon to detect potential cases of depression. This in itself is problematic. Individuals with autism and Asperger syndrome have difficulties in expressing and communicating emotion. There are marked subtleties in the quality of the expression of affect and there may be problems in mentalizing emotions. There is poor integration between the different modalities of non-verbal expressions, for instance in matching facial expressions with gestures (Hobson, 1986). Individuals with autism and Asperger syndrome, for example, demonstrate difficulties identifying and talking about complex emotions such as pride and embarassment (Capps et al., 1992). Facial expressions are often neutral and difficult to interpret in both learning disabled and high-functioning groups with autism and Asperger syndrome (Bieberich and Morgan, 1998; Yirmiya et al., 1989).

This review considers all published reports of depression in people with autism or Asperger syndrome. It provides a detailed explanation of the symptoms and provides suggestions for identification and assessment of depression in autism and Asperger syndrome.

Method

A systematic review of published reports of depression in autism and Asperger syndrome was conducted using Medline (1966 to September 2003), PsychInfo (1981 to September 2003) and Web of Science (1981 to September 2003). The following search terms were used: autism, autistic disorder, Asperger syndrome, pervasive developmental disorder, depression, dysthymia, low mood, affective disorder, seasonal affective disorder, major depression and mood disorder. In addition, the reference sections of articles gleaned from the electronic searches were searched.

Inclusion/exclusion criteria

All articles published in English that document the prevalence, natural history, characteristics or treatment of depression in autism or Asperger syndrome were included. Cases were only included if they describe depression in the absence of mania. Studies which did not specifically identify cases with autism, Asperger syndrome or depression were not

included. Only cases that describe depression in autism and Asperger syndrome are reported.

Results

Twenty-seven articles were identified; these are presented in Tables 1 and 2. Table 1 describes case studies. There are 12 articles concerning 15 cases. One case was described twice in two different papers (Ghaziuddin and Tsai, 1991; Ghaziuddin et al., 1991). Table 2 describes all other studies, of which there are 15. These include clinic series, follow-up studies, comparisons between depressed and non-depressed groups, and treatment studies.

For the remainder of the review, unless otherwise specified, the term 'depression' will be used to refer to the depressive spectrum excluding bipolar disorder. The majority of reviewed articles use the term 'depression', without giving any subclassification.

Occurrence of depression in autism and Asperger syndrome

Large population studies assessing the incidence and prevalence of depression in autism and Asperger syndrome have not been carried out. There have been a number of studies detailing the occurrence of depression in groups of individuals with autism and Asperger syndrome (see Table 2: Ghaziuddin et al., 1992; 1998; Kim et al., 2000; Larsen and Mouridsen, 1997; Rumsey et al., 1985; Tantam, 1991).

These studies are extremely variable. They differ for instance in size, study period, age of individuals, diagnostic criteria and sampling methods. It is difficult to know how generalizable data from samples such as these will be. The rates of depression among individuals with autism and Asperger syndrome vary widely from study to study, with the highest being 34 percent. The samples are generally young, which means that they may not yet have had an episode of depression which may affect them later in life. Kim et al. (2000) compare their sample to a community sample and find that the rates of depression are higher in the autism and Asperger syndrome group than the community group.

Presentation of depression in autism and Asperger syndrome

Fifteen cases of depression occurring in autism and Asperger syndrome have been described in the literature. Different diagnostic instruments have been used and in some cases the criteria on which the diagnosis of depression was based are not recorded. Bearing these limitations in mind, this section and Table 1 describe how the key symptoms of depression manifest in autism and Asperger syndrome.

Depressed mood is the most frequently cited marker of depression

Table 1 **Summary of case studies that describe depression in autism and Asperger syndrome**

Authors	*LD*	*Age of first episode (years)*	*Diagnosis of autism (criteria)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*Other*	*Treatment*
Wing, 1981	None	'Early adult life'	Asperger syndrome	Y	dk	dk	dk	Slow speech	dk	Y	dk	Attempt	Dishevelled appearance. Triggered by reorganization of office at work	
Komoto et al., 1984	Moderate	10	Autism	Y	dk	Y	Y	dk	dk	dk	dk	dk	Refused to talk, 'scared'. Cyclic, 1 week/month	Carbamazepine
Gillberg, 1985	Mild	8	Asperger syndrome (ABC)[b]	Y	Y	Y	dk	dk	dk	dk	dk	dk	Regression of speech, personal hygiene, bowel and bladder control. Loses interest in repetitive behaviours. Became much worse during puberty	No episodes in 8 months on lithium carbonate
Sovner, 1988a	Mild	24	Autism	Y	no	dk	Y	dk	dk	dk	dk	dk	Excessive skin picking	Nortriptyline, motor seizure; carbamazepine, remission
Sovner, 1988b	Moderate	25	PDD	Y	Y	Y	Y	dk	dk	dk	dk	dk	Pica and skin picking	Imipramine, amphetamine reaction; trazadone, sedated; lithium, remission
Clarke et al., 1989	Mild	23	Autism (DSM-III-R)	Y	Y	Y	Y	dk	dk	dk	dk	Y	Dishevelled appearance, agitated. Refused to attend ATC	Amitriptyline and chlorpromazine, remitted after 3 months
Ghaziuddin and Tsai, 1991	Moderate	17	Autism (DSM-III-R; ABC)	Y	Y	Y	Y	Retardation	Y	dk	dk	dk	Vague physical complaints. Used HRDS	Fluoxetine, remission after 4 weeks, sustained at 8 months
Ghaziuddin et al., 1991		16	Autism	dk	Y	Y	Y	dk	dk	dk	dk	dk		Fluoxetine, remission within 2 weeks
Hare, 1997	None	26	Asperger syndrome	Y	dk	dk	dk	dk	dk	dk	dk	dk	SIB and excessive drinking. Used BDI	Cognitive-behaviour therapy, remission
Cooke and Thompson, 1998	Severe	6	ASD	Y	dk	dk	Y	dk	dk	dk	Y	dk	Hyperactivity and aggression	SAD, remission with light therapy
Clarke et al., 1999 case 1	Severe	37	Atypical autism (ICD-10/DCR-10)	Y	Y	Y	Y	dk	dk	dk	dk	dk	Severe depression with psychotic symptoms, incontinent	Chlorpromazine and amitriptyline, remitted but relapsed within 1 month of treatment
Clarke et al., 1999 case 2	Mild	23	Asperger syndrome (ICD-10/DCR-10)	dk	dk	dk	Y	dk	dk	dk	Y	dk	Severe depression with psychotic symptoms	Flupenthixol, remitted but relapse on discontinuation; remission with fluoxetine and chlorpromazine
Clarke et al., 1999 case 3	Moderate	13	Atypical autism (ICD-10/DCR-10)	Y	Y	Y	Y	dk	dk	dk	dk	dk	Recurrent depressive disorder. Diurnal variation in mood. Increased stereotypies, SIB, aggression and social withdrawal	Paroxetine, remission after 6 weeks; fluoxetine, ineffective; lofepramine, remission after 3 weeks but relapse after 5 weeks
Clarke et al., 1999 case 4	Severe	15	Autism (ICD-10/DCR-10)	Y	dk	dk	dk	dk	dk	dk	dk	dk	SIB and aggression	Carbamazepine and chlorpromazine; paroxetine and lithium, remission, maintained at 6 months
Long et al., 2000	Severe	19	Autism (DSM-IV)	Y	no	Y	Y	no	no	no	no	no	Increase in SIB and aggression	Paroxetine and zopicilone and psychological interventions, dramatic improvement in maladaptive behaviours
Summary	15 cases			13	7	9	11	2	1	1	2	2		

1 Depressed mood as indicated by subjected report or observation (e.g. tearful). 2 Diminished interest or pleasure in all or almost all activities. 3 Significant weight loss or gain, or significant change in appetite. 4 Insomnia/hypersomnia. 5 Psychomotor agitation/retardation. 6 Fatigue or loss of energy. 7 Feelings of worthlessness, or excessive or inappropriate guilt.. 8 Diminished ability to think/concentrate, or indecisiveness. 9 Recurrent thoughts of death, suicidal ideation, suicidal attempt or plan. [a] This case was also described in Ghaziuddin et al. (1991). [b] Did not meet criteria on this scale. 'dk' means that the symptom/sign was not discussed in the article, not that the authors were unable to assess it. Similarly, 'no' means that the behaviour was discussed in the article, and either was not a problem or could not be assessed.

associated with autism and Asperger syndrome. However, in only one case was depressed mood directly reported by the affected individual (Ghaziuddin and Tsai, 1991); the remaining cases relied upon third-party accounts, usually from parents. Third-party accounts were based either on sad or miserable facial appearance, or on changes in behaviour such as increased frequency of crying or increased irritability. Only one individual had voiced suicidal thoughts (Clarke et al., 1989). One case had been hospitalized for attempted suicide (Wing, 1981).

Other symptoms of depression were apparent such as loss of interest in activities ($n = 7$). In one study this was severe enough to prevent the patient from attending his adult training centre (Clarke et al., 1989), and one case who was obsessed with meteorology totally lost interest in this when he became depressed (Gillberg, 1985). Appetite ($n = 8$) and sleep disturbance ($n = 11$) were reported. Only one study reported hypersomnia (Sovner, 1988b); the remainder reported disturbed sleep and insomnia. One study reported an individual spontaneously complaining of feeling fatigued (Ghaziuddin et al., 1991).

Only two cases presented with some evidence of psychomotor retardation (Ghaziuddin and Tsai, 1991). In one case, the patient's speech was reported to be 'painfully slow with long pauses'. Only two reports mentioned diminished ability to think or concentrate (Clarke et al., 1999; Cooke and Thompson, 1998); in both cases this was reported by a third party and was apparent in performance.

In summary, many of the key features of depression are reported by third-party accounts or are shown in behaviour rather than by self-report. Symptoms such as social withdrawal and abnormal speech patterns, which are symptoms of autism and Asperger syndrome, may be confused with fatigue or psychomotor retardation respectively, thereby making it difficult to discriminate between symptoms of autism and Asperger syndrome, and depression.

Changes in autistic symptoms of depression in autism and Asperger syndrome

A myriad of other symptoms is reported to be associated with depression in autism and Asperger syndrome. In particular, the onset and natural history of depression was usually, if not always, associated with new onset of, or exacerbation of, maladaptive behaviours, particularly self-injury and aggression (see Table 1). But this may be a reflection of the clinical settings from which the studies derive.

A decrease in self-care is common in depression and indeed, in the majority of cases with autism and Asperger syndrome, the onset of depression signified a decrease in adaptive functioning and the capacity for

Table 2 **Summary of studies describing depression in autism and Asperger syndrome (excluding single case studies)**

Authors	*Type of study*	*Diagnosis*	*LD*	*Age range (mean) years*	*Assessment of depression*	*Diagnosis of autism or Asperger syndrome*	*Finding*
Wing, 1981	Clinic series	18 Asperger	dk	Over 16	dk	dk	4 had probable depression
Rumsey et al., 1985	Follow-up to national PET study	14 autism	2 had LD	18–39 (28)	DSM-III; DICA; DIS	DSM-III	None met DSM-III criteria for depression at the time of testing. 2 patients were thought to be depressed
Chung et al., 1990	Follow-up of all referrals of children with autism over 10 year period	66 autistic	Most cases had LD	dk	Semi-structured interview	CARS	9% had definite depressive symptomatology and a further 14% had 'mild/dubious' symptomatology
Tantam, 1991	Descriptive study	85 Asperger	Some cases had LD	16–65	ICD-9	ICD-9	11% had depression, this was the most common psychiatric diagnosis
Ghaziuddin et al., 1992	Consecutive referrals over 18 months with autism	68 autistic	57 had LD	2–17 (8)	DSM-III-R	DSM-III-R; ABC	3 (4%) had depression
Ghaziuddin et al., 1995	Comparison of depressed and non-depressed children with autism and whether they had significantly more significant life events	8 autistic; 14 PDD-NOS 11 depressed;11 non-depressed controls	8 had LD	9–11	DSM-III-R; Reiss Scale (life events schedule)	DSM-III-R; ABC	Depressed children had a higher prevalence of life events than non-depressed children
Larsen and Mouridsen, 1997	30 year follow-up of child psychiatric admissions	9 autism; 9 Asperger	Moderate to normal	32–44 (38)	ICD-10	ICD-10	1 person with autism and 1 with Asperger had a history of depression
Ghaziuddin and Greden, 1998	Comparison of depressed and non-depressed people with autism/PDD-NOS and whether they had family history of depression	5 autism; 18 PDD-NOS 13 depressed; 10 non-depressed	10 had LD	(10)	DSM-III-R; Reiss Scale	DSM-III-R; ABC	Depressed group had significantly higher IQ and higher number had a family history of depression than non-depressed group
Ghaziuddin et al., 1998	Clinic series	35 Asperger	none	8–51 (15)	K–SADS–E	DSM-IV; ICD-10	All were referred for diagnosis of Asperger. 8 were diagnosed with major depression and 4 with dysthymia (34%)
Kim et al., 2000	Follow-up to clinic series. Enrolled in study 6 years prior to this assessment	19 Asperger; 40 autism	none	9–14	OCHS–R	DSM-IV; ADI	17% had clinically relevant depression scores. Depression correlated with anxiousness and externalizing behaviour. No difference in level of depression between autism and Asperger. Not correlated with IQ or ADI scores
Green et al., 2000	Comparison between Asperger syndrome and conduct disorder	20 Asperger; 20 conduct disorder controls	none	11–19 (14)	ICD-10	ICD-10; ADI; ADOS	There was no difference in parental reports of depression between the group. 1 Asperger and no controls attained ICD-10 criteria for depression
Barnhill, 2001	Descriptive study to explore relationship between social attributions and level of depression in Asperger syndrome	33 Asperger	none	12–17 (15)	CDI	Not stated	18% reported more depressive symptoms than peers. 36 % reported fewer depressive symptoms than peers. The more depressed, the more they attributed social failure to their ability and effort
Treatment studies							
Abramson et al., 1992	Family study	13 autistic	dk	(18)	dk	dk	33% had been treated for affective disorder without mania
Perry et al., 2001	Prospective study with recent onset of behaviour problems	12 autism	Moderate to severe	16–42 (28)	ICD-10; DAS	ICD-10	9 responded to anti-depressants or mood stabilizers. 3 showed no response
Tsiouris et al., 2003	Treatment of SIB in persons with developmental disabilities	17 autism	9 profound, 6 severe, 2 moderate		DSM-III-R and DSM-IV	DSM-III-R; DSM-IV	8 major depression, 2 mood disorder, 3 anxiety disorder. All improved with treatment

ABC: Autism Behaviour Checklist. ADI: Autism Diagnostic Interview. ADOS: Autism Diagnostic Observation Scale. CDI: Children's Depression Inventory. DAS: Disability Assessment Schedule. DICA: Diagnostic Interview for Children and Adolescents. DIS: NIMH Diagnostic Interview Schedule. K–SADS–E: Kiddie–Schedule for Affective Disorders and Schizophrenia–Epidemiological Version. OCHS–R: Ontario Child Health Study–Revised, Current age – not clear at what age symptoms started and treatment commenced.'dk' means that the symptom/sign was not discussed in the article, not that the authors were unable to assess it. Similarly,'no' means that the behaviour was discussed in the article, and either was not a problem or could not be assessed.

self-care (see Table 1). A man with severe learning disability became incontinent of urine upon the onset of psychotic depression (Clarke et al., 1999) and a relatively able man with Asperger syndrome lost bowel and bladder control when depressed (Gillberg, 1985).

Measurement and assessment of depression in autism and Asperger syndrome

There are no scales specifically designed to assess depression in people with autism and Asperger syndrome (either third-party or self-report); instead, researchers have used measures designed for use in the general population or in the learning disabled population. Only two scales have been used that were specifically designed for people with learning disability: the Reiss scale (Reiss, 1990) and the Disability Assessment Schedule (Holmes et al., 1982). Both scales measure a wide range of psychiatric illnesses, including depression. Ghaziuddin et al. (1995) and Ghaziuddin and Greden (1998) employed the Reiss scale, a carer-rated schedule that takes into account behaviour over the preceding 3 months. The Disability Assessment Schedule measures impairments in non-verbal communication and social interaction and considers a wide range of behavioural abnormalities (Holmes et al., 1982).

Three studies used structured or semi-structured parental interviews based upon DSM-III-R criteria: the Diagnostic Interview for Children and Adolescents (Herjanic and Campbell, 1977), the Ontario Child Health Study–Revised (Kim et al., 2000) and the Kiddie–Schedule for Affective Disorders and Schizophrenia–Epidemiological version (Puig-Antich et al., 1980). All three are designed to screen for a number of psychiatric disorders including depression in children.

One study used the Children's Depression Inventory (Barnhill, 2001) which is a self-report scale, based upon the Hamilton Depression Rating Scale (Hamilton, 1960), for use with children and adolescents. The child must choose from among three alternatives for 27 items. This scale was used with 33 children and adolescents with Asperger syndrome; none of these cases was classed as learning disabled.

Two of the most widely used scales to assess the severity of depression are the Hamilton Depression Rating Scale and the Beck Depression Inventory (Beck et al., 1961). The Beck Depression Inventory has been used in one case with Asperger syndrome (Hare, 1997) and no cases with autism. It was used over a number of months and formed the basis of cognitive-behavioural therapy sessions. Interestingly, the numerical scoring of the Beck Depression Inventory appealed to the concrete thinking processes of the individual involved; he liked the idea of being able to explain his mood in terms of numbers. The self-report format presented no problems

for this individual; however, this may not be the case for less able individuals. The Hamilton Depression Rating Scale was used to measure depression and response to treatment over a number of months in an individual with autism, Down's syndrome and moderate learning disability (Ghaziuddin and Tsai, 1991). The authors reported that a number of items from the scale could not be assessed, such as guilt and subjective feelings of anxiety.

Although measures such as the Hamilton Depression Rating Scale and the Beck Depression Inventory have been adapted, many of the questions may be difficult for an individual with autism and Asperger syndrome to answer and may also prove difficult for a third party to answer on their behalf. For instance the Hamilton Depression Rating Scale and the Beck Depression Inventory include questions which ask the individual to subjectively rate their mood and how they feel about particular issues such as guilt. Assessments relating to appetite, sleep, interest in activities and psychomotor retardation may be masked by the symptoms of autism. In addition, changes in symptoms relating to autism such as maladaptive behaviours are not assessed in these questionnaires.

There is a clear need for both assessment and measurement tools which are designed specifically for this population (for instance, O'Brien et al., 2001). Such instruments would need to take account of changes in behaviours such as self-injury, and adopt approaches to the assessment of mood in modalities more specific to this population.

Treatment

There have been few studies describing treatment of depression in autism and Asperger syndrome (see Tables 1 and 2). Although there are a wide range of therapies used both in the treatment of depression and in autism and Asperger syndrome, this review found that the main treatment used for depression in autism and Asperger syndrome was pharmacological. Pharmacological therapy was used in 12 of the 15 cases. This included: antidepressants such as tricyclics and selective serotonin reuptake inhibitors (SSRIs), mood stabilizers, antipsychotics, and hypnotics. Eight cases were on drug monotherapy. Only one of the published cases was treated using a psychological therapy, cognitive-behaviour therapy (Hare, 1997), and one was treated with a psychological intervention in conjunction with zopiclone (Long et al., 2000). Both of these studies were successful in reducing symptoms. For a case of seasonal affective disorder, light treatment was used with a marked improvement in behaviour and mood, with aggression, self-injury, low mood and anxiety all decreasing (Cooke and Thompson, 1998).

From these studies selective serotonin reuptake inhibitors were the most

effective, in that, out of seven cases, six showed a reduction in the symptoms of depression. Treatment also was associated with decreases in aggressive and self-injurious behaviours and increased capacity for self-care.

Interestingly, Perry et al. (2001) treated a group of 12 individuals with autism with moderate to severe learning disability, who were suspected of having a depressive episode due to an exacerbation of pre-existing behavioural problems, with either antidepressants or mood stabilizers or both. Two cases responded within 2 weeks, seven responded in 2–6 weeks and three showed no response within 6 weeks. Perry et al. suggested that the seven cases that showed improvement in 2–6 weeks had had an episode of depression (the two cases that responded in less than 2 weeks were considered to respond too quickly for the pharmacological agents to have had an effect). The treatment was particularly effective for low mood, sleep disturbance and self-injurious behaviours.

Another study which identified depression during treatment for self-injurious behaviour was one by Tsiouris et al. (2003) who treated persons with developmental disabilities. Out of this group, 17 had a diagnosis of autism; and of these, eight had a diagnosis of major depression and two had a diagnosis of mood disorder. Following treatment with a range of psychotropic drugs including SSRIs there was a significant decrease in self-injurious behaviour in all of these individuals.

It is important to also assess behavioural, psychological and educational interventions in this group. Residential programmes, treatment programmes and educational programmes can reduce behavioural problems in individuals with autism and Asperger syndrome. Unfortunately there is a paucity of studies which directly assess interventions of this nature for depression in this group.

Discussion

This article has reviewed all published reports concerning depression in individuals with autism or Asperger syndrome. Depression does appear to be common in autism and Asperger syndrome; however, to date it is difficult to establish a rate of prevalence. No study has established a true prevalence rate among a representative sample of adults with autism and Asperger syndrome. However, Kim et al. (2000) suggest that the rate of depression among children with autism and Asperger syndrome is higher than within a community control group. Only one study followed up individuals after 30 years (Larsen and Mouridsen, 1997); however, this sample was small and likely to suffer from selection bias. There is a need for large-scale longitudinal population studies to identify the rate and lifetime incidence of depression in autism and Asperger syndrome.

The presentation of depression may be obscured by the symptoms of autism and Asperger syndrome. A frequently reported symptom of depression in autism and Asperger syndrome is depressed mood, and in nearly all of the case studies depressed mood is identified as a symptom. Other symptoms such as feelings of worthlessness, guilt, diminished ability to concentrate and thoughts of suicide are not frequently reported. Subjective feelings can be difficult to assess in this population. In addition, symptoms more commonly associated with autism and Asperger syndrome change with mood. For instance Kim et al. (2000) noted that an increase in depressive symptoms also resulted in an increase in aggressive and oppositional behaviour. Other maladaptive behaviours such as self-injurious behaviour increase during an episode of depression (e.g. Long et al., 2000). Furthermore, following treatment for psychiatric disorders, self-injurious behaviour is much reduced (Tsioursis et al., 2003). These behaviours are not specific to depression, nor are they a diagnostic criterion for depression in autism and Asperger syndrome. Autistic behaviours can increase due to other stressful events such as change in routine, or any physical or mental illness.

Depression in autism and Asperger syndrome may raise an interesting paradox. There is little mention in the literature of how depression impacts on repetitive and obsessional behaviours. If repetitive and obsessional behaviours are decreased in individuals with autism and Asperger syndrome when they become depressed, a reduction may be viewed as an improvement rather than a feature of depression, thereby further masking depression in this group. Gillberg (1985) describes an individual who when depressed lost interest in repetitive behaviours. There needs to be further investigation into the presentation of depression in autism and Asperger syndrome in order to monitor the changes in symptoms which occur across an episode. This review has reported increases in maladaptive behaviours during an episode of depression; however, further investigation is required to identify to what extent maladaptive behaviours are affected by depression.

In order to study depression in autism and Asperger syndrome there is a need to develop adequate tools for the assessment and measurement of depression in this group. Measures have been adapted from those within general psychiatry such as the Hamilton Depression Rating Scale (Hamilton, 1960) or the Beck Depression Inventory (Beck et al., 1961). Although these may be suitable for those individuals who are high functioning they are less useful in lower-functioning groups. Other instruments used are those adapted from measures used in children or in learning disabled populations. It is time a scale was developed which will allow measurement in autism and Asperger syndrome, and will assess change over time, not only in depressive symptoms but also in autistic symptoms.

A relatively new diagnostic system has been produced for diagnosing psychiatric disorders in learning disability (DC–LD: Royal College of Psychiatrists, 2001). DC–LD does not stipulate excessive feelings of guilt or worthlessness and does not include any mention of suicidal behaviour. Instead, it includes loss of confidence or increased reassurance-seeking behaviours; increased tearfulness, which in DSM-IV (American Psychiatric Association, 1999; see also World Health Organization, 1992) comes under the auspices of depressed mood; increase in somatic symptoms and physical health concerns; and increase in a specific problem behaviour. The present authors propose that the DC–LD criteria should be modified for use with autism and Asperger syndrome. The DC–LD criteria could be supplemented with the following symptoms: increase in maladaptive behaviours, including self-injury and aggression; decrease in personal care skills or loss of bowel or bladder control; and recurrent thoughts of death (not just fear of dying).

There are few studies assessing the factors associated with the onset of depression in autism and Asperger syndrome. This review did not identify literature which documented other factors associated with depression such as quality of life, life events or social circumstances. Longitudinal studies addressing factors associated with the onset of depression are needed. However, it is well documented that individuals with autism and Asperger syndrome show confusion, distress and anxiety when there are even minor changes in the environment (Groden et al., 1994). Fear of change may induce anxiety. Indeed individuals with autism and Asperger syndrome show a resistance to change which may be due to a difficulty in understanding what is happening in the environment and fear of uncertainty. It is important to be able to distinguish anxiety and depression in this group. Children with autism and Asperger syndrome do have high levels of anxiety (Gillott et al., 2001). Anxiety and depression are highly related, and also high levels of anxiety have been shown to predispose depression (Hirschfeld et al., 1989; Kendler et al., 1993). It would be interesting to identify whether individuals with high anxiety levels and autism and Asperger syndrome have increased susceptibility for depression.

At times depression has only been identified in individuals following treatment. To the authors' knowledge, there have been no randomly controlled trials of antidepressant treatment in autism and Asperger syndrome. However, from the studies reviewed, treatment does appear to be effective. Of particular note is that not only were depressive symptoms reduced but also certain behavioural problems (e.g. Perry et al., 2001).

Depression is common within autism and Asperger syndrome and appears to be treatable. There is a clear need for better assessment and measurement tools in order to be able to identify and treat this illness more

effectively within autism and Asperger syndrome. The development of such assessment and measurement tools will allow the trials of treatment of depression in autism and Asperger syndrome which are clearly required.

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