

GIFTEDNESS & AUTISM

SAVANT SKILL FACT SHEET

Autistic Savants are children and adults who have an autism spectrum disorder (ASD) and who display remarkable abilities or skills in one or several domains. Savant abilities and/or splinter skills, may be exhibited in the following skill areas or domains: memory; hyperlexia (the exceptional ability to read, spell and write); art; music; mechanical or spatial skill; calendar calculation; mathematical calculation; sensory sensitivity; athletic performance; and computer ability. These skills may be remarkable in contrast to the disability of autism, or prodigious in relation to the typical population.

However, the often-prodigious gifts or talents of the majority of autistic savants are exhibited in obsessive and repetitive behaviours and these skills may appear to have little functional application or meaning. Dustin Hoffman, in the movie *Rain Man*, played the character of Raymond, an autistic savant who displayed remarkable memory, calendar and mathematical calculation skills but was unable to function productively or independently.

The term autistic savant first appeared in the literature when Goodman (1972) described a child with autism who displayed significantly discrepant abilities in relation to his or her mental functions. The term replaced the now unacceptable term 'idiot savant'. More recently the term 'savant syndrome' (Treffert 1989) has been adopted to refer to those with or without intellectual impairment and/or autism, who display skills above that expected of those with either intellectual impairment and/or autism, or when compared to the non-disabled population. Talented Savants or Savant I are those with '*spectacular islands of ability or brilliance which stand in stark, markedly incongruous contrast to the handicaps*' and Prodigious Savants, or Savant II as having '*ability or brilliance which would be spectacular even if viewed in a normal person*' (Treffert, 1989, p. xv).

THE NATURE OF SAVANT ABILITIES

Savant skills occur far more frequently in males than females, in a ratio of 6:1 (Hill 1978). Autistic savants are characterised by:

- concentration on their specific interests and activities to the exclusion of all else
- a tendency to be rigid, inflexible and context bound resulting in difficulty applying skills to new circumstances

Savant skills involve highly developed rote memory and a lexicon of well-organised, structurally rule-based knowledge (Sloboda, Hermelin, and O'Connor, 1986a; Young & Nettlebeck, 1994).

While up to now the assumption has been that savantism only occurs in approximately 10 per cent of cases with ASD, Howlin and her colleagues (2009) provide evidence of much higher prevalence. In a large clinical cohort, almost 30 per cent show an outstanding skill either in terms of peak performance on intelligence subtests or parent-rated savant skills (in, for example, memory, music or calculation).

WHAT CAUSES SAVANT SYNDROME?

Treffert (1989) suggests that savant skills may result from the formation of exceptional neural structures during prenatal brain development however the causes of savant skills remain unclear and controversial. There is mounting evidence for a genetic link with family members displaying similar interests, talents and abilities (Hermelin & O'Connor, 1990b; Young & Nettlebeck, 1995).

HOW DO SAVANTS DO THE EXTRAORDINARY THINGS THEY DO?

Savant skills often develop in early childhood in the absence of teaching. It may be that these skills may also develop as the result of intense concentration and practice. Pring, Hermelin and Heavey (1995) suggest that weak central coherence and a predisposition to repetitive behaviour patterns may in fact play a role in the development of savant skills.

EDUCATIONAL STRATEGIES FOR THE APPLICATION OF SAVANT AND SPLINTER SKILLS

Educational implications of savant syndrome have not been adequately researched. Clark, (2001) developed an educational strengths based curriculum (the Savant Skill Curriculum) combining strategies currently employed in the education of gifted children (enrichment, acceleration and mentorship) and autism education (visual supports and social stories). The aim of this study was develop functional skills. Gains in behaviour, social skills and academic self-esteem were observed. Improvements in the communication skills of some subjects were also reported. The study is cited in Trefferts (2012) most recent book *Islands of Genius* as an example of an innovative, targeted education and employment intervention to assist the savant to make productive use of their talents.

EDUCATIONAL STRATEGIES

A combination of gifted and autism educational strategies are recommended.

A. Gifted Education – acceleration, enrichment, mentorships

(i) Acceleration

- Acceleration involves the promotion of a student to a level of activity beyond that which is usual for his/her age. Acceleration Strategies may include;
- Grade acceleration – the advancement of the student to a higher grade than peers
- Content Acceleration - 'Telescoping' – the rapid progression through curriculum content in a far shorter time

(ii) Enrichment

- Enrichment refers generally to curriculum experiences that are supplements to, or replacements of the regular curriculum – Massé & Gagné, 1983

(iii) Mentorship

Mentorship involves a one to one relationship; a wise, experienced person guides a younger inexperienced person; a long term commitment is made by both individuals. Temple Grandin for example, a woman with autism who has achieved remarkable academic and professional success, attributes her vocational success to the guidance of several mentors throughout her life (Grandin, 1992 cited in Schopler & Mesibov, 1992, p122).

B. Autism Education – recommend ASD specific strategies may include;

- Visual supports for communication/behaviour (Hodgdon, 1995)

- Social Stories (Gray & Garand, 1993)
- Individual Education Plans (Lansing & Schopler, 1978)
- Functional Programming (Dunlap, Koegel & Egel, 1979)
- Use of obsessions (Charlop, Christy & Haymes, 1996)

An example of an Individual Education Plan that incorporates the application of savant skills using the above educational strategies is provided in the table below:

Individual Education Plan – Savant Skills

Savant Skill & Level	Enrichment	Acceleration	Mentorship
Calendar Calculations (Savant II)	<p>Written Language</p> <p>Use calendar calculation skills to broaden the student’s knowledge of world events (e.g. history) and to increase his awareness of the concept of time (past, present, future). To be responsible for school excursion calendars</p>	<p>Research Skills</p> <p>Teach research skills to access high interest information (as for enrichment)</p>	
Mechanical Spatial (Savant II)	<p>Construction</p> <p>Student to be given a wider and more complex variety of building blocks/engineering games</p>	<p>Science KLA</p> <p>Select higher level science activities from Science Curriculum e.g. basic physics, etc.</p>	<p>Mentor</p> <p>A mentor e.g. School maintenance man to work one to one with student to increase his knowledge and practical use of mechanical objects/equipment e.g. repairing electrical school equipment</p>
Art/Drawing (Savant II)	<p>Art Topics</p> <p>Student to choose from a variety of drawing/craft topics on completion of work or during lessons</p>	<p>Art Curriculum</p> <p>To extend the quality and complexity of students drawings/art work based on obsessive topics initially then fade to non-obsessive topics</p>	<p>Mentor</p> <p>To be tutored by a mentor with artistic skill (as for Acceleration) based on Art Curriculum. Expose student to a wider variety of art materials/experiences</p>

THE CASE OF PATRICK

Rather than greeting his friends, family members and teachers with the usual “Hi!” or “How are you?” Patrick will recall the person’s exact birth date. Alternatively he may also choose to inform them of their telephone number, address and car registration. Patrick’s passion for numbers started at age 2. If asked to provide the day of the week on which any date fell between 1900 and 2010, he can give the answer accurately within a few seconds. He can also accurately calculate five and six digit addition, subtraction, multiplication and division equations mentally within a few seconds, often faster than his teacher using an electronic calculator. Rather than speak words, on occasions Patrick will spell them. He spells most words accurately (two years above his chronological age) and can spell many words in Latin and Italian. Patrick has a great love of the computer and without any formal training is able to use many software programs. At the age of seven his brother discovered he had removed some files, and hidden others, on the family computer. Patrick was 14 years of age when he participated in the Savant Skill study. He was diagnosed with severe autism and developmental delay at the age of four.

At the age of four years, due to delayed speech development, abnormal behaviour, hyperactivity, destructiveness and poor concentration Patrick was diagnosed as suffering from autism and developmental delay. Although initially assessed as functioning within the upper range of moderate intellectual disability, a subsequent assessment on the *Stanford-Binet Revision IV* in 1996 indicated that Patrick's overall level of functioning was in the mild range of delay. It should be noted that at the time of the initial diagnosis Patrick was observed as displaying 'definite islands of ability and potential to learn' (Canterbury Health Service, 1986).

Patrick was referred to this study by his family and teacher for displaying multiple-savant abilities. His savant abilities include; memory (Savant II), hyperlexia (Savant I/S), calendar calculation (Savant II), mathematics calculation (Savant II), mechanical/spatial including computer ability (Savant I/S), and music (Savant I/S). The majority of his skills were identified as being, 'exceptional in the normal population'. His family reported that he developed an early interest in numbers and words, and had taught himself to read by the age of four years. Patrick is extremely obsessed with his savant interests, spending many hours per day engaged in his savant activities. Although the family reported no evidence of other family members displaying savant skills, or who might be considered gifted and talented, his eldest brother is a highly skilled executive in the computer industry.

Patrick's communication and social skills are severely delayed and disordered.

His social skills and behaviour are similarly severely delayed and disordered. Patrick's social interactions are directed towards servicing his 'wants' and 'needs'. Unless given a savant activity or a favourite food-item, or a change in his program or environment occurs, he tantrums, bite himself or become destructive. He is unable to form normal social relationships, failing to take turns or make appropriate eye contact in interactions. His obsessive interests can result in life-threatening situations. Patrick on occasions will escape from home or school and run across busy roads and into shops or houses in his search for reading materials. When assessed using the *Developmental Behaviour Checklist*, which measures the severity of behavioural and emotional disturbances in children with intellectual delay, Patrick scored in the severely disturbed range.

PATRICK'S SAVANT SKILL PROGRAM

An example of Patrick's *Individual Savant Skill Program* is presented in the *Individual Education Plan* table above in relation to his calendar calculation ability. Teaching priorities and activities were developed that

incorporated a range of gifted education teaching strategies, including the use of enrichment, acceleration and mentors to facilitate the functional application of each subject's individual savant skills. A variety of communication, social and or behaviour priorities were also designed and included in each program that was based upon the savant interests and skills of the subjects.

At the conclusion of the study Patrick continued to display a range of savant skills including memory, hyperlexia, mechanical/spatial, music, calendar, number and sensory abilities. At home, he was now using his savant computer skills appropriately and independently. At his special school for students with intellectual impairment, he was using his calendar calculation and number savant skills by keeping the class calendar, operating his class weekly shopping list and accounts and keeping account of the class daily roll. He is also responsible for typing the school newsletter. His family reported a major reduction in observable autistic behaviour.

The differentiated curriculum and strategies as outlined above is an example also of the use of alternative strategies noted by Powell and Jordan (1992, p.417) that are often necessary in the education of the student with autism:

'Meeting the exceptional needs of autistic pupils often means adopting strategies that are outside the normal repertoire of teaching techniques'.

For the majority, the special ability or isolated skills remain just that, leading neither to employment nor greater social integration and adaptation. The challenge facing all educators of those with an ASD who display savant abilities, is to determine how these individuals can be assisted from childhood onwards, to develop their talents in functional ways and to enhance opportunities for social inclusion as adults.

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