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An independent academic psychologist, based in England, who has written extensively on different areas of psychology with an emphasis on the critical stance towards traditional ideas.
A complete listing of his writings at http://kmbpsychology.jottit.com.

CONTENTS

1. ATTRIBUTION OF RESPONSIBILITY FOR AN ACCIDENT

1.1. INTRODUCTION

An observer of an accident will attribute blame and responsibility for that event [1]. But this process is prone to bias [2]. The greater the consequences, the more likely the attribution of responsibility upon the individual (than the situation) [3]. Walster (1966) stated:

> We reasoned: When we hear of a person who has suffered a small loss, it is easy to feel sympathy for the sufferer, attributing his misfortune to chance and acknowledging that unpleasant things like the accident can happen to a person through no fault of his own. As the magnitude of the misfortune increases, however, it becomes more and more unpleasant to acknowledge that 'this is the kind of a thing that could happen to anyone'. Such an admission implies a catastrophe of similar magnitude could happen to you. If we can categorise a serious incident as in some way the victim's fault, it is reassuring. We then simply need to assure ourselves that we are a different kind of person from the victim, or that we would behave differently under similar circumstances, and we feel protected from catastrophe (pp73-74).

1.2. WALSTER (1966)

Walster (1966) showed the attribution of responsibility for an accident in a classic laboratory experiment [4] [5] with eighty-eight introductory psychology

[1] Attribution theory generally was first outlined by Heider (1958), and developed by Jones and Davis (1965) and Kelley (1967).

[2] "Attribution researchers describe men and women as 'naive' or 'intuitive' psychologists who continually examine co-variations and probabilities in an effort to obtain a maximum understanding and prediction of events in the world. Unfortunately, extensive research has revealed that the intuitive psychologist's attributions of causality are subject to numerous distortions" (Burger 1981 p496).

[3] For example, Veltfort and Lane (1943) saw the desire to attribute responsibility for a nightclub fire in Boston, USA, that killed nearly 500 people.

[4] A laboratory experiment gives the research greater control over variables, but it is low on ecological validity (ie: similarity to real-life).

[5] The hypothesis was "that the worse the consequences of an accidental event, the greater the tendency for people to assign responsibility for the accident to someone possibly responsible for the accident" (p74). This a one-tailed hypothesis, which predicts the direction of the difference.

students at the University of Minnesota, USA [6]. The students heard a story [7] about "Lennie" who parked his old car on top of a hill on campus, and while he was gone it started rolling down the hill. The tape, however, had four endings which varied the consequences of the car rolling down the hill [8]. Participants heard one ending only [9]. The endings were:

- I. Mild consequences to self - Small dent to car from hitting tree gently.
- II. Severe consequences to self - Major damage to car from hitting tree hard and other cars.
- III. Mild consequences to other - Minor crash into shop.
- IV. Severe consequences to other - Hit child who was taken to hospital and damaged shop [10].

Participants were then asked to rate the degree of responsibility assigned to Lennie for the accident (from 1-4, where 4 = "Lennie was completely responsible for the accident") [11].

It was found that the participants assigned significantly more responsibility to Lennie when the damage was more serious (ie: in conditions II and IV) ($p<0.01$) (figure 1.1) [12].

This experiment has faced problems with replication [13]. For example, Shaver (1970a) found no significant

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6 Psychology students are a common group to use in experiments because of the ease of accessibility, but it does limit the generalisability of the findings to the whole population. Students generally are a minority group and make up less than 5% of the population. Sears (1986) gave examples of how students vary from the general population - eg: their self concept may not be fully formed; they may have a stronger need for peer approval.

7 The participants were given a cover story for the experiment. Namely that the tape recording would be used in other research, and the students' task was to try it out for appropriateness. Technically, this is deception, but it is classed as minor and acceptable. The debriefing after the experiment would make this clear. Deception of participants in different ways was very common in the 1950s and 1960s. Today there is more concern about the ethical treatment of participants.

8 This was the independent variable - the amount of damage caused by the car rolling down the hill. It is the variable that the experimenter deliberately manipulates between the experimental conditions.

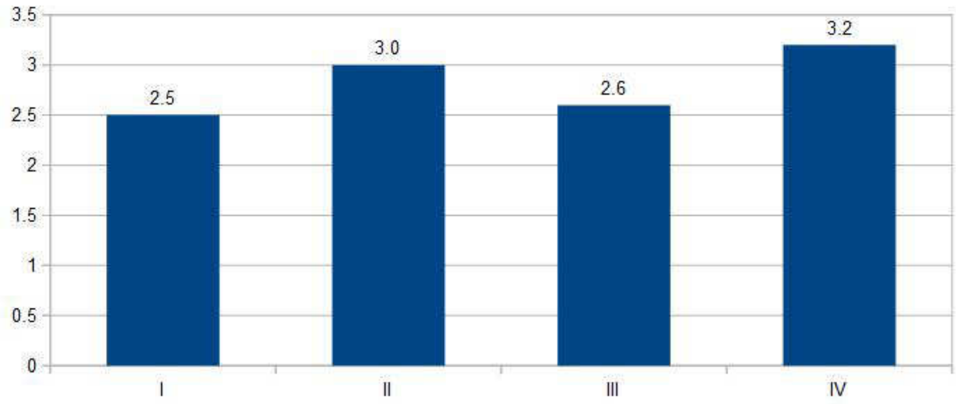
9 The experimental design was independent groups. It is not possible to use the participants more than once or else they would guess the purpose of the experiment. But there is no guarantee that the randomly allocated groups are similar on participant variables. A repeated design overcomes this problem by using all the participants in all the condition.

10 Shaver (1970b) called this two parallel experiments - one related to the consequences to the self (driver), and the other involving consequences to bystanders.

11 This is the dependent variable - the attribution of responsibility to Lennie for the accident. It is operationalised as the scale 1-4.

12 In conditions III and IV, there was also damage to the car, so Walster (1966) admitted that "there is no way to clearly determine whether increased responsibility will be assigned to a non-victim for a serious accident from the data available" (p79).

13 The ability to replicate a study is key to establishing the truth of the findings. This is the copying of the procedure with a different sample to the original or with minor changes in methodology.



(Data from Walster 1966 table 1 p77)

Figure 1.1 - Mean assignment of responsibility to Lennie (out of 4).

relationship between accident severity and attribution of responsibility. This led Shaver (1970b) to add two new variables - personal and situational similarity. The latter is the perception by the observer that they could be in the situation portrayed in the story, and personal similarity is the belief that they are like the perpetrator in the story (including would have acted that way). The closer the perceived similarity, the less likely the attribution of responsibility to "Lennie", for example. This is known as the "defensive attribution hypothesis" (appendix 1A).

Walster (1967) found no significant difference in attribution of responsibility to an individual who gains or loses a small or large amount of money due to environmental changes outside their control after a house purchase. "In fact, the tendency reported was for the subjects to assign less responsibility for greater losses" (Burger 1981 p498).

Burger (1981) found twenty-two studies similar to Walster (1966), of which six of them supported the original findings. One study found the opposite (greater damage led to less attribution of responsibility), and the other studies were not significant. Burger (1981) combined the studies in a meta-analysis, and found "a statistically significant but weak tendency to attribute more responsibility to an accident perpetrator for a severe than for a mild accident" (p496).

Burger (1981) also found support for the defensive attribution hypothesis. Observers who were similar to the perpetrator attributed less responsibility as the severity of the accident increased, but opposite when dis-similar (figure 1.2).

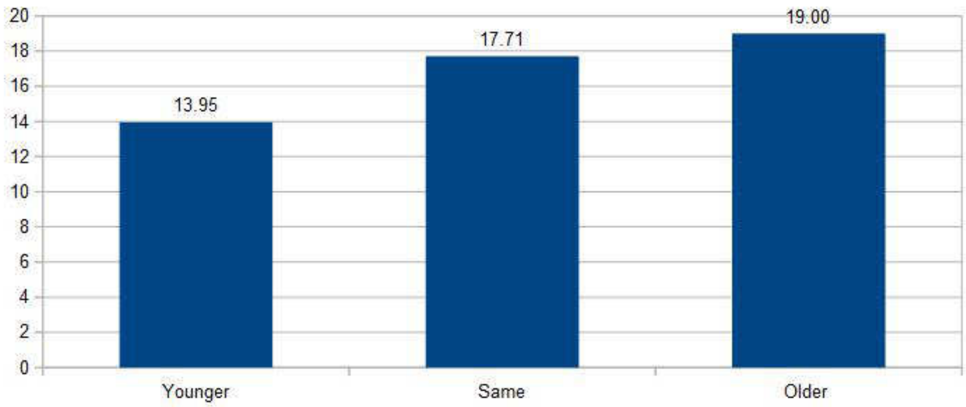
The level of involvement was not important. The different experiments used different techniques to establish similarity, which Burger (1981) divided into involvement (eg: participants believe that they will copy after watching film) or non-involvement (eg: student participants read description of student in story).

Similarity of participant to perpetrator in story and situation	→	Attribution of responsibility same for minor and major damage
Dis-similarity of participant to perpetrator in story and situation	→	Attribution of responsibility greater for major than minor damage

Figure 1.2 - Similarity and attribution.

1.3. APPENDIX 1A - DEFENSIVE ATTRIBUTION HYPOTHESIS

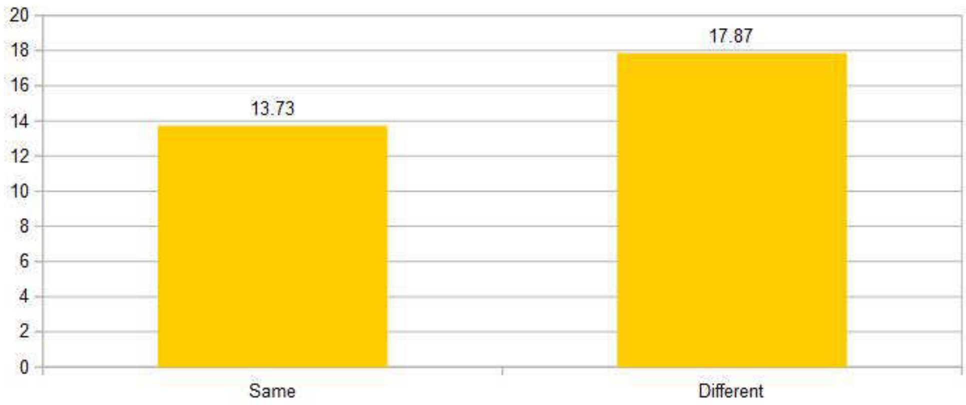
Shaver (1970b) did a number of experiments. The first one, with sixty-eight male psychology undergraduates at Duke University, North Carolina, USA, was a replication of Walster (1966). Similarity was established by giving the age of "Lennie" as younger (16 years old), the same (19 years old) or older (22 years old) than the students. Greater responsibility was attributed to older "Lennie" (figure 1.3).



(Data from Shaver 1970b table 1 p105)

Figure 1.3 - Mean attribution of responsibility (where a higher score is more responsibility) based on age similarity.

The second experiment with thirty female psychology undergraduates changed "Lennie" to "Mary" in the story, and asked participants to imagine that she was like them or not. Less responsibility was attributed when "Mary" was imagined to be similar (figure 1.4).



(Data from Shaver 1970b table 2 p107)

Figure 1.4 - Mean attribution of responsibility for "Mary" (where a higher score is more responsibility).

The third experiment with forty male and female psychology students used a story of an industrial accident and a male engineer ("Paul") to create similarity with male participants and dis-similarity with female ones. However, male participants did not significantly reduce the attribution of responsibility in the severe consequences condition, they "appeared simply to have denied personal similarity" (Burger 1981).

Chaikin and Darley (1973) found support for the defensive attribution hypothesis. Forty male US students watched a film of a "worker" stacking blocks and a "supervisor" with belief that they would subsequently re-enact the scene. In the film, the supervisor knocks over the blocks accidentally which costs the worker a monetary loss (severe consequences) or not (mild consequences). The participants who were going to play the supervisor (ie: personal and situational similarity) did not vary their attribution of responsibility to the supervisor in the film in response to monetary loss, while the future workers (ie: personal and situational dis-similarity) attributed more blame as the size of the loss increased.

Shaw and McMartin (1977) varied both personal and situational similarity. Male and female psychology students heard about an accident in a chemistry laboratory (situational similarity to men) or a kitchen (situational similarity to women) involving "Jim" (personal similarity to men) or "Jill" (personal similarity to women). The greater the similarity, the less the attribution of blame (ie: male participants - Jim in lab; female participants - Jill in kitchen).

Lerner (1970) saw the defensive attribution hypothesis as, in fact, the "just-world hypothesis" - ie: people "get what they deserve - or, after the fact, deserve what they get" (Shaver 1970b). Put another way, it is the belief in justice for ourselves.

> We do not want to believe that... [disasters] ... can happen, but they do. At least we do not want to believe they can happen to people like ourselves — good decent people. If these things can happen, what is the use of struggling, planning, and working to build a secure future for one's self and family? No matter how strongly our belief in an essentially just world is threatened by such incidents, most of us must try to maintain it in order to continue facing the irritations and struggles of daily life. This is a belief we cannot afford to give up if we are to continue to function. What I am postulating here is that for their own security, if for no other reason, people want to believe they live in a just world where people get what they deserve (Lerner 1970 quoted in Chaikin and Darley 1973 p274).

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2. STUDYING SAVANTS

2.1. GENERAL SAVANTS

Moritz in 1783 reported the first case in a scientific journal in Germany, and Dr J Langdon Down in 1887 coined the term "idiot savant" (Treffert 2014). "Idiot" has pejorative connotations, and "savant syndrome" was proposed as the alternative (Treffert 1988).

Treffert (2009) distinguished "splinter skills" (obsessive pre-occupation with certain topics), "talented" savants (outstanding abilities compared to other learning disabled individuals), and "prodigious" savants (outstanding compared to general population).

Savants have been reported to be superior to the general population in attention to detail and perception of patterns, for example (Neumann et al 2010).

Neumann et al (2010) studied seven male mnemonic savants with high functioning ASD aged eight to 37 years old in Germany. These individuals had a prodigious memory for specific stimuli (eg: memorising transportation timetables). The use of magnetoencephalography (MEG) while performing memory tasks "pointed to a different organisation of memory in mnemonist savants compared to controls that is characterised by its relative independence of general intelligence" (Neumann et al 2010 p114).

Some individuals with autistic spectrum disorders (ASD) who are not savants, appear to have outstanding memory for musical material - for example, outperforming typically developing children in identifying single tones immediately after learning and one week later (eg: Heaton et al 1999). Altgassen et al (2005) did not find any difference between child with ASD and controls in a similar experiment, though individuals with Asperger's syndrome did have a superior ability.

There is also "acquired savant syndrome" where individuals develop a savant skill after a stroke, fronto-temporal dementia, or blow to the head, for instance (Treffert 2014b) [14]. Miller et al (eg: 1998) reported twelve individuals with a particular type of dementia who developed savant art and musical skills.

Darold Treffert has established a worldwide registry of known savants, which stood at 319 individuals in 2010, and 32 of those were acquired cases (Treffert 2014b).

Treffert (2014b) listed some cases of acquired savant syndrome:

- "Orlando Serrell" - knocked unconscious by a baseball at age ten, subsequently can remember minute details about every day (now in 40s).

- "Alonzo Clemons" - since a childhood brain injury is able to sculptor animals from memory.

- "Jason Padgett" - a "math-averse" individual who, since concussion after a mugging, has passed advanced mathematics courses, and has an obsession with geometric figures.

Snyder et al (2003), for example, showed a temporary savant-like ability by applying transcranial direct-current stimulation (tDCS) to one side of the brain. Volunteers were able to solve problems that they had not been able to before the tDCS.

2.1.1. Explanations

Autism and savants have been explained by weak central coherence (Frith 1989). Information processing involves integrating information (ie: central coherence), which autists and savants are weak at. There is a "specific imbalance in integration of information at different levels" (Frith and Happe 1994). Thus the increased ability on detail (local information processing), but poor at integrating information in context (global information processing) (Altgassen et al 2005).

Treffert (2014a) explained savant syndrome with his "three R's" theory (recruitment, rewiring, release): "there is brain damage in one area, frequently the left hemisphere, with recruitment of still intact brain tissue in another area of the brain, rewiring of circuitry to that new area, and release of dormant capacity, through a disinhibiting process, of information and skills already stored in that newly recruited area" (p566).

[14] A case first appeared in the medical literature in the 1920s of a three year-old who developed extraordinary musical abilities after meningitis (Treffert 2014b).

The dormant capacity includes "genetic memory" (Treffert 2010). "Genetic memory is based on the fact that some savants, particularly those severely limited in other ways, clearly 'know things they never learned'. The only possible way to know things one never learned – sometimes at complex levels – is for that knowledge to be factory installed, genetically transmitted" (Treffert 2014 p566).

Also the savant skill is reinforced and nurtured by others (Treffert 2014a).

2.1.2. Misconceptions and Mysteries

Treffert (2014a) noted two key scientific mysteries about savant syndrome:

a) Why are learning disability (often autism), visual impairment, and musical savant so common together?

b) Why is CC, which is an obscure skill, almost universal in savants?

Treffert (2014a) addressed four misconceptions about savant syndrome:

1. Savants are not "creative".

Treffert (1989) himself made this assertion, but has subsequently changed his mind. He (Treffert 2014a) quoted the case of Leslie Lemke (visually impaired autistic savant) who can play any piece of music after one hearing. With time, Lemke has shown improvisation of music heard, and even composed entirely new pieces.

2. The "dreaded trade-off" of savant skill and low intelligence is lost by schooling.

Selfe (1997) described the case of Nadia, who could draw with great skill as a child (autistic savant), losing the skill after learning basic language and daily living skills.

Treffert (2014a) challenged this so-called "Nadia effect": "We don't seem to know exactly what did happen with Nadia and why those special skills disappeared. But what I do know is that in the many, many savants with whom I have worked, or know about, such a 'dreaded trade-off', or loss of skills, does not occur as the savant gets older or when exposed to more formal education and training. To the contrary, in my experience vigorously 'training the talent', whatever that special skill is, leads, in and of itself, to increased language, social and daily living skills without any 'dreaded trade-off' of special skills. So Nadia's experience is the exception, not the rule" (p568).

3. Savant syndrome is always related to low intelligence.

Most savants who have been measured have an IQ of between 50 and 70 (where <70 is classed as learning disabled), but savants also have high IQ (eg: well above the average of 100). Part of the problem is that IQ tests rely heavily on verbal skills, and individuals with poor language skills will be scored lower (Treffert 2014a).

4. All geniuses and prodigies have Asperger's syndrome really.

Treffert (2014a) gives this misconception short shrift - "In short, not every gifted child, nor every 'absent-minded professor', has Asperger's disorder. Instead, 'prodigy' and 'genius' do exist as independent conditions separate from any underlying disability or disorder The temptation to classify all prodigies and geniuses as having autism or Asperger's seems to be part of the disease de jour phenomenon quite rampant these days and needs to be resisted in favour of careful analysis lest continued 'diagnosis creep' deletes all meaningful classification, all the disorders lose their specificity, and the 'spectrum' engulfs us all" (p569).

2.2. CALENDAR CALCULATING

Calendar (or calendrical) calculating (CC) is a well studied savant ability that involves being able to name quickly the day of the week for any given date (without external aids) [15]. As a savant ability it is an outstanding skill in the context of general disability [16] (eg: learning disability) ("savant syndrome phenomenon" [17]) [18]. CC ability appears between the ages of eight and

[15] It is the most common savant skill. The "calculation draws on cognitive processes that constitute general intelligence. It thus seems paradoxical that people with low measured intelligence should show prowess in a form of calculation that is rarely shown by people with superior levels of cognitive functioning" (Cowan and Frith 2009 p1417).

[16] "Islets of ability", or "mono-savants" (Spitz 1995).

[17] Spitz (1995) commented that the "fact that there are individuals of very limited general intelligence who can perform exceptionally well in one or two isolated domains has always puzzled psychologists who must somehow account for this anomaly in their theories of human ability" (p167).

[18] About 10% of individuals with autism show savant ability, and less than 1% of all individuals with learning disabilities (Dubischar-Krivec et al 2009). There are 4-6 times more male than female savants (Treffert 2014a).

fifteen years old usually [19], and is often accompanied by other savant talents (eg: outstanding musical performance) [20]. CC is also found in some typically developed individuals, like mathematicians (Dubischar-Krivec et al 2009).

Howe and Smith (1988) made a number of observations about CC savants:

- They are "essentially self-taught", and devote considerable time to their interest in calendars.

- They have little ability to transfer their skills to other areas than calendars.

- The individuals tend not to be able to explain their ability (ie: how they do it).

- "Most calendar calculators, but not all, are somewhat solitary, withdrawn individuals, and capable of ignoring the outside world while they attend to their thoughts... However, despite their social aloofness, most calendar calculators appear to gain some satisfaction from the attention their feats attract" (Howe and Smith 1988 p384).

Two possibilities are proposed to explain CC. One is rote memory. This is the mechanical learning of the days of the week throughout history (and the future, sometimes), and the simple recall of the information. The pattern of failure of accurate recall for future dates is seen as a challenge to rote memory (eg: problems with dates a long way ahead) (Dubischar-Krivec et al 2009).

An alternative explanation for CC is the use of rule-based algorithms which mathematicians apply to the Gregorian (ie: Western) calendar [21]. But savants tend to struggle with simple arithmetic tasks generally, and dates in leap years as well as reverse questions (eg: "In which year does 1st November fall on a Thursday?") [22].

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[19] Cowan et al (2004) reported the case of two typically developing boys who showed spontaneous CC at 5-6 years old. Two years later, they had not progressed much in CC. Cowan and Frith (2009) suggested that they "had found more conventional domains in which to excel and receive attention and praise. By contrast, calendrical savants may not have opportunities to develop other socially engaging skills" (p1417).

[20] Treffert (2014a) noted five main areas - music, art, CC, mathematics, and mechanical/visual-spatial skills, with lesser areas like languages, unusual sensory discrimination, athletics, and outstanding knowledge.

[21] The Gregorian calendar repeats every 400 years (Cowan and Frith 2009).

[22] But many savants can answer more difficult questions (eg: there is a Saturday 12th October in which years since 1930), and other indirect questions (eg: months in 1997 when the 1st is a Monday) (Spitz 1995).

Thus "the use of an algorithm appears implausible" (Dubischar-Krivec et al 2009).

Dubischar-Krivec et al (2009) compared CC among four groups of adults in Germany - three males with autism and CC ability (ACC), five men and one woman with autism (A), two men and one woman who were healthy with CC skill (HCC), and eighteen health controls (sixteen male) (H).

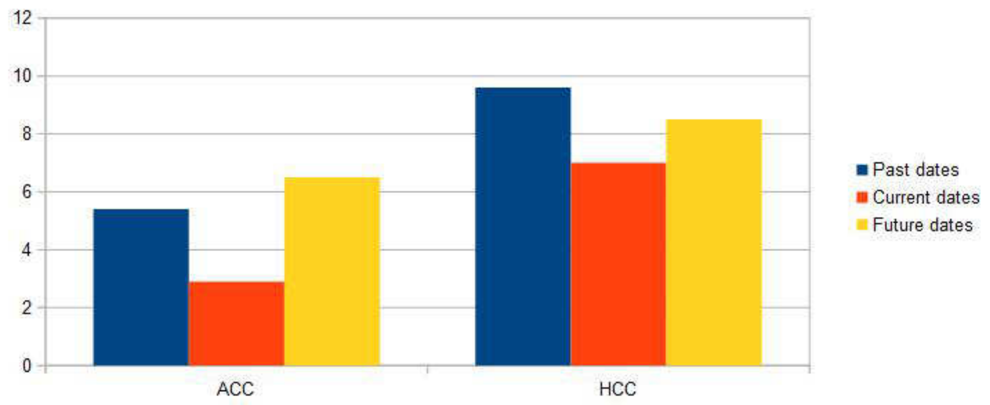
All participants were given two sets of tasks:

a) 126 CC tasks - deciding if a date and day were correct (eg: 1st November 1974 = Wednesday). Forty-two tasks for past dates (1950-1999), 42 for current dates of study (around October 2003), and 42 tasks for future dates (2003-2050).

b) 42 pseudo-date (control) tasks - deciding if the same letters were used (eg: 13th BBBB 1985 = BBBB (yes) or 13th BBBB 1985 = CCCC (no)).

Reaction times and correct responses were recorded.

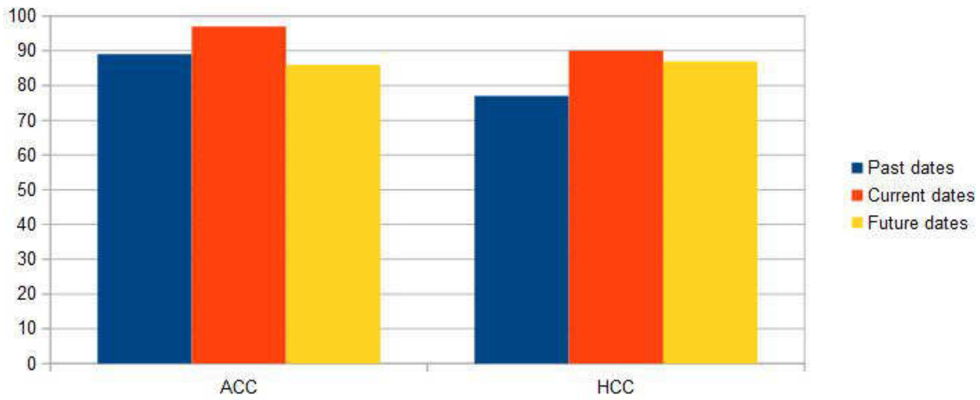
Dubischar-Krivec et al (2009) hypothesised that if using rote memory, ACC should perform better than HCC on past and current dates, but not future dates. It was found that ACC had a significantly shorter reaction time for past and current dates than HCC with no difference for future dates (figure 2.1). ACC had significantly more correct responses for past dates, but significantly less for current dates with no difference for future dates (figure 2.2).



(Data from Dubischar-Krivec et al 2009 table 4 p1359)

Figure 2.1 - Mean reaction times (seconds) for autistic individuals with CC skills (ACC) and healthy CC participants (HCC).

Dubischar-Krivec et al (2009) stated: "In conclusion, our findings suggest that CC in savants with autism involves rote memory processing when calculating current and past dates, which may not be a part of CC in HCC... We assume a model of past and current dates being learned easily by ACC using simple day-to-date associations that are stored by mechanical repetition and retrieved quickly. These rote memory processes are facilitated by interweaved anchor dates and the usage of simple regularities... On the other hand, HCC had profound knowledge of the regularities of the Gregorian calendar. However, the way ACC calculated future dates may point to the usage of at least some calendar regularities, although to a much less extent than HCC" (p1361).



(Data from Dubischar-Krivec et al 2009 table 5 p1359)

Figure 2.2 - Mean percentage correct for autistic individuals with CC skills (ACC) and healthy CC participants (HCC).

Cowan and Frith (2009) argued for calculation and against rote learning in savant CC:

i) Some CC savants can perform well on other calculations, but struggle with arithmetic in intelligence tests because it is embedded in verbal contexts (eg: Ho et al 1991).

ii) O'Connor et al (2000) reported three savants who correctly stated the days for dates after the year 8000. Finding calendars to memorise for such dates in the future would be hard.

iii) Some savants also made systematic errors for past dates which suggested calculation. For example, century years, like 1700 or 1900, are only leap years if they are exactly divisible by 400, but some savants act as if all century years were leap years. This puts the CC out by one day at least (Cowan and Frith 2009).

iv) Another error observed in some savants is for older dates (ie: pre-Gregorian calendar). This was adopted in 1752 in Britain, for example, and involved the removal of the days between 3rd and 13th September that year as a re-alignment [23]. Prior to that, the Julian calendar was used in the West, which had leap years in every year divisible by four (Cowan and Frith 2009).

Cowan and Frith (2009) argued that "at least some calendrical savants, and maybe all, can calculate the answers to date questions" (p1419) [24]. These researchers were able to study one CC savant in the functional magnetic resonance imaging scanner. They found increased activity in the area of the brain related to calculation for remote dates.

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[23] 3rd September 1752 (Julian calendar) became 14th September 1752 (Gregorian calendar). Also New Year's Day was moved from 24th March (Julian) to 1st January (Gregorian) (Spitz 1995).

[24] Spitz (1995) felt that: "Familiarity triggers the use of patterns, rules and principles that are not immediately apparent to the casual observer. In a word, the material is reorganised in ways which reduce the information processing load" (p179).

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