Historical recovery heroes – Isaac Newton

Elizabeth Wakely and Jerome Carson

Abstract
Purpose – Isaac Newton has been described as the father of modern science. What is less well known is that he had mental health problems. Here, the authors aim to review the literature on his problems and life to see if he was a mental health recovery hero.

Design/methodology/approach – The paper reviewed all the published papers on Newton’s mental health problems, as well as many of the biographies written on him.

Findings – Scholars of Newton have focussed most of their attention on Newton’s breakdown of 1693. This has been attributed to mercurialism or paranoid psychosis. The more likely explanation is depression or bipolar disorder. Personality factors are also critical in understanding Newton; he had a troubled upbringing and problems in relating to others. The latter enabled him to focus exclusively on his research and experiments and may have contributed to his greatness.

Originality/value – The authors have brought to bear their insights as a professional historian and as a clinical psychologist, giving this paper a unique perspective from previous uni-disciplinary reviews.

Keywords Isaac Newton, Recovery, Mercurialism, Depression, Bipolar disorder, Asperger’s syndrome, Mental illness

Paper type Viewpoint

Early life

The circumstances of Isaac Newton’s birth were less than auspicious, as he was born prematurely and posthumously into a yeoman family in Woolsthorpe, Lincolnshire on Christmas Day 1642 but he, himself, later considered the date significant. His mother, Hannah, remarried in 1646, when he was just three, and left her son in the care of his grandparents with whom there is no record of any affection; indeed his grandfather left him out of his will. In 1653, after the death of her second husband, Hannah returned to him, but with three half-siblings in tow. In 1654, Isaac was sent to King’s School, Grantham where he lodged with the local apothecary, Mr Clark and his family. He was not particularly interested in the school’s classical curriculum, but spent a lot of time in the apothecary’s shop experimenting with chemicals – which may have triggered his future interest in alchemy – and in building working models (for example of a local windmill) – a trigger for his interest in mechanics. He did not get on with other children but, after an encounter with a bully and winning the physical fight, decided to prove his worth by achieving academically; learning Latin, although there was no maths or science, was a bonus as it later enabled him to communicate with other European scholars. However, in 1659, his mother decided to remove him from school to manage the family estate, in which he showed not the slightest interest, and in 1660 Henry Stokes, headmaster of the grammar school, persuaded her to send him back to school, at which the family servants were delighted, saying that he was “fit for nothing but the ‘Versity” (Stukeley, cited in White, 1997, p. 46).

In 1661, Isaac duly went up to Trinity College, Cambridge as a subsizar (the lowliest of students, whose tasks included emptying the chamber pots of fellows) to study natural philosophy,
where he came under the influence of Isaac Barrow, who became the first Lucasian Professor of Mathematics in 1663 (a post now held by Professor Stephen Hawking) and was instrumental in getting him elected to a scholarship in 1664, which was vital both to improving his social standing and getting him a fellowship later. In 1665 he gained his BA. Interestingly, Stukeley quoted says:

When Sir Isaac stood for his Bachelor of Arts degree, he was put in second posing, or lost his groats, as they call it, which is looked upon as disgraceful (White, 1997, p. 64).

In more modern parlance, he did poorly in his viva examination. The same year the plague hit Cambridge and closed down the university. Newton went home to Woolsthorpe for the next two years where he completed his work on the calculus, four years after arriving at Cambridge with no maths! He also studied optics as well as mechanics and motion and began his work on gravity. The famous story of the apple dates from this time. In effect, he taught himself through his intellectual curiosity and this was one of the most productive periods of his life. On his return to Cambridge in March 1667 he was elected a fellow of Trinity. In 1668 he passed his MA, and in October 1669 he was appointed Lucasian Professor of Mathematics on the resignation of Barrow. It had taken Newton only eight years to make the transition from fresher to professor.

Cambridge years

The next 30 years of Newton’s life were spent in Cambridge working on his scientific interests – physics, maths and astronomy – and giving the occasional mandatory lecture, often to an empty room as the students were unable to grasp his ideas. Indeed, on the publication of his most famous work *Philosophiae Naturalis Principia Mathematica* (*Mathematical Principles of Natural Philosophy*), a student commented, on passing Newton in the street:

There goes the man that writt a book that neither he nor anybody else understands! (Westfall, 1993, p. 190).

His years at Cambridge were solitary and lonely, and he concentrated so hard on his work that he frequently forgot to eat. In the 1670s, he was working and lecturing on optics, and he constructed a reflecting telescope, which was demonstrated in 1671 to the Royal Society. He was elected a Fellow of the Royal Society in 1672, eventually becoming its President in 1703. Some of his ideas were published in the Philosophical Transactions of the Royal Society in 1672, which led to a quarrel with the scientist Robert Hooke that was to last for 30 years. It was in a reply to Hooke that he stated:

If I have seen further, it is by standing on ye shoulders of giants (Westfall, 1993, p. 106).

While sounding complimentary to Hooke, and modest about himself, it was in fact a coded insult, as Hooke was short in stature. But, on the whole, he was very secretive about his work and suspicious of sharing his knowledge. and it was not until 1704 that he finally published his Opticks which expounded his theories of colour and light. Similarly, although he worked on mechanics and gravitation for some 20 years, and recording his findings in notebooks, it was only in 1687 that his magnum opus *The Principia* (referred to above) was published, in which he presented his three laws of motion and his theory of universal gravitation.

At the same time, as this, he was also experimenting in alchemy, a dangerous and forbidden subject but one that he thought superior to ordinary chemistry because it embraced a spiritual element. He also wrote on Christian theology and the chronology and prophecies of the Bible. His religious views were unorthodox because, although a firm believer in God the Father as omnipotent, omniscient and omnipresent, he denied the doctrine of the Trinity (ironical for one who made his living from Trinity College) and, until his deathbed, when he refused the sacrament, he kept them largely to himself. In order to remain at Cambridge he should have been ordained into the Anglican Church but, with help from Barrow, in 1675 he received a dispensation from King Charles II allowing him to continue without ordination.

It was through alchemy that, in 1689, he met Nicolas Fatio de Duillier, a Swiss mathematician, with whom he had an intense relationship, bordering on infatuation, until it came to an abrupt
end in 1693. Personal relationships were always difficult for Newton, especially as he had no capacity for forgiveness, and he quarrelled not only with Hooke (see above) but also famously with Gottfried Leibniz, over which of them had first discovered the calculus (a dispute lasting 40 years) and, over a period of years, with Sir John Flamsteed, the Astronomer Royal. To try and resolve the question of priority with Leibniz, he set up a commission at the Royal Society to examine all the documentation on the calculus dispute. While Newton declared somewhat righteously that:

No man is a witness in his own cause (Gleick, 2003, p. 176).

It was he who wrote the report on the matter, clearly finding in his own favour [...] He did, however, have some friends, including the diarist Samuel Pepys and the philosopher John Locke, and it was two paranoid and delusional letters written to them in September 1693 that indicated the state of Newton's mental health and the psychotic breakdown that he was suffering. The acute period of his illness was, fortunately, short-lived and, also fortunately, his career was about to take another direction.

Old age

In 1696, Newton was appointed Warden, then in 1700 Master, of the Royal Mint in London. He left Cambridge for ever, and spent the last 30 years of his life as an administrator and civil servant, overseeing the recoinage, pursuing counterfeaters and as a very public figure – a sea-change from his Cambridge days. He was knighted by Queen Anne in 1705 and died, a grand old man, in 1727. Newton was buried in Westminster Abbey and the tribute on his monument reads:

Let mortals rejoice that there has existed such and so great an ornament to the Human Race.

Or as Alexander Pope (1683-1744) put it both grandiloquently and somewhat facetiously in his intended epitaph:


God said “Let Newton be!” and all was Light!

Achievements

Sir Isaac Newton was knighted for public service, but his achievements and legacy lie in science. However, it was not only his ideas that paved the way for modern science (just as his mechanics paved the way for the industrial revolution), but also his methods. He was not just satisfied with theories and hypotheses ("hypotheses non fingo") (second edition of Principia 1713): they had to be demonstrable, hence his emphasis on induction from experimentation (even to the extent of forcing a bodkin, a small sharply pointed instrument, behind his eyeball and tasting the results of his alchemical experiments):

Amicus Plato, Amicus Aristotles, magis amica veritas. Plato and Aristotle are my friends but my greater friend is Truth (quoted in Westfall, 1993, p. 25).

Mental illness aspects

At the outset it is perhaps wise to heed Anthony Storr's advice:

In a subject in which so much is controversial, it behoves both the psychiatrist and the historian to be modest in their claims to psychological understanding (Storr, 1985, p. 1784).

There are three aspects which we will address with respect to Newton's mental health. First, we will look at his breakdown of 1693. Second, we will look at his childhood. Third, we will consider personality issues.

The bulk of the literature on Newton's mental illness centres on his breakdown in 1693. A number of authors have suggested his breakdown was caused by exposure to mercury, through his alchemical experiments (Spivack and Epstein, 2001; Keynes, 1980, 2008).
Broad reports that Newton tasted the results of his experiments on at least 108 occasions (Broad, 1981, p. 1342). Ditchburn provides the most comprehensive review of the mercury hypothesis (Ditchburn, 1980). He starts by describing the symptoms of Newton's "psychosis." Evidence of this "psychosis" (Jeste et al., 2000), comes largely from correspondence. In a letter to Pepys, Newton said:

I must withdraw from your acquaintance, and see neither you or any of my friends anymore.

The same day he wrote to Locke and stated:

You have attempted to embroil me with women.

Yet, some two weeks later, following a visit from Millington, a mutual friend of Pepys and Newton's, Millington was able to tell Pepys that Newton realised he had written a very odd letter while he was not well. Millington feared he was:

[…] under some small degree of melancholy. (Ditchburn, 1980, p. 2).

Ditchburn (1980, p. 13) summarises Newton's symptoms thus:

- He had suffered with insomnia for at least a year.
- He was depressed and wanted to withdraw from the few close friends he had.
- He had a loss of appetite.
- For a short period of a few days, he suffered delusions that his friends were against him.

Ditchburn goes on to show that Newton did not show any of the classic symptoms of mercurialism. He had no pains in his mouth, his writing showed no signs of tremor and he had no excitability. He concludes that Newton's symptoms were more consistent with depression.

Lieb and Hershman having also reviewed and dismissed the evidence for mercurialism, as having caused Newton's breakdown, go on to suggest that his crisis of 1693 was an exacerbation of a manic depressive illness (Lieb and Hershman, 1983, p. 1479). They argue that Newton had a previous breakdown in 1664, when a period of overwork and insomnia were followed by a depressive episode. In the next two years, Newton achieved his highest level of creativity, which they feel points to a period of hypomania. Then, as we see it, the completion of *The Principia* in 1687, was preceded by 18 months of excitement and astonishing productivity, after which he may have experienced significant feelings of deflation. These feelings may have been exacerbated by the breakup of the relationship with Fatio, in which there may have been an element of repressed homosexuality (a thesis supported by the absence of a paternal role model, his ambivalent relationship with his mother and the lack of evidence of any emotional or sexual relationships with other women), which, in a man so puritanically religious as he, would have led to agonies of guilt. Also the fact that not only was his alchemy work not leading anywhere, but was actually causing him another irreconcilable emotional conflict and the realisation that his most creative days were probably now behind him. All of which precipitated a crisis. Lieb and Hershman conclude that Newton remained complex, paradoxical and manic depressive to the end.

The second aspect of Newton's mental health that needs to be commented on is his early upbringing. As we pointed out earlier, his mother left Newton with his maternal grandparents at the age of three and did not return until eight years later. His father died three months before he was born. Westfall (1993, p. 11) comments:

Isaac's boyhood appears to have been lonely. He formed no bond with any of his numerous relations that can be traced in his later life. The lonely boyhood was the first chapter in a long career of isolation.

While it has been noted that Newton was close to his mother (Broad, 1981, p. 1342), Westfall points out that in the 12 years after his return to Cambridge following the plague, he paid a maximum of only six visits to Woolsthorpe to see his mother. He observes:

More vigorous displays of filial affection have been recorded (Westfall, 1993, p. 134).
Storr comments that he feels Newton’s childhood was classically traumatic and that it must have affected his later personality (Storr, 1985, p. 1779).

The third aspect of Newton’s mental health is his personality. White suggests that Newton was:

[...] far more twisted and convoluted than historians of science would have us believe (White, 1997, p. 2).

James, in a review of very eminent scientists, notes that Professor Simon Baron Cohen has diagnosed both Newton and Einstein as having Asperger’s syndrome (James, 2003, p. 36). He reports that Newton was:

[...] unable to form intimate friendships. Morbidly suspicious and secretive, he was subject to peevish outbreaks of ill temper [...] On such occasions he stooped to regrettable acts which involved him in a succession of painful controversies that plagued his life, robbed him of the just fruits of his work and disheartened his sincere admirers (James, 2003, p. 37).

Storr (1985) presents a detailed perspective on Newton’s personality. Amongst other characteristics, he notes that the counterfeiters that Newton pursued when Warden of the Mint, served the same function for him, as did Hitler for Churchill. They gave him a channel for his aggressive feelings.

White (1997) suggests that there was also a grandiose and somewhat delusional nature to Newton’s personality:

Would it be unreasonable to suggest that he (Newton) wanted to identify himself with Christ? After all was he not the only child of a dead father, born on Christmas Day and (so he believed) possessed of unparalleled ability and unique talents? (White, 1997, pp. 153-4).

Appraisal as a recovery hero

Newton not only recovered from his breakdown in 1693, he decided to leave Cambridge and gave up the career of a scientist for that of an administrator, when he became Warden, then Master, of the Mint. His knowledge of metallurgy from his alchemical experiments helped him with the recoinage, and his scientific approach to tackling problems, enabled him to become successful in this new field. His life also shows that sometimes genius can emerge from traumatic backgrounds. He never knew his father. His mother left him from the age of three to eleven. Despite these losses, he went on to become one of the greatest scientists to have lived. His social isolation and his complete dedication also helped him achieve his breakthroughs. As Storr observes:

[...] if intense periods of concentration over long periods are required to attain fundamental insights, the family man is at a disadvantage (Storr, 1985, p. 1784).

Historical recovery heroes – who needs them?

The idea to examine historical recovery heroes in this series of articles came from two sources. First, we had already written a set of five contemporary narratives for this journal. These were profiles of Dolly Sen, Peter Chadwick, Gordon McManus, Matt Ward and Margaret Muir. The second, was inspiration from Campbell and Jones’ account of the “fantastic five,” (Campbell and Jones, 2009). They argued that if Winston Churchill, Abraham Lincoln, Florence Nightingale, Charles Darwin and Marie Curie had been alive today, stigma and discrimination towards people with mental health problems might have prevented them from achieving as much as they had. Elizabeth gave a presentation at our local recovery group (Morgan and Carson, 2009), in which she proposed an alternative thesis – that Churchill, Nightingale and Darwin had actually benefited from their mental health problems. In this short series of profiles of historical recovery heroes, we have added Isaac Newton to these three.

We started with Winston Churchill. We concluded that his own experiences of depression helped him to understand and sympathise with the nation during the war years, to boost their morale and to offer them hope and inspiration. We also argued, as did Storr (1989), that it
was the manic aspects of his illness that gave him his “trump card.” In 1940, a leader of sober judgement might have concluded that Britain was doomed, and that we ought to sue for peace with Hitler. But not Churchill (Wakely and Carson, 2010).

Our second profile was of Florence Nightingale. Whilst she is known in the popular imagination for her work during the Crimean War, we argued that her more important work was completed on her return to England. Despite a prolonged period of illness that lasted almost three decades, she produced over 200 reports, pamphlets and booklets, not just on nursing, but on a wide range of other topics, from statistics to philosophy. While Bostridge (2008), claimed she suffered with brucellosis, other researchers have suggested she may also have had bipolar disorder or PTSD (Wakely and Carson, 2011b).

Our third hero was Charles Darwin (Wakely and Carson, 2011a). In 1842, he moved to Down in Kent, and started to lead a reclusive life, rarely venturing far from his house and becoming increasingly unwell. He published his magnum opus, “On the Origin of Species by Natural Selection,” in 1859. While Campbell and Jones had claimed he suffered with an anxiety disorder, the clinical picture was more complex. A number of alternative diagnoses have been offered to explain Darwin’s illness, ranging from Chagas’ disease to systemic lactose intolerance. Hubble offered the opinion that there were benefits arising from his clinical condition:

[. . .] Darwin by his psychoneurosis secretly and passionately nourished his genius; he was protected thus from painful and wasted contacts, escaped from any circumstances which interfered with his work, was rewarded by sleepless nights of suffering which stimulated his restless mind (Hubble, 1943, p. 132).

Darwin himself acknowledged the benefits of his situation:

I have had ample leisure from not having to earn my own bread. Even ill health, though it has annihilated several years of my life, has saved me from the distraction of society and amusement (Neve and Messenger, 2002, p. 88).

The final profile in our series has been Isaac Newton, the focus of this article. Interestingly, no books have been written on the mental health of our four historical recovery heroes, in contrast to Abraham Lincoln (Burlingame, 1997; Shenk, 2006). This may reflect a greater interest in the mental health of famous people in America than in the UK. We hope that our portrayals of these four historical recovery heroes have inspired readers, and that in many ways their mental health problems can be seen as having been advantageous to their life’s achievements.

Conclusions

Studying Isaac Newton’s mind seems almost as complex as many of the mysteries his scientific work tried to unravel. Indeed, Jeste and colleagues caution:

The trail of evidence is probably too cold for us to ever know definitively what his illness was or what caused it (Jeste et al., 2000, p. 444).

There is no doubt that his upbringing was traumatic, that he had serious personality difficulties and that he experienced at least two episodes of mental breakdown. His isolation, single mindedness and dedication, helped contribute to his greatness. It is perhaps fitting to end this brief review with one of Newton’s more modest assessments of his work:

I do not know what I may appear to the world, but to myself I seem to have been like a boy, playing on the sea shore and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, while the great ocean of truth lay all undiscovered before me (White, 1997, p. 343).

References


About the authors

Elizabeth Wakely is a retired history teacher and service user.

Jerome Carson is a Consultant Clinical Psychologist at the South London and Maudsley NHS Foundation Trust, London. Jerome Carson is the corresponding author and can be contacted at: j-carson@o2.co.uk

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints