



# CORDELIA FINE

The Real Science  
Behind Sex Differences

## DELUSIONS OF GENDER

Shortlisted for the John Llewellyn Rhys Prize

'If you believe that the tide of blue and pink that greets children in a toy or children's clothes shop is just about colours ... think again.' [workingmums.co.uk](http://workingmums.co.uk)

'A brilliant feminist critic of the neurosciences ... Read her, enjoy and learn' **Hilary Rose**, *THES*

## Praise for *A Mind of Its Own*

'We are all vain bigots, thanks to the foibles of the human brain, so argues Fine in her witty survey of psychology experiments ... An ideal gift for anyone interested in psychology' *Focus*

'Clear, accessible writing makes her a science writer to watch.' *Metro*

'Filled with quotable stories and interactive ways of how our brain has a buoyant ego of its own and is not the objective tool we might like to believe' *Bookseller*

'A light and amusing introduction to the brain and how it works on our perceptions and actions' *Publishing News*

'Consistently well-written and meticulously researched ... [Fine's] touching vignettes about life with her young son and her rational but tender husband suggest the buried presence of someone who could in the future rewardingly illuminate the workings of the mind with the studied casualness of the gifted novelist.' **Alain de Botton**, *Sunday Times*

'In breezy demotic, Fine offers an entertaining tour of current thinking ... [she] is especially fascinating on the blurring of the line between pathological delusions and the normal deluded brain.' *Telegraph*

'Fine, with a sharp sense of humour and an intelligent sense of reality, slaps an Asbo on the hundred billion grey cells

that – literally – have shifty, ruthless, self-serving minds of their own.’ *The Times*

‘Fine’s style is chirpy ... [with] many affectionately amusing scenes.’ *Guardian*

‘Engaging, intelligent’ *Scotland on Sunday*

‘Fine’s flair for the humorous and anecdotal makes this a delightful read.’ *Irish Times*

‘Fine sets out to demonstrate that the human brain is vainglorious and stubborn. She succeeds brilliantly.’ *Mail on Sunday*

‘This is one of the most interesting and amusing accounts of how we think we think – I think.’ **Alexander McCall Smith**

‘A fascinating, funny, disconcerting and lucid book. By the end you’ll realise that your brain can (and does) run rings around you.’ **Helen Dunmore**

‘Witty and informative’ **Philip Pullman**

‘Excellent ... Fine’s very engaging and chatty style ... will delight many readers ... Fine has got it just right. Although she is an academic, she writes like a human being ... All in all this short and enjoyable book is a must for anyone who wants to get a better understanding of what their brain gets up to when they aren’t watching it. First class.’ **Brian Clegg, [popularscience.co.uk](http://popularscience.co.uk)**

‘A fun introduction to some of the factors that can distort our reasoning. I’d recommend it to anyone who is just getting interested in the topic, or as a gift for anyone you know who still thinks that their personal point of view is unprejudiced and reliable.’ *Psychologist*

'Fine is that rare academic who's also an excellent writer. Highly recommended for all public and undergraduate libraries.' *Library Journal*

'Remarkably entertaining' *Los Angeles Times*

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OF GENDER**



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*For my mother*

## ABOUT THE AUTHOR

Cordelia Fine is a Research Associate at the Centre for Agency, Values and Ethics at Macquarie University, Australia, and an Honorary Research Fellow at the Department of Psychological Sciences at the University of Melbourne, Australia. Her previous book, *A Mind of Its Own* (Icon, 2006) was hugely acclaimed and she was called 'a science writer to watch' by *Metro*.



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Of all difficulties which impede the progress of thought, and the formation of well-grounded opinions on life and social arrangements, the greatest is now the unspeakable ignorance and inattention of mankind in respect to the influences which form human character. Whatever any portion of the human species now are, or seem to be, such, it is supposed, they have a natural tendency to be: even when the most elementary knowledge of the circumstances in which they have been placed, clearly points out the causes that made them what they are.

—John Stuart Mill, *The Subjection of Women* (1869)

# INTRODUCTION

Meet Evan.

When his wife, Jane, is upset, he sits with her on the couch, reading a magazine or book 'to distract himself from his own discomfort' while he cradles Jane with the other arm. After a few years working on this issue, Evan gradually comes to be able to offer comfort in a more conventional way. The politically correct and/or scientifically uninformed among you may be wondering about the cause of Evan's peculiar behaviour. Does he secretly find Jane deeply unattractive? Is he in the slow process of recovery from some deeply traumatic incident? Was he raised by wolves until the age of thirteen? Not at all. He's just a regular guy, with a regular guy-brain that's wired all wrong for empathy. That a simple act of comfort is not part of Evan's behavioural repertoire is the fault of the neurons dealt him by nature: neurons that endure a devastating 'testosterone marination'; neurons that are lacking the same 'innate ability to read faces and tone of voice for emotional nuance' as women's; neurons, in a word, that are male.<sup>1</sup>

Evan is just one of several curious characters who populate Louann Brizendine's *New York Times* best seller, *The Female Brain*. In her depiction, men's empathising skills resemble those of the hapless tourist attempting to decipher a foreign menu and are sharply contrasted with the cool proficiency of females' achievements in this domain. Take Sarah, for example. Sarah can 'identify and anticipate what [her husband] is feeling - often before he is conscious of it himself.' Like the magician who knows that you'll pick the seven of diamonds even before it's left the

pack, Sarah can amaze her husband at whim, thanks to her lucky knack of knowing what he's feeling before he feels it. (*Ta-DA! Is this your emotion?*) And no, Sarah is not a fairground psychic. She is simply a woman who enjoys the extraordinary gift of mind reading that, apparently, is bestowed on all owners of a female brain:

Maneuvering like an F-15, Sarah's female brain is a high-performance emotion machine - geared to tracking, moment by moment, the non-verbal signals of the innermost feelings of others.<sup>2</sup>

Just what is it that makes the female brain so well suited to stalking people's private feelings as though they were terrified prey? Why, you are asking, are male neurons not capable of such miracles - better placed instead to navigate the masculine worlds of science and maths? Whatever the answer du jour - whether it's the foetal testosterone that ravages the male neural circuits, the oversized female corpus callosum, the efficiently specialised organisation of the male brain, the primitively subcortical emotion circuits of boys, or the underendowment of visuospatial processing white matter in the female brain - the underlying message is the same. Male and female brains are different in ways that matter.

Having marital problems, for instance? Turn to *What Could He Be Thinking?* by 'educator, therapist, corporate consultant, and ... *New York Times* bestselling author'<sup>3</sup> Michael Gurian, and you will discover the epiphany the author experienced with his wife, Gail, on seeing MRI (magnetic resonance imaging) and PET (positron emission tomography) scans of male and female brains:

I said, 'We thought we knew a lot about each other, but maybe we haven't known enough.' Gail said,

‘There really is such a thing as a “male” brain. It’s hard to argue with an MRI.’ We realized that our communication, our support of each other, and our understanding of our relationship were just beginning, after six years of marriage.

The information from those scans, says Gurian, was ‘marriage saving.’<sup>4</sup>

Nor are spouses the only ones who, it is now claimed, can be better understood with the benefit of a little background in brain science. The blurb of the influential book *Why Gender Matters* by physician Leonard Sax, founder and executive director of the National Association for Single Sex Public Education (NASSPE), promises to show readers how to ‘recognize and understand ... hardwired differences [between the sexes] to help every girl and every boy reach their fullest potential.’<sup>5</sup> Likewise, parents and teachers are informed in a recent Gurian Institute book that ‘Researchers [using MRI] have literally seen what we have always known. There are fundamental gender differences and they start in the very structure of the human brain.’<sup>6</sup> Thus, Gurian suggests that ‘to walk into a classroom or home without knowledge of both how the brain works and how the male and female brains learn differently is to be many steps behind where we can and should be as teachers, parents, and caregivers of children.’<sup>7</sup>

Even CEOs can, it is said, benefit from a greater understanding of sex differences in the brain. The recent book *Leadership and the Sexes* ‘links the actual science of male/female brain differences to every aspect of business’ and ‘presents brain science tools with which readers can look into the brains of men and women to understand themselves and one another.’ According to the jacket blurb, the ‘gender science’ in the book ‘has been used successfully by such diverse corporations as IBM, Nissan, Proctor [sic] &

Gamble, Deloitte & Touche, PriceWaterhouseCoopers, Brooks Sports, and many others.’<sup>8</sup>

Is it realistic, you will begin to wonder, to expect two kinds of people, with such different brains, to ever have similar values, abilities, achievements, lives? If it’s our differently wired brains that make us different, maybe we can sit back and relax. If you want the answer to persisting gender inequalities, stop peering suspiciously at society and take a look right over here, please, at this brain scan.

If only it were that simple.

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About 200 years ago, the English clergyman Thomas Gisborne wrote a book that despite its, to my mind, rather unappealing title - *An Enquiry into the Duties of the Female Sex* - became an eighteenth-century best seller. In it, Gisborne neatly set out the different mental abilities required to fulfil male versus female roles:

The science of legislation, of jurisprudence, of political economy; the conduct of government in all its executive functions; the abstruse researches of erudition ... the knowledge indispensable in the wide field of commercial enterprise ... these, and other studies, pursuits, and occupations, assigned chiefly or entirely to men, demand the efforts of a mind endued with the powers of close and comprehensive reasoning, and of intense and continued application.<sup>9</sup>

It was only natural, the author argued, that these qualities should be ‘impart[ed] ... to the female mind with a more sparing hand’ because women have less need of such



talents in the discharge of their duties. Women are not inferior, you understand, simply *different*. After all, when it comes to performance in the feminine sphere 'the superiority of the female mind is unrivalled', enjoying 'powers adapted to unbend the brow of the learned, to refresh the over-laboured faculties of the wise, and to diffuse, throughout the family circle, the enlivening and endearing smile of cheerfulness'.<sup>10</sup> What awfully good luck that these womanly talents should coincide so happily with the duties of the female sex.

Fast-forward 200 years, turn to the opening page of *The Essential Difference*, a highly influential twenty-first-century book about the psychology of men and women, and there you will find Cambridge University psychologist Simon Baron-Cohen expressing much the same idea: '*The female brain is predominantly hard-wired for empathy. The male brain is predominantly hard-wired for understanding and building systems.*'<sup>11</sup> Just like Gisborne, Baron-Cohen thinks that it is those with the 'male brain' who make the best scientists, engineers, bankers and lawyers, thanks to their capacity to focus in on different aspects of a system (be it a biological, physical, financial or legal system), and their drive to understand how it works. And the soothing reassurance that women, too, have their own special talents remains present and correct. In what has been described as a 'masterpiece of condescension',<sup>12</sup> Baron-Cohen explains that the female brain's propensity for understanding others' thoughts and feelings, and responding to them sympathetically, ideally suits it to occupations that professionalise women's traditional caring roles: 'People with the female brain make the most wonderful counsellors, primary-school teachers, nurses, carers, therapists, social workers, mediators, group facilitators or personnel staff.'<sup>13</sup> Philosopher Neil Levy's neat summary of Baron-Cohen's thesis - that 'on average, women's intelligence is best employed in putting people at their ease, while the men get

on with understanding the world and building and repairing the things we need in it'<sup>14</sup> – can't help but bring to mind Gisborne's eighteenth-century wife, busily unbending the brow of her learned husband.

Baron-Cohen does, it must be said, take great pains to point out that not all women have a female, empathising brain, nor all men a male, systemising one. However, this concession does not set him apart from traditional views of sex differences quite as much as he might think. As long ago as 1705, the philosopher Mary Astell observed that women who made great achievements in male domains were said by men to have '*acted above their Sex*. By which one must suppose they wou'd have their Readers understand, That they were not Women who did those Great Actions, but that they were Men in Petticoats!'<sup>15</sup> Likewise, a few centuries later intellectually talented women were 'said to possess "masculine minds".'<sup>16</sup> As one writer opined in the *Quarterly Journal of Science*:

The *savante* – the woman of science – like the female athlete, is simply an anomaly, an exceptional being, holding a position more or less intermediate between the two sexes. In one case the brain, as in the other the muscular system, has undergone an abnormal development.<sup>17</sup>

Baron-Cohen, of course, does not describe as 'abnormal' the woman who reports a greater tendency to systemise. But certainly there is an incongruous feel to the idea of a male brain in the body of a woman, or a female brain housed in the skull of a man.

The sheer stability and staying power of the idea that male and female psychologies are inherently different can't help but impress. Are there, in truth, psychological differences hardwired into the brains of the sexes that

explain why, even in the most egalitarian of twenty-first-century societies, women and men's lives still follow noticeably different paths?

For many people, the experience of becoming a parent quickly abolishes any preconceptions that boys and girls are born more or less the same. When the gender scholar Michael Kimmel became a father, he reports that an old friend cackled to him, 'Now you'll see it's all biological!'<sup>18</sup> And what could be more compelling proof of this, as a parent, than to see your own offspring defy your well-meaning attempts at gender-neutral parenting? This is a common experience, discovered sociologist Emily Kane. Many parents of preschoolers - particularly the white, middle-and upper-middle-class ones - came to the conclusion that differences between boys and girls were biological by process of elimination. Believing that they practised gender-neutral parenting, the 'biology as fallback' position, as Kane calls it, was the only one left remaining to them.<sup>19</sup>

Some commentators, casting their eye over society at large, find themselves falling back on biology in much the same way. In her recent book *The Sexual Paradox*, journalist and psychologist Susan Pinker tackles the question of why 'gifted, talented women with the most choices and freedoms don't seem to be choosing the same paths, in the same numbers, as the men around them. Even with barriers stripped away, they don't behave like male clones.' Considering this, to some, unexpected outcome, Pinker wonders 'whether biology is, well, if not destiny exactly, then a profound and meaningful departure point for a discussion about sex differences.'<sup>20</sup> The gender gap, she suggests, has in part 'neurological or hormonal roots'.<sup>21</sup> As the barriers of a sexist society continue to fall, there seem to be fewer and fewer social scapegoats to call on to explain continuing gender inequalities and work segregation. When we can't pin the blame on outside forces, all eyes swivel to

the internal – the differences in the structure or functioning of female and male brains. Wired differently from men, many women choose to reject what Pinker calls the ‘vanilla’ male model of life – in which career takes priority over family – and have different interests.

The fallback conclusion that there must be hardwired psychological differences between the sexes also appears to enjoy impressive scientific support. First, there is the surge of foetal testosterone that takes place during the gestation of male, but not female, babies. As *Brain Sex* authors Anne Moir and David Jessel describe this momentous event:

[At] six or seven weeks after conception ... the unborn baby ‘makes up its mind’, and the brain begins to take on a male or a female pattern. What happens, at that critical stage in the darkness of the womb, will determine the structure and organisation of the brain: and that, in turn, will decide the very nature of the mind.<sup>22</sup>

Like other popular writers, Moir and Jessel leave us in little danger of underestimating the psychological significance of what goes on ‘in the darkness of the womb’. While Louann Brizendine is content to merely state that the effect of prenatal testosterone on the brain ‘defines our innate biological destiny’,<sup>23</sup> Moir and Jessel are openly gleeful about the situation. ‘[Infants] have, quite literally, made up their minds in the womb, safe from the legions of social engineers who impatiently await them.’<sup>24</sup>

Then, there are the differences between male and female brains. Rapid progress in neuroimaging technology enables neuroscientists to see, in ever-increasing detail, sex differences in brain structure and function. Our brains are different, so surely our minds are too? For example, in a *New York Times Magazine* feature on the so-called opt-out

revolution (that is, women who give up their careers to take up traditional roles as stay-at-home mothers) one interviewee told journalist Lisa Belkin that “[i]t’s all in the M.R.I.,” ... [referring to] studies that show the brains of men and women “light up” differently when they think or feel. And those different brains, she argues, inevitably make different choices.’<sup>25</sup> The neuroscientific discoveries we read about in magazines, newspaper articles, books and sometimes even journals tell a tale of two brains – essentially different – that create timeless and immutable psychological differences between the sexes. It’s a compelling story that offers a neat, satisfying explanation, and justification, of the gender status quo.<sup>26</sup>

We have been here before, so many times.

In the seventeenth century, women were severely disadvantaged educationally; for example, in their political development they were hindered ‘through their lack of formal education in political rhetoric, their official exclusion from citizenship and government, the perception that women ought not to be involved in political affairs, and the view that it was immodest for a woman to write at all.’<sup>27</sup> Yet despite such – to our modern eyes – obvious impediments to women’s intellectual development, they were widely assumed to be naturally inferior by many. While, in retrospect, it might seem to go without saying that men’s apparently superior intellect and achievements might lie in sources other than natural neural endowments, at the time it *did* need saying. As one seventeenth-century feminist put it: ‘For a Man ought no more to value himself upon being Wiser than a Woman, if he owe his Advantage to a better Education, and greater means of Information, then he ought to boast of his Courage, for beating a Man, when his Hands were bound’.<sup>28</sup>

In the eighteenth century, as we've seen, Thomas Gisborne felt no need to consider an alternative explanation of his observations of sex differences within society. As the writer Joan Smith has pointed out:

[V]ery few women, growing up in England in the late eighteenth century, would have understood the principles of jurisprudence or navigation, but that is solely because they were denied access to them. Obvious as this is to a modern observer, the hundreds of thousands of readers who bought his books accepted his argument at face value because it fitted in with their prejudices.<sup>29</sup>

And in the late nineteenth and early twentieth centuries, women still did not have equal access to higher education. And yet, '[w]omen', declared the well-known psychologist Edward Thorndike, 'may and doubtless will be scientists and engineers, but the Joseph Henry, the Rowland, and the Edison of the future, will be men'. This confident proclamation, made at a time when women were not granted full membership to, for example, Harvard, Cambridge or Oxford University seems - I don't know - a bit premature? And, given that at the time women couldn't vote, was it not also a little rash for Thorndike to claim with such confidence that 'even should all women vote, they would play a small part in the Senate'?<sup>30</sup> In retrospect, the constraints on women are perfectly obvious. *Hey, Professor Thorndike, we might think to ourselves, ever think about letting women into the Royal Society, or maybe offering them a little civil entitlement known as the vote, before casting judgement on their limitations in science and politics?* Yet to many of those who were there at the time, the slope of the playing field was imperceptible. Thus philosopher John Stuart Mill's denial in 1869 that 'any one

knows, or can know, the nature of the two sexes, as long as they have only been seen in their present relation to one another'<sup>31</sup> was revolutionary, and derided. Decades later it was still with only the utmost tentativeness that the early-twentieth-century researcher of 'eminence', Cora Castle, asked, 'Has innate inferiority been the reason for the small number of eminent women, or has civilisation never yet allowed them an opportunity to develop their innate powers and possibilities?'<sup>32</sup>

There is also nothing new about looking to the brain to explain and justify the gender status quo. In the seventeenth century, the French philosopher Nicolas Malebranche declared women 'incapable of penetrating to truths that are slightly difficult to discover', claiming that '[e]verything abstract is incomprehensible to them.' The neurological explanation for this, he proposed, lay in the 'delicacy of the brain fibers'.<sup>33</sup> Presumably, one abstract thought too many and - *ping!* - those fibres snap. Over the intervening centuries, the neurological explanations behind men and women's different roles, occupations and achievements have been overhauled again and again, as neuroscientific techniques and understanding have become ever more sophisticated. Early brain scientists, using the cutting-edge techniques of the time, busily filled empty skulls with pearl barley, carefully categorised head shape using tape measures and devoted large portions of careers to the weighing of brains.<sup>34</sup> Infamously, they proposed that women's intellectual inferiority stemmed from their smaller and lighter brains, a phenomenon that came to be widely known among the Victorian public as 'the missing five ounces of the female brain.'<sup>35</sup> The hypothesis, widely believed, that this sex difference in the brain was of profound psychological significance was championed by Paul Broca, one of the most eminent scientists of the time. Only when it became inescapably clear that brain weight did not correlate with intelligence did brain scientists



acknowledge that men's larger brains might merely reflect their larger bodies. This inspired a search for a measure of relative, rather than absolute, brain weight that would leave the absolutely bigger-brained sex ahead. As historian of science Cynthia Russett reports:

Many ratios were tried - of brain weight to height, to body weight, to muscular mass, to the size of the heart, even (one begins to sense desperation) to some one bone, such as the femur.<sup>36</sup>

These days, we have rather more of an inkling of the complexity of the brain. It's undeniable that by moving into the realm of the brain itself, rather than its outer casing, scientific advance was made. It was certainly an important moment when a forward-thinking nineteenth-century scientist, fingering his tape measure with the tense distraction of one who suspects that his analysis has left certain important details unpenetrated, said thoughtfully, 'Pass me that brain and those scales, will you?' But even the untrained twenty-first-century layperson can see that this brought scientists only a little closer to understanding the mystery of how brain cells create the engine of the mind, and can sense the unfortunate hastiness of the conclusion that women's cognitive inferiority to men could be weighed in ounces.

It may seem like the same sort of prejudice couldn't possibly creep into the contemporary debate because now we are all so enlightened; perhaps even ... *overenlightened*? Writers who argue that there are hardwired differences between the sexes that account for the gender status quo often like to position themselves as courageous knights of truth, who brave the stifling ideology of political correctness. Yet claims of 'essential differences' between the two sexes simply reflect - and give scientific authority to - what I



suspect is really a majority opinion.<sup>37</sup> If history tells us anything, it is to take a second, closer look at our society and our science. This is the aim of *Delusions of Gender*.

At the core of the first part of this book, “‘Half-Changed World”, Half-Changed Minds’, is the critical idea that the psyche is ‘not a discrete entity packed in the brain. Rather, it is a structure of psychological processes that are shaped by and thus closely attuned to the culture that surrounds them.’<sup>38</sup> We tend not to think about ourselves this way, and it’s easy to underestimate the impact of what is *outside* the mind on what takes place inside. When we confidently compare the ‘female mind’ and the ‘male mind’, we think of something stable inside the head of the person, the product of a ‘female’ or ‘male’ brain. But such a tidily isolated data processor is not the mind that social and cultural psychologists are getting to know with ever more intimacy. As Harvard University psychologist Mahzarin Banaji puts it, there is no ‘bright line separating self from culture’, and the culture in which we develop and function enjoys a ‘deep reach’ into our minds.<sup>39</sup> It’s for this reason that we can’t understand gender differences in female and male minds – the minds that are the source of our thoughts, feelings, abilities, motivations, and behaviour – without understanding how psychologically permeable is the skull that separates the mind from the sociocultural context in which it operates. When the environment makes gender salient, there is a ripple effect on the mind. We start to think of ourselves in terms of our gender, and stereotypes and social expectations become more prominent in the mind. This can change self-perception, alter interests, debilitate or enhance ability, and trigger unintentional discrimination. In other words, the social context influences who you are, how you think and what you do. And these thoughts, attitudes and behaviours of yours, in turn, become part of the social context. It’s intimate. It’s messy. And it demands a different way of thinking about gender.

Then, there's the less subtle, consciously performed discrimination against women, the wide-ranging forms of exclusion, the harassment and the various injustices both at work and home. These stem from not-all-that-old, and still powerful, ideas about men and women's proper roles and places in the world. By the end of the first part of the book, one can't help but wonder if we have stumbled on the twenty-first-century blind-spot. As University of California-Irvine professor of mathematics Alice Silverberg commented:

When I was a student, women in the generation above me told horror stories about discrimination, and added 'But everything has changed. That will never happen to you.' I'm told that this was said even by the generations before that, and now my generation is saying similar things to the next one. Of course, a decade or so later we always say, 'How could we have thought *that* was equality?' Are we serving the next generation well if we tell them that everything is equal and fair when it's not?<sup>40</sup>

In the second part of the book, 'Neurosexism', we take a closer look at claims about male and female brains. What do people *mean* when they say that there are inherent gender differences, or that the two sexes are hardwired to be better suited to different roles and occupations? As cognitive neuroscientist Giordana Grossi notes, these readily used phrases, 'along with the continual references to sex hormones, evoke images of stability and unchangeability: women and men behave differently because their brains are structured differently.'<sup>41</sup> Avid readers of popular science books and articles about gender may well have formed the impression that science has shown that the path to a male or a female brain is set in utero, and that these differently

structured brains create essentially different minds. There *are* sex differences in the brain. There are also large (although generally decreasing) sex differences in who does what, and who achieves what. It would make sense if these facts were connected in some way, and perhaps they are. But when we follow the trail of contemporary science we discover a surprising number of gaps, assumptions, inconsistencies, poor methodologies, and leaps of faith – as well as more than one echo of the insalubrious past. As Brown University professor of biology and gender studies Anne Fausto-Sterling has pointed out, ‘despite the many recent insights of brain research, this organ remains a vast unknown, a perfect medium on which to project, even unwittingly, assumptions about gender.’<sup>42</sup> The sheer complexity of the brain lends itself beautifully to overinterpretation and precipitous conclusions. After combing through the controversies, we’ll ask whether modern neuroscientific explanations of gender inequality are doomed to join the same scrap heap as measures of skull volume, brain weight and neuron delicacy.

And it’s important for scientists to remain aware of this possibility because from the seeds of scientific speculation grow the monstrous fictions of popular writers. Again and again, claims are made by so-called experts that are ‘simply coating old-fashioned stereotypes with a veneer of scientific credibility’, as Caryl Rivers and Rosalind Barnett warn in the *Boston Globe*.<sup>43</sup> Yet this ‘popular neurosexism’ easily finds its way into apparently scientific books and articles for the interested public, including parents and teachers.<sup>44</sup> Already, sexism disguised in neuroscientific finery is changing the way children are taught.

Neurosexism reflects and reinforces cultural beliefs about gender – and it may do so in a particularly powerful way. Dubious ‘brain facts’ about the sexes become part of the cultural lore. And, as I describe in ‘Recycling Gender’, the third part of the book, refreshed and invigorated by

neurosexism, the gender cycle is ready to sweep up into it the next generation. Children, keen to understand and find their place in society's most salient social divide, are born into a half-changed world, to parents with half-changed minds.

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I don't think that in my lifetime there will be a woman Prime Minister.

—Margaret Thatcher (1971), Prime Minister of Great Britain from 1979 to 1990<sup>45</sup>

It's worth remembering just how much society can change in a relatively short period of time. Precedents are still being set. Could a society in which males and females hold equal places ever exist? Ironically, perhaps it is not biology that is the implacably resistant counterforce, but our culturally attuned minds.<sup>46</sup> No one knows whether males and females could ever enjoy perfect equality. But of this I am confident: So long as the counterpoints provided by the work of the many researchers presented in this book are given an audience, in fifty years' time people will look back on these early-twenty-first-century debates with bewildered amusement, and wonder how we ever could have thought that *that* was the closest we could get to equality.

PART I

'Half-Changed World',  
Half-Changed Minds

The more I was treated as a woman, the more woman I became. I adapted willy-nilly. If I was assumed to be incompetent at reversing cars, or opening bottles, oddly incompetent I found myself becoming. If a case was thought too heavy for me, inexplicably I found it so myself.

—Jan Morris, a male-to-female transsexual describing her post-transition experiences in her autobiography, *Conundrum* (1987)<sup>1</sup>

Suppose a researcher were to tap you on the shoulder and ask you to write down what, according to cultural lore, males and females are like. Would you stare at the researcher blankly and exclaim, ‘But what can you mean? Every person is a unique, multifaceted, sometimes even contradictory individual, and with such an astonishing range of personality traits within each sex, and across contexts, social class, age, experience, educational level, sexuality and ethnicity, it would be pointless and meaningless to attempt to pigeonhole such rich complexity and variability into two crude stereotypes’? No. You’d pick up your pencil and start writing.<sup>2</sup> Take a look at the two lists from such a survey, and you will find yourself reading adjectives that