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Invisible Women

Exposing Data Bias in a World Designed for Men

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For the women who persist: keep on being bloody difficult

Introduction: The Default Male

Seeing men as the human default is fundamental to the structure of human society. It's an old habit and it runs deep – as deep as theories of human evolution itself. In the fourth century BC Aristotle was already baldly articulating male default as unarguable fact: 'The first departure from type is indeed that the offspring should become female instead of male', he wrote in his biological treatise *On the Generation of Animals*. (He did allow that this aberration was, however, 'a natural necessity'.)

Over two thousand years later, in 1966, the University of Chicago held a symposium on primitive hunter-gatherer societies. It was called 'Man the Hunter'. Over seventy-five social anthropologists from around the world gathered to debate the centrality of hunting to human evolution and development. The consensus was that it is pretty central.[1] 'The biology, psychology, and customs that separate us from the apes – all these we owe to the hunters of time past', claimed one of the papers published in the resulting book. Which is all very well, only, as feminists pointed out, this theory poses something of a problem for female evolution. Because, as the

book made clear, hunting was a male activity. So if 'our intellect, interests, emotions, and basic social life – all are evolutionary products of the success of hunting adaptation', what does that mean for women's humanity? If human evolution is driven by men, are women even human?

In her now classic 1975 essay, 'Woman the Gatherer', anthropologist Sally Slocum challenged the primacy of 'Man the Hunter'.[2] Anthropologists, she argued, 'search for examples of the behaviour of males and assume that this is sufficient for explanation'. And so she asked a simple question to fill the silence: 'what were the females doing while the males were out hunting?' Answer: gathering, weaning, caring for children during 'longer periods of infant dependency', all of which would similarly have required cooperation. In the context of this knowledge, the 'conclusion that the basic human adaptation was the desire of males to hunt and kill,' objects Slocum, 'gives too much importance to aggression, which is after all only one factor of human life.'

Slocum made her critique over forty years ago now, but the male bias in evolutionary theory persists. 'Humans evolved to have an instinct for deadly violence, researchers find', read a 2016 headline in the *Independent*.[3] The article reported on an academic paper called 'The phylogenetic roots of human lethal violence', which claimed to reveal that humans have evolved to be six times more deadly to their own species than the average mammal.[4]

This is no doubt true of our species overall – but the reality of human-on-human lethal violence is that it is overwhelmingly a male occupation: a thirty-year analysis of murder in Sweden found that nine out of ten murders are committed by men.[5] This holds with statistics from other countries, including Australia,[6] the UK[7] and the US.[8] A 2013 UN homicide survey found that 96% [9] of homicide perpetrators worldwide are male. So is it humans who are murderous,

or men? And if women aren't on the whole murdering, what are we to think of female 'phylogenetics'?

The male-unless-otherwise-indicated approach to research seems to have infected all sorts of ethnographic fields. Cave paintings, for example, are often of game animals and so researchers have assumed they were done by men – the hunters. But new analysis of handprints that appear alongside such paintings in cave sites in France and Spain has suggested that the majority were actually done by women.[10]

Even human bones are not exempt from male-unless-otherwise-indicated thinking. We might think of human skeletons as being objectively either male or female and therefore exempt from male-default thinking. We would be wrong. For over a hundred years, a tenth-century Viking skeleton known as the 'Birka warrior' had – despite possessing an apparently female pelvis – been assumed to be male because it was buried alongside a full set of weapons and two sacrificed horses.[11] These grave contents indicated that the occupant had been a warrior[12] – and warrior meant male (archaeologists put the numerous references to female fighters in Viking lore down to 'mythical embellishments'[13]). But although weapons apparently trump the pelvis when it comes to sex, they don't trump DNA and in 2017 testing confirmed that these bones did indeed belong to a woman.

The argument didn't, however, end there. It just shifted.[14] The bones might have been mixed up; there might be other reasons a female body was buried with these items. Naysaying scholars might have a point on both counts (although based on the layout of the grave contents the original authors dismiss these criticisms). But the resistance is nevertheless revealing, particularly since male skeletons in similar circumstances 'are not questioned in the same way'.[15] Indeed, when archaeologists dig up grave sites, they nearly always find more males, which, as noted anthropologist Phillip

Walker drily noted in a 1995 book chapter on sexing skulls, is 'not consistent with what we know about the sex ratios of extant human populations'.[16] And given Viking women could own property, could inherit and could become powerful merchants, is it so impossible that they could have fought too?[17]

After all, these are far from the only female warrior bones that have been discovered. 'Battle-scarred skeletons of multiple women have been found across the Eurasian steppes from Bulgaria to Mongolia' wrote Natalie Haynes in the *Guardian*.[18] For people such as the ancient Scythians, who fought on horseback with bows and arrows, there was no innate male warrior advantage, and DNA testing of skeletons buried with weapons in more than 1,000 Scythian burial mounds from Ukraine to Central Asia have revealed that up to 37% of Scythian women and girls were active warriors.[19]

The extent to which male-unless-otherwise-indicated permeates our thinking may seem less surprising when you realise that it is also embedded in one of the most basic building blocks of society: language itself. Indeed, when Slocum criticised male bias in anthropology, she pointed out that this bias appeared 'not only in the ways in which the scanty data are interpreted, but in the very language used'. The word 'man', she wrote, 'is used in such an ambiguous fashion that it is impossible to decide whether it refers to males or to the human species in general'. This collapse in meaning led Slocum to suspect that 'in the minds of many anthropologists, 'man', supposedly meaning the human species, is actually exactly synonymous with 'males'. As we shall see, the evidence suggests that she was probably right.

In Muriel Rukeyser's poem 'Myth', an old, blind Oedipus asks the Sphinx, 'Why didn't I recognize my mother?' The Sphinx replies that Oedipus answered her question (what walks on four legs in the morning, two in the afternoon and three in the evening) incorrectly. '[Y]ou answered, Man. You didn't say anything about

woman.' But, replies Oedipus, when you say man, 'you include women too. Everyone knows that.'

But in fact the Sphinx was right and Oedipus is wrong. When you say man you don't 'include women too', even if everyone *does* technically 'know that'. Numerous studies in a variety of languages over the past forty years have consistently found that what is called the 'generic masculine' (using words like 'he' in a gender-neutral way) is not in fact read generically.[20] It is read overwhelmingly as male.

When the generic masculine is used people are more likely to recall famous men than famous women;[21] to estimate a profession as male-dominated;[22] to suggest male candidates for jobs and political appointments.[23] Women are also less likely to apply, and less likely to perform well in interviews, for jobs that are advertised using the generic masculine.[24] In fact the generic masculine is read so overwhelmingly as male that it even overrides otherwise powerful stereotypes, so that professions such as 'beautician', which are usually stereotyped female, are suddenly seen as male.[25] It even distorts scientific studies, creating a kind of meta gender data gap: a 2015 paper looking at self-report bias in psychological studies found that the use of the generic masculine in questionnaires affected women's responses, potentially distorting 'the meaning of test scores'.[26] The authors concluded that its use 'may portray unreal differences between women and men, which would not appear in the gender-neutral form or in natural gender language versions of the same questionnaire'.

And yet in the face of decades of evidence that the generic masculine is anything but clear, official language policy in many countries continues to insist that it is purely a formality whose use must continue for the sake of … clarity. As recently as 2017, the Académie française, France's ultimate authority on the French language, was thundering against 'the aberration of "inclusive

writing" ', claiming that 'the French language finds itself in mortal danger' from workarounds for the generic masculine. Other countries including Spain[27] and Israel[28] have faced similar rows.

Because English is not a grammatically gendered language, the generic masculine is fairly restricted in modern usage. Terms like 'doctor' and 'poet' used to be generic masculine (with specifically female doctors and poets referred to – usually derisively – as poetesses and doctoresses), but are now considered gender neutral. But while the formal use of the generic masculine only really clings on in the writings of pedants who still insist on using 'he' to mean 'he or she', it has made something of a comeback in the informal usage of Americanisms such as 'dude' and 'guys', and, in the UK, 'lads' as supposedly gender-neutral terms. A recent row in the UK also showed that, for some, male default still matters an awful lot: when in 2017 the first female head of London's Fire Brigade, Dany Cotton, suggested that we should replace 'fireman' with the now standard (and let's face it, much cooler) 'firefighter', she received a deluge of hate mail.[29]

Languages such as French, German and Spanish, however, are what is called 'gender-inflected', and here the concept of masculine and feminine is woven into the language itself. All nouns are gendered either masculine or feminine. A table is feminine, but a car is masculine: *la mesa roja* (the red table); *el coche rojo* (the red car). When it comes to nouns that refer to people, while both male and female terms exist, the standard gender is always masculine. Try searching Google for 'lawyer' in German. It comes back '*Anwalt*', which literally means male lawyer, but is also used generically as just 'lawyer'. If you want to refer to a female lawyer specifically you would say '*Anwältin*' (incidentally, the way female terms are often, as here, modified male terms is another subtle way we position the female as a deviation from male type – as, in de Beauvoir's terms, 'Other'). The generic masculine is also used when referring to groups of people: when the gender is unknown, or if it's a mixed

group the generic masculine is used. So a group of one hundred female teachers in Spanish would be referred to as '*las profesoras*' – but as soon as you add a single male teacher, the group suddenly becomes '*los profesores*'. Such is the power of the default male.

In gender-inflected languages the generic masculine remains pervasive. Job vacancies are still often announced with masculine forms – particularly if they are for leadership roles.[30] A recent Austrian study of the language used in leadership jobs ads found a 27:1 ratio of masculine to 'gender-fair forms' (using both the male and female term).[31] The European Parliament believes it has found a solution to this problem, and since 2008 has recommended that '(m/f)' be added on the end of job ads in gender-inflected languages. The idea is that this makes the generic masculine more 'fair' by reminding us that women exist. It's a nice idea – but it wasn't backed up by data. When researchers *did* test its impact they found that it made no difference to the exclusionary impact of using the generic masculine on its own – illustrating the importance of collecting data and *then* creating policy.[32]

Does all this arguing over words make any real world difference? Arguably, yes. In 2012, a World Economic Forum analysis found that countries with gender-inflected languages, which have strong ideas of masculine and feminine present in almost every utterance, are the most unequal in terms of gender.[33] But here's an interesting quirk: countries with genderless languages (such as Hungarian and Finnish) are not the most equal. Instead, that honour belongs to a third group, countries with 'natural gender languages' such as English. These languages allow gender to be marked (female teacher, male nurse) but largely don't encode it into the words themselves. The study authors suggested that if you can't mark gender in any way you can't 'correct' the hidden bias in a language by emphasising 'women's presence in the world'. In short: because men go without saying, it matters when women literally can't get said at all.

It's tempting to think that the male bias that is embedded in language is simply a relic of more regressive times, but the evidence does not point that way. The world's 'fastest-growing language',[34] used by more than 90% of the world's online population, is emoji.[35] This language originated in Japan in the 1980s and women are its heaviest users:[36] 78% of women versus 60% of men frequently use emoji.[37] And yet, until 2016, the world of emojis was curiously male.

The emojis we have on our smartphones are chosen by the rather grand-sounding 'Unicode Consortium', a Silicon Valley-based group of organisations that work together to ensure universal, international software standards. If Unicode decides a particular emoji (say 'spy') should be added to the current stable, they will decide on the code that should be used. Each phone manufacturer (or platform such as Twitter and Facebook) will then design their own interpretation of what a 'spy' looks like. But they will all use the same code, so that when users communicate between different platforms, they are broadly all saying the same thing. An emoji face with heart eyes is an emoji face with heart eyes.

Unicode has not historically specified the gender for most emoji characters. The emoji that most platforms originally represented as a man running, was not called 'man running'. It was just called 'runner'. Similarly the original emoji for police officer was described by Unicode as 'police officer', not 'policeman'. It was the individual platforms that all interpreted these gender-neutral terms as male.

In 2016, Unicode decided to do something about this. Abandoning their previously 'neutral' gender stance, they decided to explicitly gender all emojis that depicted people.[38] So instead of 'runner' which had been universally represented as 'male runner', Unicode issued code for explicitly male runner and explicitly female runner. Male and female options now exist for all professions and athletes. It's a small victory, but a significant one.

It's easy to slam phone manufacturers and social media platforms as sexist (and, as we shall see, they are, if often unknowingly), but the reality is that even if they had somehow managed to design an image of a 'gender neutral' runner, most of us would still have read that runner as male, because we read most things as male unless they are specifically marked as female. And so while it is of course to be hoped that angry grammarians will come round to the idea that saying 'he and she' (or even, God forbid, 'she and he') instead of just 'he' may not be the worst thing that has ever happened to them, the truth is that getting rid of the generic masculine would only be half the battle: male bias is so firmly embedded in our psyche that even genuinely gender-neutral words are read as male.

A 2015 study identified the top five words used to refer to people in human–computer interaction papers published in 2014 and found that they are all apparently gender neutral: user, participant, person, designer and researcher.[39] Well done, human–computer interaction academics! But there is (of course) a catch. When study participants were instructed to think about one of these words for ten seconds and then draw an image of it, it turned out that these apparently gender-neutral words were not perceived as equally likely to be male or female. For male participants, only 'designer' was interpreted as male less than 80% of the time (it was still almost 70% male). A researcher was more likely to be depicted as of no gender than as a female. Women were slightly less gender-biased, but on the whole were still more likely to read gender-neutral words as male, with only 'person' and 'participant' (both read by about 80% of male participants as male) being about 50/50.

This rather disheartening finding tallies with decades of 'draw a scientist' data, where participants overwhelmingly draw men (the bias has historically been so extreme that media around the world celebrated as great progress a recent paper which found that 28%

of children now draw women).[40] It also tallies, perhaps more disturbingly, with a 2008 study in which Pakistani students (aged nine and ten) who were asked to draw an image of 'us'.[41] Hardly any of the female students drew women and none of the male students did.

We don't even allow non-humans to escape our perception of the world as overwhelmingly male: when researchers in one study attempted to prompt participants to see a gender-neutral stuffed animal as female by using female pronouns, children, parents and carers still overwhelmingly referred to the animal as 'he'.[42] The study found that an animal must be 'super-feminine' before 'even close to half of participants will refer to it as she rather than he'.

To be fair, it's not an entirely unreasonable assumption: often it really is a he. A 2007 international study of 25,439 children's TV characters found that only 13% of non-human characters are female (the figure for female human characters was slightly better, although still low at 32%).[43] An analysis of G-rated (suitable for children) films released between 1990 and 2005 found that only 28% of speaking roles went to female characters – and perhaps even more tellingly in the context of humans being male by default, women made up only 17% of crowd scenes.[44]

Men don't just have more roles, they also spend twice as much time on screen – this rises to nearly three times as much when, as most films do, the film has a male lead.[45] Only when the lead is female do men and women appear about as often as each other (as opposed to women getting, as you might expect, the majority of screen time). Men also get more lines, speaking twice as much as women overall; three times as much in films with male leads; and almost twice as much in films with male and female co-leads. Again it is only in the few films with female leads where male and female characters drew even on screen time.

This imbalance is found not just in films and TV. It's everywhere.

It's in statues: when I counted all the statues in the UK's Public Monuments and Sculptures Association database I found that there were more statues of men called John than there were of historical, named, non-royal women (the only reason adding royal women to the figure just beats the Johns is down to Queen Victoria, whose enthusiasm for putting up statues of herself I have a grudging respect for).

It's on banknotes: in 2013 the Bank of England announced they were replacing the only female historical figure on their banknotes with another man (I fought a successful campaign against it and campaigns have cropped up in other countries, including Canada and the US).[46]

It's in the news media: every five years since 1995, the Global Media Monitoring Project has evaluated the world's print and broadcast media for its representation of women. Its latest report, published in 2015, found that 'women make up only 24% of the persons heard, read about or seen in newspaper, television and radio news, exactly as they did in 2010'.[47]

It's even in school textbooks. Thirty years of language and grammar textbook studies in countries including Germany, the US, Australia, and Spain have found that men far outnumber women in example sentences (on average by about 3:1).[48] A US study of eighteen widely used high-school history textbooks published between 1960 and 1990 found that pictures of named men outnumbered pictures of named women by a ratio of about 18 to 100 and that only 9% of the names in the indexes were women (a figure that persisted into the 2002 edition of one of the textbooks).[49] More recently, a 2017 analysis of ten introductory political-science textbooks found that an average of only 10.8% of pages per text referenced women (some texts were as low as 5.3%).[50] The same level of male bias has been found in recent analyses of Armenian, Malawian, Pakistani, Taiwanese, South African and Russian textbooks.[51]

So widespread is this cultural bias towards representing men that the makers of the classic sci-fi action game series, *Metroid*, relied on it when they wanted to surprise their users. 'We wondered what would surprise everyone and talked about removing [main character] Samus's helmet. Then someone said, 'It would be a shocker if Samus turned out to be a woman!' they recalled in a recent interview.[52] And to make sure everyone really got it, they put her in a pink bikini and hip-jutting pose.

Metroid was – and remains – something of an outlier in gaming. Although a 2015 Pew Research Center report[53] found that equal numbers of American men and women play video games, only 3.3%[54] of the games spotlighted at press conferences during 2016's E3 (the world's largest annual gaming expo) starred female protagonists. This is actually lower than the figure for 2015 which, according to Feminist Frequency, was 9%.[55] If female playable characters do make it into a game they are still often framed as just another feature. At E3 2015 the director of *Fallout 4*, Todd Howard, revealed how easy it was to switch between male and female playable characters – only to switch back to the male version for the rest of the demo.[56] As Feminist Frequency remarked when they released their data on E3 2016, 'heroes are male by default'.[57]

The result of this deeply male-dominated culture is that the male experience, the male perspective, has come to be seen as universal, while the female experience – that of half the global population, after all – is seen as, well, niche. It is because what is male is universal that when a professor at Georgetown University named her literature course 'White Male Writers', she hit the headlines, while the numerous courses on 'female writers' pass unremarked.[58]

It is because what is male is universal (and what is female is niche) that a film about the fight of British women for their right to vote is slammed (in the *Guardian*, no less) as 'peculiarly hermetic' for not covering the First World War – sadly proving that Virginia Woolf's

1929 observation ('This is an important book, the critic assumes, because it deals with war. This is an insignificant book because it deals with the feelings of women in a drawing-room') is still relevant today.[59] It is why V. S. Naipaul criticises Jane Austen's writing as 'narrow', while at the same time no one is expecting *The Wolf of Wall Street* to address the Gulf War, or Norwegian writer Karl Ove Knausgaard to write about anyone but himself (or quote more than a single female writer) to receive praise from the *New Yorker* for voicing 'universal anxieties' in his six-volume autobiography.

It is why the England national football team page on Wikipedia is about the men's national football team, while the women's page is called the England women's national football team, and why in 2013 Wikipedia divided writers into 'American Novelists' and 'American Women Novelists'. It is why a 2015 study of multiple language Wikipedias found that articles about women include words like 'woman', 'female' or 'lady', but articles about men don't contain words like 'man', 'masculine' or 'gentleman' (because the male sex goes without saying).[60]

We class the fourteenth to seventeenth centuries as 'the Renaissance' even though, as social psychologist Carol Tavris points out in her 1991 book *The Mismeasure of Woman*, it wasn't a renaissance for women, who were still largely excluded from intellectual and artistic life. We call the eighteenth century 'the Enlightenment', even though, while it may have expanded 'the rights of man', it 'narrowed the rights of women, who were denied control of their property and earnings and barred from higher education and professional training'. We think of ancient Greece as the cradle of democracy although the female half of the population were explicitly excluded from voting.

In 2013, British tennis player Andy Murray was lauded across the media for ending Britain's '77-year wait' to win Wimbledon, when in fact Virginia Wade had won it in 1977. Three years later,

Murray was informed by a sports reporter that he was 'the first person ever to win two Olympic tennis gold medals' (Murray correctly replied that 'Venus and Serena have won about four each').[61] In the US it is a truth universally acknowledged that its soccer team has never won the World Cup or even reached the final – except it has. Its women's team has won four times.[62]

Recent years have seen some laudable attempts to address this relentless male cultural bias, but these are often met with hostility. When Thor was reinvented as a woman by Marvel Comics,[63] fans revolted – although as *Wired* magazine pointed out, 'no one uttered a peep' when Thor was replaced by a frog.[64] When the *Star Wars* franchise released two films in a row with a female lead howls of outrage reverberated around the manosphere.[65] One of the UK's longest-running television shows (*Doctor Who*) is a sci-fi fantasy series about a shape-shifting alien who periodically morphs into a new body, and the alien's first twelve incarnations were all male. But in 2017, for the first time, the doctor morphed into a woman. In response, former doctor Peter Davison expressed 'doubts' about the wisdom of casting a woman in the role of Doctor Who.[66] He preferred the idea of the doctor as 'a boy' and mourned 'the loss of a role model for boys'. Upset men took to Twitter calling for a boycott of the show, condemning the decision as 'PC' and 'liberal' virtue-signalling.[67]

Colin Baker, the body into whom the Peter Davison doctor had morphed, disagreed with his predecessor. Boys have 'had fifty years of having a role model', he argued. And in any case, he mused, do you have to be the same gender as someone to be a role model? 'Can't you be a role model as people?' Not really, Colin, because as we've seen, 'people' tends to be read as male. And in any case, while there is evidence that women can to a certain extent accept men as role models, men won't do the same for women. Women will buy books by and about men, but men won't buy books by and about

women (or at least not many).[68] When adventure video game series *Assassin's Creed* announced in 2014 that it would not be possible to play as a female assassin in their new cooperative multiplayer mode, some male players were pleased with the decision.[69] Playing as a woman would alienate them from the game, they argued.

Journalist Sarah Ditum has little time for this argument. 'Come on now,' she chided in a column. 'You've played games as a blue hedgehog. As a cybernetically augmented space marine. As a sodding dragon-tamer. […B]ut the idea that women can be protagonists with an inner life and an active nature is somehow beyond your imaginative capacities?'[70] Ditum is of course technically right. It *should* be easier to imagine yourself as a woman than as a blue hedgehog. But on the other hand she's also wrong, because that blue hedgehog has one particularly important similarity with male players, even more so than species alignment, and that is that Sonic the hedgehog is male. We know this because he isn't pink, he doesn't have a bow in his hair, and he doesn't simper. He is the standard, unmarked gender, not the atypical one.

This kind of negative reaction to the introduction of women is witnessed all over the cultural landscape. When in 2013 I campaigned to have a female historical figure on the back of English banknotes some men got so angry that they felt compelled to threaten me with rape, mutilation and death. Not all the men who disliked the campaign went that far, of course, but the sense of injustice was still clear in the more measured responses I got. I remember one man expostulating, 'but women are everywhere now!' Clearly, given I was having to campaign so hard for the inclusion of one woman, they aren't, but his perspective was nevertheless telling. These men were experiencing even minor female representation as an iniquity. As far as they were concerned, the playing field was already level, and the entirely male line-up was just an objective reflection of merit.

Before they caved, the Bank of England's case for their all-male line-up also rested on the meritocracy argument: historical figures were, they said, chosen using an 'objective selection criteria'. To join the 'gilded list' of 'key figures from our past', a person must fulfil the following: have broad name recognition; have good artwork; not be controversial; and have made 'a lasting contribution which is universally recognised and has enduring benefits'. Reading these subjective designations of worth, I realised how the Bank had ended up with five white men on its banknotes: the historical gender data gap means that women are just far less likely to be able to fulfil any of these 'objective' criteria.

In 1839 the composer Clara Schumann wrote in her diary, 'I once thought that I possessed creative talent, but I have given up this idea; a woman must not desire to compose – not one has been able to do it, and why should I expect to?' The tragedy is, Schumann was wrong. Women before her *had* been able to do it, and they included some of the most successful, prolific and influential composers of the seventeenth and eighteenth centuries.[71] It's just that they didn't have 'broad name recognition', because a woman barely has to die before she is forgotten – or before we consign her work to the gender data gap by attributing it to a man.

Felix Mendelssohn published six of his sister Fanny Hensel's pieces under his own name and in 2010 another manuscript previously thought to be his was proven to be Hensel's.[72] For years classical scholars argued that the Roman poet Sulpicia couldn't possibly have written the verses signed with her name – they were too good, not to mention too smutty.[73] Judith Leyster, one of the first Dutch women to be admitted to an artists' guild, was renowned in her time, but after her death in 1660 she was erased, her work attributed to her husband. In 2017, new works by nineteenth-century artist Caroline Louisa Daly were discovered – they had been previously attributed to men, one of whom was not even an artist.[74]

At the turn of the twentieth century, award-winning British engineer, physicist and inventor Hertha Ayrton remarked that while errors overall are 'notoriously hard to kill […] an error that ascribes to a man what was actually the work of a woman has more lives than a cat'. She was right. Textbooks still routinely name Thomas Hunt Morgan as the person who discovered that sex was determined by chromosomes rather than environment, despite the fact that it was Nettie Stevens' experiments on mealworms that established this – and despite the existence of correspondence between them where Morgan writes to ask Stevens for details of her experiment.[75] Cecilia Payne-Gaposchkin's discovery that the sun is predominantly composed of hydrogen is often credited to her male supervisor.[76] Perhaps the most famous example of this kind of injustice is Rosalind Franklin, whose work (she had concluded via her X-ray experiments and unit cell measurements that DNA consisted of two chains and a phosphate backbone) led James Watson and Francis Crick (now Nobel Prize-winning household names) to 'discover' DNA.

None of this means that the Bank of England deliberately set out to exclude women. It just means that what may seem objective can actually be highly male-biased: in this case, the historically widespread practice of attributing women's work to men made it much harder for a woman to fulfil the Bank's requirements. The fact is that worth is a matter of opinion, and opinion is informed by culture. And if that culture is as male-biased as ours is, it can't help but be biased against women. By default.

The case of the Bank's subjective selection criteria also shows how male default can be both a cause and a consequence of the gender data gap. By neglecting to account for the historical gender data gap, the Bank's selection procedure for historical figures was designed around the kind of success typically achieved by men; even a requirement as seemingly benign as that the figure

not be controversial, well, as the historian Laurel Thatcher Ulrich famously put it, 'well-behaved women seldom make history'. The result was that the Bank not only failed to correct for the historical gender data gap: it perpetuated it.

Such subjective designations of worth masquerading as objectivity crop up all over the place. In 2015 a British A level student called Jesse McCabe noticed that of the sixty-three set works included in her music syllabus, not a single one was by a woman. When she wrote to her exam board, Edexcel, they defended the syllabus. 'Given that female composers were not prominent in the western classical tradition (or others for that matter),' they wrote, 'there would be very few female composers that could be included.' The phrasing here is important. Edexcel doesn't mean that there simply aren't any female composers – after all, the *International Encyclopaedia of Women Composers* alone has more than 6,000 entries. What they are talking about here is 'the canon', that is, the body of works generally agreed to have been the most influential in shaping western culture.

Canon formation is passed off as the objective trickle-down of the musical marketplace, but in truth it is as subjective as any other value judgment made in an unequal society. Women have been locked out of the canon wholesale because what success looked like in composing has historically been almost impossible for women to achieve. For most of history, if women were allowed to compose at all, it was for a private audience and domestic setting. Large orchestral works, so crucial for the development of a composer's reputation, were usually off limits, considered 'improper'.[77] Music was an 'ornament' for women, not a career.[78] Even by the twentieth century, Elizabeth Maconchy (who was the first woman ever to chair the Composers' Guild of Great Britain), was being curtailed in her ambitions by publishers such as Leslie Boosey, who 'couldn't take anything except little songs from a woman'.

Even if the 'little songs' women were allowed to write were enough to earn you a place in the canon, women simply didn't have the resources or position to ensure their legacy. In her book *Sounds and Sweet Airs: The Forgotten Women of Classical Music*, Anna Beer compares the prolific seventeenth-century composer Barbara Strozzi (who 'had more music in print in her lifetime than any other composer of the era') to one of her male contemporaries, Francesco Cavalli. As head of music at St Mark's in Venice (a position not open to women at the time), Cavalli had the money and the stature to ensure all his works, including the many he did not publish in his lifetime, were kept in a library. He could pay for an archivist to look after them, and he could, and did, pay for the Masses he composed to be sung on the anniversary of his death. In the face of such inequality of resources, Strozzi never stood a chance of being remembered on an equal footing. And to continue to insist on the primacy of a canon that excludes women like her is to perpetuate the male-biased injustices of the past.

As well as going some way to explaining their exclusion from cultural history, the exclusion of women from positions of power is often given as an excuse for why, when we teach them about the past, we teach children almost exclusively about the lives of men. In 2013, a battle raged in Britain over what we mean by 'history'. On one side was the then British Secretary of State for Education, Michael Gove, brandishing his proposed new 'back to basics' national history curriculum.[79] An army of twenty-first-century Gradgrinds, he and his supporters insisted that children needed 'facts'.[80] They needed a 'foundation of knowledge'.

This 'foundation of knowledge', the 'basic' blocks of 'facts' which every child should know, was notable, amongst other gaps, for its almost wholesale absence of women. No women appeared in Key Stage 2 (ages seven to eleven) at all, other than two Tudor queens. Key Stage 3 (ages eleven to fourteen) included only five women,

four of whom (Florence Nightingale, Mary Seacole, George Eliot and Annie Besant) were lumped together under 'The Changing Role of Women' – rather implying, not without reason, that the rest of the curriculum was about men.

In 2009, prominent British historian David Starkey criticised female historians for, in his opinion, focusing too much on Henry VIII's wives rather than the king himself who, he railed, should be 'centre stage'.[81] Dismissing the 'soap opera' of his personal life as secondary to the formal political consequences of his rule, such as the Reformation, Starkey insisted that '[i]f you are to do a proper history of Europe before the last five minutes it is a history of white males because they were the power players, and to pretend anything else is to falsify'.

Starkey's position rests on the assumption that what takes place in the private realm is unimportant. But is that a fact? The private life of Agnes Huntingdon (born after 1320) is revealed through snippets in public documents from the court cases concerning her two marriages.[82] We discover that she was a victim of domestic abuse, and that her first marriage was disputed because her family disapproved of her choice. On the evening of 25 July 1345 she ran away from her second husband after he attacked her; later that night he turned up at her brother's house with a knife. Is the abuse (and lack of freedom of choice) of a fourteenth-century woman private irrelevancies, or part of the history of female subjugation?

The arbitrary division of the world into 'private' and 'public' is in any case arguably a false distinction. Invariably both bleed into each other. When I spoke to Katherine Edwards, a history teacher who was heavily involved in the fight against Gove's reforms, she pointed to recent research on women's role in the American Civil War. Far from being an irrelevance, 'women and their conception of their own role completely undermined the whole Confederate war effort'.

Elite women, brought up to believe absolutely in the myth of their own helplessness, simply could not get over their understanding of work as intrinsically unfeminine. Unable to bring themselves to take up the jobs vacated by enlisted men, they wrote to their husbands begging them to desert, to come home and protect them. Poorer women proved a headache in a more proactive way, as they organised resistance to Confederate policies, 'because they were starving basically, and they needed to feed their families'. Excluding women from an analysis of the outcome of the American Civil War not only constitutes a gender data gap, but also a data gap in the understanding of the construction of the United States itself. That seems like a 'fact' worth knowing.

The history of humanity. The history of art, literature and music. The history of evolution itself. All have been presented to us as objective facts. But the reality is, these facts have been lying to us. They have all been distorted by a failure to account for half of humanity – not least by the very words we use to convey our half-truths. This failure has led to gaps in the data. A corruption in what we think we know about ourselves. It has fuelled the myth of male universality. And that *is* a fact.

The persistence of this myth continues to affect how we see ourselves today – and if the past few years have shown us anything it is that how we see ourselves is not a minor concern. Identity is a potent force that we ignore and misread at our peril: Trump, Brexit and ISIS (to name just three recent examples) are global phenomena that have upended the world order – and they are all, at heart, identity-driven projects. But misreading and ignoring identity is exactly what obfuscating maleness under the guise of gender-neutral universality causes us to do.

A man I briefly dated tried to win arguments with me by telling me I was blinded by ideology. I couldn't see the world objectively, he said, or rationally, because I was a feminist and I saw everything

through feminist eyes. When I pointed out that this was true for him too (he identified as a libertarian) he demurred. No. That was just objective, common sense – de Beauvoir's 'absolute truth'. For him, the way he saw the world was universal, while feminism – seeing the world from a female perspective – was niche. Ideological.

I was reminded of this man in the wake of the 2016 US presidential election, when it felt you couldn't move for tweets, speeches and op-eds by (usually) white men decrying the ills of what they called 'identity politics'. Ten days after Donald Trump's victory, the *New York Times* published an article by Mark Lilla, professor of humanities at Columbia University, that criticised Clinton for 'calling out explicitly to African American, Latino, LGBT and women voters'.[83] This left out, he said, 'the white working class'. Lilla presented Clinton's 'rhetoric of diversity' as mutually exclusive with 'a large vision', linking this 'narrow' vision (clearly, Lilla has been reading his V. S. Naipaul) with what he felt he was witnessing with college students. Students today, he claimed, were so primed to focus on diversity that they 'have shockingly little to say about such perennial questions as class, war, the economy and the common good'.

Two days after this was published, ex-Democratic candidate Bernie Sanders was in Boston at a stop on his book tour[84] explaining that 'It is not good enough for someone to say, I'm a woman! Vote for me!'[85] In Australia, Paul Kelly, editor of the *Australian*, described Trump's victory as 'a revolt against identity politics',[86] while over in the UK, Labour MP Richard Burgon tweeted that Trump's inauguration was 'what can happen when centre/left parties abandon transformation of economic system and rely on identity politics'.[87]

The *Guardian*'s Simon Jenkins concluded the *annus horribilis* that was 2016 with a diatribe against 'the identity apostles', who had been 'over-defensive' of minorities, and thus killed off liberalism.

'I have no tribe,' he wrote. He could not 'join the prevailing hysteria'. What he wanted was 'to re-enact the glorious revolution of 1832' – which resulted in the extension of the British franchise to a few extra hundred thousand men of property.[88] Heady days, indeed.

These white men have in common the following opinions: that identity politics is only identity politics when it's about race or sex; that race and sex have nothing to do with 'wider' issues like 'the economy'; that it is 'narrow' to specifically address the concerns of female voters and voters of colour; and that working class means white working-class men. Incidentally, according to the US Bureau of Labor Statistics, the coal mining industry, which during the 2016 election became the shibboleth for (implicitly male) working-class jobs, provides 53,420 jobs in total, at a median annual wage of $59,380.[89] Compare this to the majority female 924,640-strong cleaning and housekeeper workforce, whose median annual income is $21,820.[90] So who's the real working class?

These white men also have in common that they are white men. And I labour this point because it is exactly their whiteness and maleness that caused them to seriously vocalise the logical absurdity that identities exist only for those who happen not to be white or male. When you have been so used, as a white man, to white and male going without saying, it's understandable that you might forget that white and male is an identity too.

Pierre Bourdieu wrote in 1977 that 'what is essential goes without saying because it comes without saying: the tradition is silent, not least about itself as a tradition'.[91] Whiteness and maleness are silent precisely because they do not need to be vocalised. Whiteness and maleness are implicit. They are unquestioned. They are the default. And this reality is inescapable for anyone whose identity does not go without saying, for anyone whose needs and perspective are routinely forgotten. For anyone who is used to jarring up against a world that has not been designed around them and their needs.

The way whiteness and maleness go without saying brings me back to my bad date (OK, dates), because it is intrinsically linked to the misguided belief in the objectivity, the rationality, the, as Catherine Mackinnon has it, 'point-of-viewlessness' of the white, male perspective. Because this perspective is not articulated as white and male (because it doesn't need to be), because it is the norm, it is presumed not to be subjective. It is presumed to be objective. Universal, even.

This presumption is unsound. The truth is that white and male is just as much an identity as black and female. One study which looked specifically at white Americans' attitudes and candidate preferences found that Trump's success reflected the rise of 'white identity politics', which the researchers defined as 'an attempt to protect the collective interests of white voters via the ballot box'.[92] White identity, they concluded, 'strongly predicts a preference for Trump'. And so did male identity. Analysis of how gender affected support for Trump revealed that 'the more hostile voters were toward women, the more likely they were to support Trump'.[93] In fact, hostile sexism was nearly as good at predicting support for Trump as party identification. And the only reason this is a surprise to us is because we are so used to the myth of male universality.

The presumption that what is male is universal is a direct consequence of the gender data gap. Whiteness and maleness can only go without saying because most other identities never get said at all. But male universality is also a *cause* of the gender data gap: because women aren't seen and aren't remembered, because male data makes up the majority of what we know, what is male *comes* to be seen as universal. It leads to the positioning of women, half the global population, as a minority. With a niche identity and a subjective point of view. In such a framing, women are set up to be forgettable. Ignorable. Dispensable – from culture, from history, from data. And so, women become invisible.

Invisible Women is the story of what happens when we forget to account for half of humanity. It is an exposé of how the gender data gap harms women when life proceeds, more or less as normal. In urban planning, politics, the workplace. It is also about what happens to women living in a world built on male data when things go wrong. When they get sick. When they lose their home in a flood. When they have to flee that home because of war.

But there is hope in this story too, because it's when women are able to step out from the shadows with their voices and their bodies that things start to shift. The gaps close. And so, at heart, *Invisible Women* is also a call for change. For too long we have positioned women as a deviation from standard humanity and this is why they have been allowed to become invisible. It's time for a change in perspective. It's time for women to be seen.

PART I

Daily Life

CHAPTER 1

Can Snow-Clearing be Sexist?

It all started with a joke. It was 2011 and officials in the town of Karlskoga, in Sweden, were being hit with a gender-equality initiative that meant they had to re-evaluate all their policies through a gendered lens. As one after another of their policies were subjected to this harsh glare, one unfortunate official laughed that at least snow-clearing was something the 'gender people' would keep their noses out of. Unfortunately for him, his comment got the gender people thinking: is snow-clearing sexist?

At the time, in line with most administrations, snow-clearing in Karlskoga began with the major traffic arteries, and ended with pedestrian walkways and bicycle paths. But this was affecting men and women differently because men and women travel differently.

We lack consistent, sex-disaggregated data from every country, but the data we do have makes it clear that women are invariably more likely than men to walk and take public transport.[1] In France, two-thirds of public transport passengers are women; in Philadelphia and Chicago in the US, the figure is 64%[2] and 62%[3] respectively. Meanwhile, men around the world are more likely to drive[4]

and if a household owns a car, it is the men who dominate access to it[5] – even in the feminist utopia that is Sweden.[6]

And the differences don't stop at the mode of transport: it's also about *why* men and women are travelling. Men are most likely to have a fairly simple travel pattern: a twice-daily commute in and out of town. But women's travel patterns tend to be more complicated. Women do 75% of the world's unpaid care work and this affects their travel needs. A typical female travel pattern involves, for example, dropping children off at school before going to work; taking an elderly relative to the doctor and doing the grocery shopping on the way home. This is called 'trip-chaining', a travel pattern of several small interconnected trips that has been observed in women around the world.

In London women are three times more likely than men to take a child to school[7] and 25%[8] more likely to trip-chain; this figure rises to 39% if there is a child older than nine in the household. The disparity in male/female trip-chaining is found across Europe, where women in dual-worker families are twice as likely as men to pick up and drop off children at school during their commute. It is most pronounced in households with young children: a working woman with a child under the age of five will increase her trip-chaining by 54%; a working man in the same position will only increase his by 19%.[9]

What all these differences meant back in Karlskoga was that the apparently gender-neutral snow-clearing schedule was in fact not gender neutral at all, so the town councillors switched the order of snow-clearing to prioritise pedestrians and public-transport users. After all, they reasoned, it wouldn't cost any more money, and driving a car through three inches of snow is easier than pushing a buggy (or a wheelchair, or a bike) through three inches of snow.

What they didn't realise was that it would actually end up saving them money. Since 1985, northern Sweden has been collecting

data on hospital admissions for injuries. Their databases are dominated by pedestrians, who are injured three times more often than motorists in slippery or icy conditions[10] and account for half the hospital time of all traffic-related injuries.[11] And the majority of these pedestrians are women. A study of pedestrian injuries in the Swedish city area of Umeå found that 79% occurred during the winter months, and that women made up 69% of those who had been injured in single-person incidents (that is, those which didn't involve anyone else). Two-thirds of injured pedestrians had slipped and fallen on icy or snowy surfaces, and 48% had moderate to serious injuries, with fractures and dislocations being the most common. Women's injuries also tended to be more severe.

A five-year study in Skåne County uncovered the same trends – and found that the injuries cost money in healthcare and lost productivity.[12] The estimated cost of all these pedestrian falls during just a single winter season was 36 million Kronor (around £3.2 million). (This is likely to be a conservative estimate: many injured pedestrians will visit hospitals that are not contributing to the national traffic accident register; some will visit doctors; and some will simply stay at home. As a result, both the healthcare and productivity costs are likely to be higher.)

But even with this conservative estimate, the cost of pedestrian accidents in icy conditions was about twice the cost of winter road maintenance. In Solna, near Stockholm, it was three times the cost, and some studies reveal it's even higher.[13] Whatever the exact disparity, it is clear that preventing injuries by prioritising pedestrians in the snow-clearing schedule makes economic sense.

A brief snow-clearing coda comes from the alt-right blogosphere,[14] which reacted with glee when Stockholm failed to execute a smooth transfer to gender-equal snow-clearing in 2016: an unusually high snowfall that year left roads and pavements covered in snow and commuters unable to get to work. But in their rush to

celebrate the foundering of a feminist policy what these right-wing commentators failed to note was that this system had already been working successfully in Karlskoga for three years.

They also, in any case, reported the issue inaccurately. Heat St claimed[15] that the policy was a failure in part because 'injuries requiring a hospital visit reportedly spiked' – neglecting to note that it was pedestrian injuries[16] that had 'spiked', illustrating that the problem was not that pedestrians had been prioritised, but that snow-clearing as a whole had not been conducted effectively. Motorists may not have been travelling well, but neither was anyone else.

The following winter was much more successful: when I spoke to Daniel Helldén, a local councillor in Stockholm's traffic department, he told me that on the 200 km of joint cycle and pedestrian lanes that are now being cleared with special machines ('which make them as clean as in the summer') accidents have gone down by half. 'So it's a really good effect.'

The original snow-clearing schedule in Karlskoga hadn't been deliberately designed to benefit men at the expense of women. Like many of the examples in this book, it came about as a result of a gender data gap – in this instance, a gap in perspective. The men (and it would have been men) who originally devised the schedule knew how they travelled and they designed around their needs. They didn't deliberately set out to exclude women. They just didn't think about them. They didn't think to consider if women's needs might be different. And so this data gap was a result of not involving women in planning.

Inés Sánchez de Madariaga, an urban-planning professor at Madrid's Technical University, tells me that this is a problem in transport planning more generally. Transport as a profession is 'highly male-dominated', she explains. In Spain, 'the Ministry of Transportation has the fewest women of all the ministries both in

political and technical positions. And so they have a bias from their personal experience.'

On the whole, engineers focus mostly on 'mobility related to employment'. Fixed labour times create peak travel hours, and planners need to know the maximum capacity that infrastructure can support. 'So there's a technical reason for planning for peak hours,' Sánchez de Madariaga acknowledges. But needing to plan for peak hours doesn't explain why female travel (which doesn't tend to fit into peak hours, and therefore 'doesn't affect the maximum capacity of systems') gets ignored.

The available research makes bias towards typically male modes of travel clear. The United Nations Commission on the Status of Women found 'a male bias' in transport planning and a failure to address gender 'in system configuration'.[17] A 2014 EU report on Europeans' satisfaction with urban transport describes male travel patterns as 'standard' even as it decries the failure of European public transport systems to adequately serve women.[18] More galling are common planning terms such as 'compulsory mobility', which Sánchez de Madariaga explains is a commonly used umbrella concept for 'all trips made for employment and educational purposes'.[19] As if care trips are not compulsory, but merely expendable 'me time' for dilettantes.

The bias is also clear in government spending priorities. Stephen Bush, the *New Statesman*'s political correspondent, pointed out in a July 2017 article that although the Conservative government has consistently spouted austerity rhetoric, the last two Tory chancellors have made an exception for road-building, on which both have spent lavishly.[20] With living standards falling and Britain already having a fairly serviceable road infrastructure there is a whole host of areas that seem a potentially wiser investment, but somehow, both times, for both men, roads have seemed the obvious choice. Meanwhile, by 2014, 70% of councils had cut bus funding (the

most feminised form of transport), with a £19 million cut in 2013 alone, and bus prices had been rising every year.[21]

British politicians are not alone here. A 2007 World Bank report revealed that 73% of World Bank transport funding is for roads and highways, most of them rural or linking up cities.[22] Even where roads are the right investment choice, where the proposed road leads is not a gender-neutral decision. In an illustration of how important it is that development projects are based on sex-disaggregated data, another World Bank report recounted the disagreement over a proposed road in one village in Lesotho. Women wanted the road to be constructed in one direction to 'facilitate their access to the nearest village with basic services'; men wanted it built in the opposite direction 'to enable them to reach the larger town and market more easily on horseback'.[23]

The gender gap in travel data continues with the intentional omission in many transport surveys of shorter pedestrian and other 'non-motorised' trips.[24] These trips, says Sánchez de Madariaga, are 'not considered to be relevant for infrastructure policymaking'. Given women generally walk further and for longer than men (in part because of their care-giving responsibilities; in part because women tend to be poorer), this marginalisation of non-motorised travel inevitably affects them more. Ignoring shorter walking trips also adds to the gap in trip-chaining data, as this kind of travel usually involves at least one journey on foot. In short, the assumption that shorter walking trips are irrelevant to infrastructure policy is little short of an assumption that women are irrelevant to infrastructure policy.

But they aren't. Men tend to travel on their own, but women travel encumbered – by shopping, by buggies, by children or elderly relatives they are caring for.[25] A 2015 survey on travel in London found that women are 'significantly less likely than men to be satisfied with the streets and pavements after their last journey by

foot', perhaps reflecting the reality that not only are women more likely to walk than men but also that women are more likely to be pushing prams and therefore be more affected by inadequate walkways.[26] Rough, narrow and cracked pavements littered with ill-placed street furniture combine with narrow and steep steps at numerous transit locations to make travelling around a city with a buggy 'extremely difficult', says Sánchez de Madariaga, who estimates that it can take up to four times as long. 'So what do young women with small kids do?'

Valuing cars over pedestrians is not inevitable. In Vienna 60% of all journeys are made on foot, in no small part because the city takes gender planning seriously. Since the 1990s Vienna's head of gender planning, Eva Kail, has been collecting data on pedestrian travel and has installed the following improvements: improved and signed crossing locations (plus forty additional crossings); retrofitted steps with ramps for prams and bikes; widened 1,000 metres of pavement; and increased pedestrian street lighting.[27]

The mayor of Barcelona, Ada Colau, has shown similar determination to give her city back to pedestrians, creating what are called *superilles* or 'superblocks' – squared-off sections of the city with low speed limits open only to local traffic, with roads where pedestrians have equal priority with cars. Another example of easy changes that can be implemented to accommodate female travel patterns comes via London, where in 2016 the 'hopper fare' was introduced to the bus network.[28] Previously, every time a user boarded a bus they were charged for a new journey, but under the new system users can now make two trips in one hour for the price of one. This change is particularly helpful for women because they were disproportionately penalised by the old charging system. This is not only because of women being more likely to trip-chain, but also because women make up the majority (57%) of London's bus

users (partly because it's cheaper, partly because the bus is perceived as more child-friendly), and are more likely to have to transfer (which under the old system counted as a new trip).

The reason women are more likely to have to transfer is because, like most cities around the world, London's public transport system is radial.[29] What this means is that a single 'downtown' area has been identified and the majority of routes lead there. There will be some circular routes, concentrated in the centre. The whole thing looks rather like a spider's web, and it is incredibly useful for commuters, who just want to get in and out of the centre of town. It is, however, less useful for everything else. And this useful/not so useful binary falls rather neatly onto the male/female binary.

But while solutions like London's hopper fare are an improvement, they are by no means standard practice worldwide. In the US, while some cities have abandoned charging for transfers (LA stopped doing this in 2014), others are sticking with it.[30] Chicago for example, still charges for public transport connections.[31] These charges seem particularly egregious in light of a 2016 study which revealed quite how much Chicago's transport system is biased against typical female travel patterns.[32] The study, which compared Uberpool (the car-sharing version of the popular taxi app) with public transport in Chicago, revealed that for trips downtown, the difference in time between Uberpool and public transport was negligible – around six minutes on average. But for trips between neighbourhoods, i.e. the type of travel women are likely to be making for informal work or care-giving responsibilities, Uberpool took twenty-eight minutes to make a trip that took forty-seven minutes on public transport.

Given women's time poverty (women's paid and unpaid work combines into a longer working day than men's), Uberpool might seem attractive.[33] Except it costs around three times more than public transport and women are also cash poor compared to men:

around the world women have less access to household finances than men, while the global gender pay gap currently stands at 37.8% (it varies hugely from country to country, being 18.1% in the UK; 23% in Australia; and 59.6% in Angola).[34]

There is, of course, an issue of resources here, but the problem is, to a certain extent, one of attitude and priorities. Although McKinsey estimates that women's unpaid care work contributes $10 trillion to annual global GDP,[35] trips made for paid work are still valued more than trips made for unpaid care work.[36] But when I ask Sánchez de Madariaga if, in a city like London or Madrid, there is an economic argument for providing transport that caters for women's care responsibilities she replied immediately. 'Absolutely. Women's employment is a really important input to GDP. For every percentage increase in women's employment there is a greater increase in GDP. But for women to work, the city has to support this work.' And one of the key ways to do this is to design transport systems that enable women to do their unpaid work and still get to the office on time.

When it comes to fixed infrastructure like subways and trains, Sánchez de Madariaga explains, there is not much you can easily or cheaply do to address this historical bias. 'You can improve their accessibility,' she says and that's about it. Buses, on the other hand, are flexible and their routes and stops can and should be 'moved and adjusted for need', says Sánchez de Madariaga. This is, in fact, what Ada Colau has done in Barcelona, by introducing a new orthogonal bus route (a grid rather than a spiderweb, which is more useful for trip-chaining). Sánchez de Madariaga also argues that public transport needs to develop 'intermediate services, something between a car and a bus. In Mexico they have something called *terceros*, which are really small, like a mini mini minibus. And they have shared taxis. These have a lot of flexibility, and, I think, could and should be developed to support women's mobility.'

While much of the historical gender data gap in travel planning has arisen simply because the idea that women might have different needs didn't occur to the (mainly) male planners, there is another, less excusable, reason for it, and that is that women are seen as, well, just more *difficult* to measure. 'Women have much more complicated travel patterns,' explains Sánchez de Madariaga, who has designed a survey to measure women's care travel. And on the whole, transport authorities aren't interested in women's 'atypical' travel habits. Anastasia Loukaitou-Sideris, a professor of urban planning at UCLA, tells me that 'oftentimes there is the perception from the part of transit operators that everyone has universal needs. Men, women, everything is the same. And this is completely untrue.' She laughs in exasperation. 'Talking to women riders they bring up a whole slew of different needs that are not being taken care of.'

To make matters worse, transport authorities are compounding the existing gender data gap by failing to separate the data they *do* have by sex. The annual transport statistics report[37] created by the UK government's Department of Transport includes a single statistic (on the gender breakdown of driving-test pass rates – in 2015/16 44% of women passed versus 51% of men), and a link to a page on a government website that hosts a report on gender and walking. The report has nothing to say on the gender breakdown of bus or rail usage, for example, even though this information is vital for planning a transport system that properly serves all its users.

India's public transport agencies also don't separate their data by sex,[38] while a recent EU report bemoaned the paucity of gender-sensitive transport data, explaining that 'this kind of data is not collected on a regular basis in the majority of European countries.'[39] As in the UK, the US's Transport Statistics Annual Report only mentions women twice: once in relation to driving licences and once in

relation to walking.[40] Unlike the UK, however, these references are not even presented as usable statistics, just generalised statements.

A more hidden data gap comes courtesy of the way transport agencies around the world present their data. On the whole, all travel for paid work is grouped together into one single category, but care work is subdivided into smaller categories, some of which, like 'shopping', aren't distinguished from leisure. This is failing to sex-disaggregate by proxy. When Sánchez de Madariaga collected care-related travel data in Madrid, she found that the number of trips made for caring purposes almost equalled those made for employment purposes. And when she further refined the data by sex-disaggregating it, she found that care was 'the single and foremost purpose of travel for women, in much the same way as employment is the main purpose of men's travel'. If all travel surveys were to do this, she argues, planners would be forced to take care travel as seriously as employment travel.

If we really want to start designing transport systems that serve women as well as men, it's no good designing transport infrastructure in isolation, cautions Sánchez de Madariaga, because women's mobility is also an issue of overarching planning policy: specifically, the creation of 'mixed use' areas. And mixed-use areas fly in the face of traditional planning norms that, in many countries, legally divide cities into commercial, residential and industrial single-use areas, a practice that is called zoning.

Zoning dates back to antiquity (what was allowed on either side of the city walls, for example), but it wasn't until the Industrial Revolution that we started to see the kind of explicit division of what could be built where that legally separated where you live from where you might work. And, with its oversimplified categories, this kind of zoning has woven a male bias into the fabric of cities around the world.

Zoning laws are based on, and prioritise the needs of, a bread-winning heterosexual married man who goes off to work in the morning, and comes home to the suburbs to relax at night. This is, explains Sánchez de Madariaga, 'the personal reality of most decision-makers in the field', and the idea that the home is mostly a place for leisure 'continues to underpin planning practices throughout the world.'[41]

But if for these decision-makers the home is 'a respite from paid labour' and 'a place for leisure', that is far from its role in most women's lives. Globally women do three times the amount of unpaid care work men do;[42] according to the IMF, this can be further subdivided into twice as much childcare and four times as much housework.[43] In Katebe, a town in central Uganda, the World Bank found that after spending nearly fifteen hours on a combination of housework, childcare, digging, preparing food, collecting fuel and water, women were unsurprisingly left with only around thirty minutes of leisure time per day.[44] By contrast, men, who spent an hour less than women per day digging, negligible amounts of time on housework and childcare, and no time at all on collecting fuel and water, managed to find about four hours per day to spend on leisure. The home may have been a place of leisure for him – but for her? Not so much.

In any case, in most families both parents work, and with women in heterosexual couples being the most likely to have primary caring responsibilities over children and elderly relatives, the legal separation of the home from formal workplaces can make life incredibly difficult. Those who have to accompany children and sick relatives around the peripheries of an urban area poorly served by public transport infrastructure are forgotten. The truth is that most zoning ordinances do not reflect women's lives (or even many men's lives).

The impact of the kind of lazy unthinking that positions the home as a place of leisure can be severe. In 2009, Brazil launched

a public housing scheme called Minha Casa, Minha Vida (My House, My Life). The plan was to help those (at the time an estimated 50 million people) living in inadequate housing.[45] It hasn't exactly worked out that way.

The stereotypical image of Brazil's *favelas* is one of substandard slums, of crime-ridden areas of poverty and lawlessness, where cowed residents live in fear of prowling gangs. There is a grain of truth to this stereotype, but for many *favela* residents, the reality is very different, and the homes they live in are simply the community-built social housing the state has failed to provide. They have grown in response to need, and are generally located in convenient locations, for both work and transport.

The same cannot be said for the Minha Casa, Minha Vida (MCMV) complexes, which have mostly been built on the far edges of the West Zone, an area which in 2010 was described by Antônio Augusto Veríssimo, director of Rio's housing ministry, as a '*região dormitório*', a dormant region, because of its lack of jobs.[46] In fact, Veríssimo discouraged the building of public housing in this area, for fear of creating '*mais guetos de pobreza*' – more ghettos of poverty. Research from the London School of Economics has also found that the majority of those who have been resettled have been moved much further from their original homes than the 7 km distance allowed under municipal law.[47]

Luisa, forty-two, used to live in a *favela* in Rio's wealthy South Zone, where, along with the Central and North Zones, the majority of jobs in Rio are to be found. 'I walked out of my door and was practically already at work,' she told a researcher for the Heinrich Böll Foundation.[48] 'There was transportation going everywhere. I didn't have to walk for miles just to get to a bus stop.' She now lives in an MCMV condo in Campo Grande, in Rio's underdeveloped West Zone, more than 50 km away from her old home.

With no jobs in the immediate vicinity, residents must travel up to three hours to the North and Central Zones using a transport infrastructure that can be described as limited at best. Over 60% of the new housing units are a thirty-minute walk from the nearest train or metro.[49] And the failure to provide adequate public transport for those relocated from the centre to the outskirts of Rio impacts on women in particular because Rio follows the global trend of men dominating car ownership: 71% of cars are owned by men, and men are twice as likely as women to travel using individual vehicles.[50]

It also particularly impacts on women because of their unpaid care-work responsibilities. Melissa Fernández Arrigoitia, a researcher at LSE, told me about the panic of a woman she interviewed who had just been told that she was being moved to an MCMV complex. Pregnant and already a mother of two, she was only able to work because she could rely on her mother for childcare. Being moved 70 km away from her mother and her workplace would make keeping her job impossible. And in the new MCMV complexes what little childcare provision exists has 'not been renovated or expanded to attend to the new residents'.[51]

The failure to provide childcare is exacerbated by the design of the government's new complexes. The apartments themselves have been designed for traditional nuclear families – but the nuclear family is by no means the standard family unit in a *favela*. 'It's very rare that you go into a home in a *favela* and there aren't three generations living there,' says Dr Theresa Williamson, a Rio-based urban planning expert, adding that she's 'never seen an elderly person living on their own in a *favela*'. Similarly, the majority of the households Arrigoitia interviewed were single mothers, often with both children and an older parent living with them. But the standardised design of these 'super tiny' housing units 'didn't respond at all to the potential variety of families', and a side effect is that the childcare solution

that intergenerational *favela* living often provides has been excluded from the new complexes by design.

As for public space in the MCMV complexes, this is more or less limited to 'huge car parks', despite the fact that very few people have cars, and 'horribly maintained playgrounds' with equipment that is so cheap it is destroyed within a couple of months (and not replaced). The complexes seem designed with privacy rather than community in mind. For the families used to the intimacy of the *favela* where, explains Williamson, 'your kid doesn't necessarily even need childcare after a certain age, because everybody is always watching them', this often translates into isolation and fear of crime. The upshot is that 'kids aren't outside as much, they stay in their apartments'. And 'suddenly women do need to be watching their kids in a way they didn't used to in the *favela*'. Suddenly they need childcare. And they don't have any.

This isn't even an issue of resources. It's an issue of priorities. Brazil spent millions on public transport infrastructure in the run-up to the 2014 World Cup and 2016 Olympics. The money was there, it was just being spent elsewhere. LSE Cities research found that the new Bus Rapid Transit corridors tended to privilege areas where Olympic facilities were located, leaving 'the problem of collective transport between the poorer resettlements and downtown […] unattended'.[52] Furthermore, according to residents, government relocation priorities seemed to be less about helping those who needed better housing and more about making way for the upcoming World Cup and Olympics infrastructure development.

And so the women pay. Cristine Santos lost her job in a market in Nova Iguaçu after she was moved to the Vivenda Das Patativas complex in Campo Grande. 'I had to take three buses,' she explained.[53] Another woman was so exhausted from her daily commute of up to six hours, that she had a near-fatal car

accident.[54] With few other options open to them women have taken to setting up shop in their new homes, selling drinks, preparing lunch plates, cutting people's hair. But they have to do it in the knowledge that it could get them evicted, because in doing so they are flouting zoning regulations. Turning your home into your workplace is an option in *favela* living because there are no zoning regulations in place: the whole area is already technically illegal. This is not the case with the government's public housing, where, being a residential zone, running a business from your home is strictly forbidden.

So, to sum up, the Brazilian government moved women away from the formal workplace (and indeed the informal workplace: women dominate Brazil's 7.2 million domestic workers) and provided them with inadequate public transport and no childcare.[55] In so doing, they practically forced women to turn their homes into their workplace, by making this the one option that is realistically open to them. And they've made it illegal.

Public housing doesn't have to be this way: but the alternative does require thought. When Vienna's public officials decided to build a new housing complex in 1993, they first defined 'the needs of the people using the space' and then looked for technical solutions to meet those needs, explains Eva Kail.[56] What this meant was collecting data, specifically sex-disaggregated data, because the 'people' this housing was intended to serve were women.

Surveys compiled at the time by Austria's national statistics agency revealed that women spent more time per day than men on household chores and childcare.[57] (According to the latest World Economic Forum figures Austrian women spend double the time men spend on unpaid work, and more time overall on paid and unpaid work combined.)[58] And so, explains Kail, officials designed the housing complex Frauen-Werk-Stadt I (Women-Work-City I – there has since been a II and a III) to cater for women's caring needs.

First came the location, which, Kail says, was carefully chosen to make it easier for women to carry out their caring responsibilities. The complex is right next to a tram stop, has a kindergarten on-site and is close to schools, meaning children can travel on their own from an early age (Sánchez de Madariaga tells me that one of the biggest time drains for women is 'escorting kids to school, to doctors, and to extracurricular activities'). A doctor's practice, a pharmacy and commercial space for other shops are all included within the complex, and there is a large supermarket nearby. It is the ultimate in mixed-use design.

The design of FWS I is, in fact, rather like a purpose-built *favela*. It prioritises community and shared space. Interconnected buildings with a maximum of four units per floor stand around a series of shared courtyards (complete with grassy areas and children's play spaces) which are visible from any unit in the project. Meanwhile, transparent stairwells visible to the outdoors, high levels of lighting in public spaces, and well-lit car parking accessible only via flats, were all designed to promote a sense of safety.[59] Another housing complex in Vienna (Autofreie Mustersiedlung) dispensed with parking spaces altogether, bypassing the zoning rule that specifies one car parking space per new apartment.[60] They instead spent the money on communal rooms and additional play areas. The complex was not specifically aimed at women, but given women are less likely to drive and more likely to care for children than men, the outcome is nevertheless one that caters to women's housing and care needs.

Care work is also built into the interior of the open-floor plan FWS I flats. The kitchen is at the heart of each flat, its visible lines of sight to the rest of the home mirroring the outer courtyard design. This not only enables women to keep an eye on children while working in the kitchen, it also places housework at the heart of the house: a subtle challenge to the idea that housework is solely

a woman's responsibility. Compare this to the tendency a local official in Philadelphia revealed she had to repeatedly check in developers of putting kitchens up on a third floor with no elevator: 'Do you want to carry your groceries and strollers up to the third floor?' she points out.[61]

CHAPTER 2

Gender Neutral With Urinals

In April 2017 veteran BBC journalist Samira Ahmed wanted to use a toilet. She was at a screening of *I Am Not Your Negro* at London's famous Barbican arts centre, and it was the interval. Any woman who has ever been to the theatre knows what this means: a rush as soon as the lights go up to try to beat the inevitable queue that will soon be snaking it way across the foyer floor.

Women are used to queueing when they go out. It's frustrating and puts a dampener on their evening. No nice interval chit-chat about the show with friends over a drink, just dull, tedious lining up, occasionally leavened by the knowing eye rolls they share with their fellow waiting women.

But this evening was different. This evening, the queue was worse than usual. Far worse. Because in an almost comically blatant display of not having thought about women at all, the Barbican had turned both the male and female toilets gender neutral simply by replacing the 'men' and 'women' signage with 'gender neutral with urinals' and 'gender neutral with cubicles'. The obvious happened. Only men were using the supposedly 'gender neutral

with urinals' and everyone was using the 'gender neutral with cubicles'.

Rather than rendering the toilets actually gender neutral by this move, they had simply increased the provision for men: women are generally not able to use urinals, while men are of course able to use both urinals and cubicles. There were also no sanitary bins in the 'gender neutral with urinals' toilets. 'Ah the irony of having to explain discrimination having just been to see *I Am Not Your Negro* IN YOUR CINEMA', Ahmed tweeted, suggesting that the solution would be to 'turn the gents into gender-neutral loos. There's NEVER such a queue there & you know it.'[1]

Although this truism seems to have passed the Barbican's heavily male-dominated management team by, it is true that the perennial queueing problem is one that men do tend to know about – given it so often spills out of the main bathroom door, it's hard for even the most oblivious man to miss.[2] But fewer people – men or women – know exactly why it happens. There is a tendency (as ever) to blame the women rather than male-biased design. But male-biased design is in fact exactly what the problem is here.

On the face of it, it may seem fair and equitable to accord male and female public toilets the same amount of floor space – and historically, this is the way it has been done. 50/50 division of floor space has even been formalised in plumbing codes. However, if a male toilet has both cubicles and urinals, the number of people who can relieve themselves at once is far higher per square foot of floor space in the male bathroom than in the female bathroom. Suddenly equal floor space isn't so equal.

But even if male and female toilets had an equal number of stalls, the issue wouldn't be resolved, because women take up to 2.3 times as long as men to use the toilet.[3] Women make up the majority of the elderly and disabled, two groups that will tend to need more time in the toilet. Women are also more likely to be

accompanied by children, as well as disabled and older people.[4] Then there's the 20–25% of women of childbearing age who may be on their period at any one time, and therefore needing to change a tampon or a sanitary pad.

Women may also in any case require more trips to the bathroom than men: pregnancy significantly reduces bladder capacity, and women are eight times more likely to suffer from urinary-tract infections than men which again increases the frequency with which a toilet visit is needed.[5] In the face of all these anatomical differences, it would surely take a formal (rather than substantive) equality dogmatist to continue to argue that equal floor space between men and women is fair.

It gets a lot worse than supposedly equal provision being in fact male-biased. A third of the world's population lack adequate toilet provision at all.[6] According to the UN, one in three women lack access to safe toilets,[7] and WaterAid reports that girls and women collectively spend 97 billion hours a year finding a safe place to relieve themselves.[8] The lack of adequate toilet provision is a public health problem for both sexes (for example, in India, where 60% of the population does not have access to a toilet,[9] 90% of surface water is contaminated[10]), but the problem is particularly acute for women, in no small part because of the attitude that men can 'go anywhere',[11] while for women to be seen urinating is shameful. Women get up before dawn and then wait for hours until dusk to go out again in search of a relatively private place to urinate or defecate.[12] And this isn't just a problem in poor countries: Human Rights Watch spoke to young girls working in tobacco fields in America and found that they would 'refrain from relieving themselves at all during the day – aided by avoiding drinking liquids, which increased their risk of dehydration and heat illness'.[13]

This affects women's paid labour: women make up 91% of the 86% of Indians who work in the informal economy. Many of these

women work as market vendors, and no public toilets means they have nowhere to go during the workday.[14] In Afghanistan, female police officers go to the toilets in pairs, because their changing and toilet facilities (described by an international advisor to Human Rights Watch as 'a site of harassment') often have peepholes or doors which don't lock. The lack of safe toilet provision in fact often prevents women from joining the force at all, and this in turn has had a significant impact on how the police respond to crimes against women and girls.[15]

Despite women's arguably greater need for public sanitary facilities, however, men are often the ones who are better provided for. More than half of Mumbai's 5 million women do not have an indoor toilet and there are no free public toilets for women. Meanwhile, free urinals for men run into the thousands.[16] A typical Mumbai slum might have six bathrooms for 8,000 women,[17] and government figures from 2014 revealed that the city as a whole has '3,536 public restrooms that women share with men, but not a single women's-only facility – not even in some police stations and courts'.[18]

A 2015 survey found that 12.5% of women in Mumbai's slums defecate in the open at night: they 'prefer to take this risk to walking 58 metres, the average distance of the community toilet from their homes'.[19] But defecating in the open isn't really much safer for women: there is a real danger of sexual assault from men who lurk near and on the routes to areas which are known to be used by women when they need to relieve themselves.[20] The level of violation ranges from voyeurism (including being masturbated at) to rape – and in extreme cases, to murder.

Accurate data on the level of sexual harassment and assault faced by women as they seek to engage in what should be a mundane activity is hard to come by, in no small degree because of the shame surrounding the issue. Few women are willing to talk about something they may well be blamed for 'encouraging'.[21] But what

data does exist makes it clear that a failure to provide adequate sanitation is a feminist issue.

A 2016 study found that Indian women who use fields to relieve themselves are twice as likely to face non-partner sexual violence as women with a household toilet.[22] Following the 2014 murder of two girls aged twelve and fourteen in Uttar Pradesh,[23] there was a brief flurry of national focus on the lack of adequate toilet provision for women, and in December 2014, Bombay's high court ordered all municipal corporations to provide safe and clean toilets for women near main roads.[24] Ninety-six potential sites were identified and Bombay's local government promised 50 million rupees (around £550,000) to build new toilets. But a year later, reported online women's rights magazine *Broadly*, not a single brick had been laid.[25] The fund allocation lapsed in 2016.[26]

Local governments that fail to provide public toilets may believe that they are cutting costs, but a 2015 Yale study suggests that this is a false economy. The study authors developed a mathematical model linking the 'risk of sexual assault to the number of sanitation facilities and the time a woman must spend walking to a toilet', and calculated the tangible costs (lost earnings, medical, court and prison expenses) and intangible costs (pain and suffering, risk of homicide) of sexual assault versus the cost of installing and maintaining toilets.

They applied their model to Khayelitsha, a township in South Africa, which has an estimated 5,600 toilets for a population of 2.4 million, resulting, the authors claimed, in 635 sexual assaults at a cost of $40 million each year. Increasing the number of toilets to 11,300, at a direct cost of $12 million, would almost half the average distance to a toilet and result in a 30% decrease in sexual assault. According to the mathematical model, the reduced social and policing costs more than offset the additional cost of providing toilets, leaving the township $5 million better off. These

figures, they added, were conservative, since their costings had not included 'the many additional health benefits of improving sanitation in resource-constrained urban areas'.[27]

And there *are* many additional health benefits, particularly for women. Women get bladder and urinary-tract infections from holding in their urine; others suffer from dehydration or chronic constipation.[28] Women who defecate outdoors are at risk of a range of infections and diseases, including pelvic inflammatory disease, worm infections, hepatitis, diarrhoea, cholera, polio and waterborne diseases. Some of these diseases kill millions of people (particularly women and children) every year in India alone.[29]

Health problems arising from a lack of public sanitary provision are not restricted to low-income countries. Canadian and British studies have revealed that referrals for urinary-tract infections, problems with distended bladders, and a range of other uro-gynaecological problems have increased proportionately to toilet closure; similarly, research shows that the chances of streptococcal toxic shock syndrome from sanitary protection are increased 'if there are no toilets available to change tampons during menstruation'.[30] And, increasingly, there *isn't* a toilet available. A 2007 study revealed that public-toilet closure in the US has been a trend for over half a century.[31] In the UK, 50% of public toilets were closed between 1995 and 2013 – or, as in the public toilet closest to where I live in London, converted into the proverbial hipster bar.[32]

Urban planning that fails to account for women's risk of being sexually assaulted is a clear violation of women's equal right to public spaces – and inadequate sanitary provision is only one of the many ways planners exclude women with this kind of gender-insensitive design.

Women are often scared in public spaces. In fact, they are around twice as likely to be scared as men. And, rather unusually, we have

the data to prove it. 'Crime surveys and empirical studies from different parts of the world show that a majority of women are fearful of the potential violence against them when in public spaces,' explains urban-planning professor Anastasia Loukaitou-Sideris. Analyses of crime data from the US and Sweden both show that women and men respond to similar environmental conditions differently, with women tending to be 'more sensitive than men to signs of danger and social disorder, graffiti, and unkempt and abandoned buildings'.

A UK Department for Transport study highlighted the stark difference between male and female perceptions of danger, finding that 62% of women are scared walking in multistorey car parks, 60% are scared waiting on train platforms, 49% are scared waiting at the bus stop, and 59% are scared walking home from a bus stop or station. The figures for men are 31%, 25%, 20% and 25%, respectively.[33] Fear of crime is particularly high among low-income women, partly because they tend to live in areas with higher crime rates, but also because they are likely to be working odd hours[34] and often come home from work in the dark.[35] Ethnic-minority women tend to experience more fear for the same reasons, as well as having the added danger of (often gendered) racialised violence to contend with.

This fear impacts on women's mobility and their basic right of access to the city.[36] Studies from Finland, Sweden, the United States, Canada, Taiwan and the UK all show that women adjust their behaviour and their travel patterns to accommodate this fear.[37] They avoid specific routes, times and modes of transport. They avoid travelling at night. In one Canadian study exactly half of the women surveyed 'indicated that fear prevents them from using public transportation or parking garages'[38] and studies from around the world find that fear of crime is 'amongst the most important reasons women choose not to use public transport'.[39] If they can afford to, they choose to drive or take a taxi instead.

The trouble is, many of them can't afford to. Most passengers are 'transit captives', meaning that they have no reasonable means other than public transport to get from one place to another.[40] This lack of choice particularly affects low-income women, and those living in the global south – in India, for example, women have limited access[41] to private transport and therefore rely on public transport to a far greater extent than men.[42] These women adopt strategies such as taking a longer roundabout route or only travelling while accompanied. Some women go as far as quitting their jobs – a solution that is not limited to those on low incomes.[43] When I tweeted about women's experiences of harassment on public transport, one man replied to tell me about 'a very intelligent and capable woman' he knows, who 'gave up a really good job in the City and moved out of London because she hated being groped on the Tube'.

Clearly, there is an injustice here. But all too often the blame is put on women themselves for feeling fearful, rather than on planners for designing urban spaces and transit environments that make them feel unsafe. And, as usual, the gender data gap is behind it all. The official statistics show that men are in fact more likely to be victims of crime in public spaces, including public transport. And this paradox, says Loukaitou-Sideris, 'has led to the conclusion that women's fear of crime is irrational and more of a problem than crime itself'. But, she points out, the official statistics do not tell the whole story.

As women navigate public spaces, they are also navigating a slew of threatening sexual behaviours. Before we even get to the more serious offences like being assaulted, women are dealing on a daily basis with behaviours from men that make – and are often calculated to make – them feel uncomfortable. Ranging from catcalling, to being leered at, to the use of 'sexualised slurs [and] requests for someone's name', none of these behaviours is criminal exactly, but they all add up to a feeling of sexual menace.[44] A feeling of being

watched. Of being in danger – and in fact these behaviours can easily escalate. Enough women have experienced the sharp shift from 'Smile, love, it might never happen,' to 'Fuck you bitch why are you ignoring me?' to being followed home and assaulted, to know that an 'innocent' comment from a male stranger can be anything but.

But women don't report these behaviours, because who could they report them to? Until the emergence of groups like 'EverydaySexism' and 'Hollaback', which give women a space in which they can talk about the intimidating-but-just-short-of-criminal behaviours they face in public spaces on a daily basis, public awareness of this behaviour was more or less non-existent. When police in Nottingham started recording misogynistic behaviour (everything from indecent exposure, to groping, to upskirting) as a hate crime (or if the behaviour was not strictly criminal, a hate incident), they found reports shot up – not because men had suddenly got much worse, but because women felt that they would be taken seriously.[45]

The invisibility of the threatening behaviour women face in public is compounded by the reality that men don't do this to women who are accompanied by other men – who are in any case also much less likely to experience this kind of behaviour. A recent Brazilian survey found that two-thirds of women had been victims of sexual harassment and violence while in transit, half of them on public transportation. The proportion among men was 18%.[46] So men who didn't do it and didn't experience it simply didn't know it was going on. And they all too often dismissed women who told them about it with an airy 'Well I've never seen it.' Another gender data gap.

And one that is exacerbated by how we collect the data. 'Large-scale data for the prevalence of sexual harassment is lacking', explains a 2017 paper, not only because of under-reporting, but also because it is 'often not included in crime statistics'.[47] Added to this is the problem that sexual harassment 'is often poorly classified',

with many studies failing to either 'define harassment or codify harassment types'. In 2014, the Australia Institute found that 87% of the women surveyed had experienced verbal or physical street harassment, but data 'concerning the extent or form of incidences were not collected'.

The apparent mismatch between women's fear and the level of violence the official statistics say they experience is not just about the general stew of menace women are navigating. Women also aren't reporting the more serious offences. A 2016 survey of sexual harassment in the Washington DC metro found that 77% of those who were harassed never reported, which is around the same level found by Inmujeres, a Mexican government agency that campaigns on violence against women.[48]

The reporting rate is even lower in New York City, with an estimated 96% of sexual harassment and 86% of sexual assaults in the subway system going unreported, while in London, where a fifth of women have reportedly been physically assaulted while using public transport, a 2017 study found that 'around 90% of people who experience unwanted sexual behaviour would not report it'.[49] An NGO survey of female metro users in Baku, Azerbaijan found that none of the women who said they had been sexually harassed reported it to the appropriate authority.[50]

Clearly then, official police data is not showing the full picture. But although there is a lack of global data on 'the exact nature, location and time' of sexual crimes against women in public spaces, a growing body of research shows that women are in fact not being irrational.[51]

From Rio to Los Angeles men have raped women and girls on buses while drivers carry blithely along their routes.[52] 'The truth is that every time I leave my house, I am scared,' said Victoria Juárez, a thirty-four-year old woman from Mexico where nine in ten women have experienced sexual harassment while using public

transport,[53] and female workers report that men hang around in cars 'to kidnap women getting on and off buses'.[54] Travelling to and from work is, they say, the most dangerous part of their day.

A 2016 study found that 90% of French women had been victims of sexual harassment on public transport;[55] in May that year two men were jailed for an attempted gang rape on a Paris train.[56] A 2016 Washington metro survey found that women were three times more likely than men to face harassment on public transport.[57] In April that year[58] a suspect was identified in an indecent exposure incident on the Washington metro; a month later he had escalated to raping a woman at knifepoint on a train.[59] In October 2017 another repeat offender was arrested on the Washington metro: he had targeted the same victim twice.[60]

'The message is unanimous across all articles of this special issue', wrote professor of urban planning Vania Ceccato in her afterword to a 2017 special issue of the academic journal *Crime Prevention and Community Safety*, 'Women's Victimisation and Safety in Transit Environments': 'sexual crime against women in transit (cases of staring, touching, groping, ejaculation, exposing genitalia and full rape) is a highly under-reported offence'.[61]

Women don't report for a variety of reasons. Some of these are societal: stigma, shame, concern that they'll be blamed or disbelieved. And there is little that authorities can do about this. That change has to come from society itself. But many women don't report for more prosaic issues that can be far more easily addressed.

For a start, women often aren't sure exactly 'what counts as sexual harassment and are afraid of the response of authorities'.[62] Assuming they do realise that what has happened is wrong, they often don't know who it is they have to report *to*.[63] Around the world there is a lack of clear information for women on what to

do if they are sexually harassed or assaulted on public transport (although most authorities seem to have managed to install clear signage about what to do in the event of spotting a suspicious package). Sometimes, though, the lack of signage is because there really aren't any procedures in place.[64] And this leads to the next problem: the experiences of those women who *do* report.

In 2017 a Danish woman tweeted about what happened when she reported a man who was sexually harassing her on a London bus.[65] After asking her what she expected him to do, the bus driver commented, 'You're a pretty girl, what do you expect?' Her experience echoes that of a twenty-six-year-old woman riding a bus in Delhi: 'It was around 9 p.m. A man standing behind touched me inappropriately. I shouted and caught the guy by his collar. I made the driver stop the bus too. But I was told to get off and solve it myself because other passengers were getting late.'[66]

Fear of being dismissed was why Sarah Hayward, a former local councillor for my borough in London, didn't report. 'I was felt up on a packed Tube train when I was about twenty-two. I can't begin to explain the absolute terror of that feeling. And I just knew that if I said anything, people would think it was just that the Tube was packed.' The irony is, the Tube having been packed may well have been a factor in what happened to her: the data we have suggests that peak travel times coincide with peak sexual harassment times.[67] Hayward tells me that she still tries 'to avoid the Tube in rush hour'.

The lack of reporting procedures for sexual assault is also a problem in the sky. A 2016 *Slate* article told the story of Dana T. who, mid-flight between the US and Germany, woke up to find a hand squeezing her breast hard.[68] It belonged to the man sitting next to her. She told cabin crew who initially tried to make her sit back down. Eventually, they gave her a seat in business class, but although many of the crew were sympathetic, no one seemed to

know what to do. When they landed, the man simply got off the plane and went on his way. A similar story emerged in 2017: American Airlines crew refused to move a woman to another seat when it became clear the man next to her was masturbating.[69]

The first step for transit authorities – which have a hugely male-dominated workforce from top to bottom – is to accept that they have a problem.[70] When Loukaitou-Sideris wanted to find out how US transit agencies address women's safety on public transport, she came across a gender data gap. She found only two papers from the 1990s, neither of which looked at the security needs of female passengers and which in any case were redundant given the huge changes that have been made to transport security post-9/11. There was a more recent paper from 2005, but it focused primarily on the response of US transit agencies to the threat of terrorism, 'and did not investigate women's concerns or their specific security needs'.

So Loukaitou-Sideris conducted her own survey. And she encountered some resistance from the male-dominated workforce she surveyed. 'You're assuming that the world is less safe for females,' replied the male chief operating officer of one agency. The male safety and security manager of another insisted that 'Safety and security issues and concerns are non-gender specific.' And in a clear example of the damage the gender data gap does, another (male) safety and security officer refuted the need for gendered planning on the basis that 'Statistical data for our system does not show females have a greater risk.'

Once they have accepted that they have a problem, step two for transport planners is to design evidence-based solutions. Of the 131 transit agencies (more than half of all the large and medium-sized transit operators in the US) that responded to Loukaitou-Sideris's survey, 'only one-third felt that transit agencies should really do something about it', and only three agencies *had* actually done anything about it. Perhaps unsurprisingly given the chronic lack of data

and research on women's safety in transport settings, Loukaitou-Sideris also found 'a significant mismatch between the safety and security needs and desires of female passengers and the types and locations of strategies that transit agencies use'.

Most of the agencies she surveyed had security strategies on their buses: 80% had CCTV; 76% had panic alarms; and 73% had public address systems. But the vast majority neither had, nor intended to install, security measures at bus stops. This is in diametric opposition to what women actually want: they are far more likely to feel scared waiting in the dark at a bus stop than they are to feel scared on the bus itself. And in fact, they are right to feel this way: one study found that people were over three times more likely to be a victim of crime at or near a transit stop than on the vehicle itself.[71]

The type of security transport agencies install also matters – and there is also a mismatch here. Transit agencies, possibly for cost reasons, vastly prefer technological solutions to hiring security officers. There is little available data on what impact CCTV has on harassment, but certainly repeated studies have found that women are deeply sceptical of its use, vastly preferring the presence of a conductor or security guard (that is, a preventative solution) as opposed to a blinking light in the corner which may or may not be monitored miles away.[72] Interestingly, men prefer technological solutions to the presence of guards – perhaps because the types of crime they are more likely to experience are less personally violating.[73]

But if paying for a full-time guard is expensive (although arguably worth it if it increases women's use of public transport), there are plenty of cheaper solutions available.[74] Loukaitou-Sideris tells me that 'the city of Portland has a digital timetable in the bus stop so you know when the next bus is going to come', meaning women don't have to wait for ages in the dark, simply because they don't

know the next bus is half an hour away. I admit, when I heard this presented as a radical solution I was shocked – in London it's far more unusual to come across a bus stop *without* a digital timetable.

Other evidence-based[75] solutions include transparent bus shelters for better visibility and increased lighting – not just at bus stops and metro stations themselves, but on the route to them.[76] The location of the bus stop is also important: 'sometimes even moving the bus stops a few feet up or down the block if it is in front of a well-used establishment' can make all the difference, says Loukaitou-Sideris. My personal favourite approach is the introduction of request stops in between official stops for women travelling on night buses: although women make up the majority of bus users overall, they are in the minority when it comes to night buses, and while we don't have data on why exactly this disparity exists, given the data we do have it seems reasonable to conclude that feeling unsafe might have something to do with it.[77]

The good news for transport planners is that, other than increased security guard presence and lighting, none of these measures is particularly costly. And research conducted by Loukaitou-Sideris in Los Angeles found that there were specific bus stops that were hotspots for gender-based crime, suggesting that costs could be kept further in check by focusing on problem areas.[78] All each transport authority would need is its own data – and the will to collect it. But that will is lacking. In the US, Loukaitou-Sideris tells me, 'there is no federal incentive' for transit authorities to collect data. 'They aren't legally obligated to collect it and so they don't.' She doesn't buy what she calls their 'excuse' that they don't have the money.

In India (Delhi was ranked the fourth most dangerous public transport system in the world for women in 2014) following what came to be known as the 'Delhi gang rape', women are taking data collection into their own hands.[79] This assault, which

hit headlines around the world, began just after 9 p.m. on 16 December 2012 in south Delhi. Twenty-three-year-old physiotherapy student Jyoti Singh and her friend Avanindra Pandey had just finished watching *Life of Pi* at the cinema when they decided to board one of Delhi's many private buses.[80] Their plan was to go home – but they never got there. The two friends were first severely beaten with a rusty iron rod – and then the gang of six men stared to gang rape Singh. The attack (which included shoving the metal rod inside her) lasted nearly an hour, and was so brutal it perforated her colon.[81] Eventually, having exhausted themselves, the six rapists dumped the semi-conscious friends on the roadside, five miles from where they had boarded the bus.[82] Thirteen days later, Singh died from her injuries. The following year, three women set up a crowd-mapping platform called SafeCity.[83] Women can report the location, date and time they were harassed, as well as what happened, 'so that others can view "hot spots" of such incidents on a map'. The data collected so far is revealing: groping is the most common type of harassment – ahead even of catcalls – and it is most likely to happen on public buses (likely because of overcrowding).

Innovative solutions like this are to be welcomed, but they are not a sufficient substitute for data collected and analysed by professional researchers. And this kind of data is severely lacking in all areas of urban planning, not just transport. A 2016 article in the *Guardian* asking why we aren't designing cities 'that work for women, not just men' cautions that the limited number of urban datasets 'that track and trend data on gender make it hard to develop infrastructure programmes that factor in women's needs'.[84] Even when we do start collecting data, there is no guarantee we will continue to do so indefinitely: in 2008 a UK-based database of research on gender and architecture was set up; by 2012 'Gendersite' had closed for lack of funds.[85] And when we don't collect and, crucially, *use*

sex-disaggregated data in urban design, we find unintended male bias cropping up in the most surprising of places.

Most women who use a gym will have experienced that moment of psyching herself up to walk into the free weights area, knowing that many of the men who dominate the space will regard her on a range from nuisance to freak. And yes, you *can* technically just walk in, but there's that extra mental hurdle to clear that most men simply don't face, and it takes a particular kind of self-confidence not to be bothered by it at all. Some days, you just won't feel like it. It's the same story in the outdoor gym in my local park; if it's full of men, I often give it a miss, not relishing the inevitable stares and all too clear sense that I don't belong.

The inevitable reaction from some quarters to such complaints is to tell women to stop being delicate flowers – or for feminists to stop painting women as delicate flowers. And of course some women aren't bothered by the leering and macho posturing. But women who do avoid these spaces are not being irrational, because there are plenty of accounts of hostility from men when women venture into supposedly gender-neutral shared exercise spaces.[86] Like transit environments, then, gyms are often a classic example of a male-biased public space masquerading as equal access.

The good news is that this kind of male bias can be designed out and some of the data collection has already been done. In the mid-1990s, research by local officials in Vienna found that from the age of ten, girls' presence in parks and public playgrounds 'decreases significantly'.[87] But rather than simply shrugging their shoulders and deciding that the girls just needed to toughen up, city officials wondered if there was something wrong with the design of parks. And so they planned some pilot projects, and they started to collect data.

What they found was revealing. It turned out that single large open spaces were the problem, because these forced girls to

compete with the boys for space. And girls didn't have the confidence to compete with the boys (that's social conditioning for you) so they tended to just let the boys have the space. But when they subdivided the parks into smaller areas, the female drop-off was reversed. They also addressed the parks' sports facilities. Originally these spaces were encased by wire fencing on all sides, with only a single entrance area – around which groups of boys would congregate. And the girls, unwilling to run the gauntlet, simply weren't going in. Enter, stage right, Vienna's very own Leslie Knope, Claudia Prinz-Brandenburg, with a simple proposal: more and wider entrances.[88] And like the grassy spaces, they also subdivided the sports courts. Formal sports like basketball were still provided for, but there was also now space for more informal activities – which girls are more likely to engage in. These were all subtle changes – but they worked. A year later, not only were there more girls in the park, the number of 'informal activities' had increased. And now all new parks in Vienna are designed along the same lines.

The city of Malmö, Sweden, discovered a similar male bias in the way they'd traditionally been planning 'youth' urban regeneration. The usual procedure was to create spaces for skating, climbing and painting grafitti.[89] The trouble was, it wasn't the 'youth' as a whole who were participating in these activities. It was almost exclusively the boys, with girls making up only 10–20% of those who used the city's youth-directed leisure spaces and facilities. And again, rather than shrugging their shoulders and thinking there was something wrong with the girls for not wanting to use such spaces, officials turned instead to data collection.

In 2010, before they began work on their next regeneration project (converting a car park to a leisure area) city officials asked the girls what they wanted.[90] The resulting area is well lit and, like the Viennese parks, split into a range of different-sized spaces on

different levels.[91] Since then, Christian Resebo, the official from Malmö's traffic department who was involved in the project, tells me, 'Two more spaces have been developed with the intention of specifically targeting girls and younger women.'

The benefits of this gender-sensitive approach won't just be felt by girls: it may also be felt by the public purse. In the city of Gothenburg in Sweden, around 80 million kronor is distributed every year to sports clubs and associations. Of course, the funding is meant to benefit everyone equally. But when city officials examined the data, they found that it wasn't.[92] The majority of funding was going to organised sports – which are dominated by boys. Grants benefited boys over girls for thirty-six out of forty-four sports. In total, Gothenburg was spending 15 million kronor more on boys' than girls' sports. This didn't just mean that girls' sports were less well funded – sometimes they weren't provided for at all, meaning girls had to pay to do them privately. Or, if they couldn't afford to pay, girls didn't do sports at all.

Most readers will be unsurprised by the report's conclusion that the failure to invest in girls' sport contributed to poorer mental health in girls. More unexpected, perhaps, is the claim that investing in girls' sport could reduce the health cost of fractures due to osteoporosis. Physical exercise increases young people's bone density, reducing the risk of osteoporosis later in life, with research suggesting it is especially important that young girls begin exercising before puberty.

The total cost to Gothenburg of the estimated 1,000 fractures a year resulting from falls (three-quarters of which are suffered by women) is around 150 million kronor. Women account for over 110 million kronor of this. As the report concludes, '[I]f an increase in the city's support for girls' sports of SEK 15 million can lead to a 14 per cent reduction in future fractures due to osteoporosis, the investment will have paid for itself.'

When planners fail to account for gender, public spaces become male spaces by default. The reality is that half the global population has a female body. Half the global population has to deal on a daily basis with the sexualised menace that is visited on that body. The entire global population needs the care that, currently, is mainly carried out, unpaid, by women. These are not niche concerns, and if public spaces are truly to be for everyone, we have to start accounting for the lives of the other half of the world. And, as we've seen, this isn't just a matter of justice: it's also a matter of simple economics.

By accounting for women's care responsibilities in urban planning, we make it easier for women to engage fully in the paid workforce – and as we will see in the next chapter, this is a significant driver of GDP. By accounting for the sexual violence women face and introducing preventative measures – like providing enough single-sex public toilets – we save money in the long run by reducing the significant economic cost of violence against women. When we account for female socialisation in the design of our open spaces and public activities, we again save money in the long run by ensuring women's long-term mental and physical health.

In short, designing the female half of the world out of our public spaces is not a matter of resources. It's a matter of priorities, and, currently, whether unthinkingly or not, we just aren't prioritising women. This is manifestly unjust, and economically illiterate. Women have an equal right to public resources: we must stop excluding them by design.

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