Introduction

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'Identity' may seem a hard and fast concept: either this is your fingerprint, your DNA or it is someone else's; either this is the glove you mislaid yesterday or, at best, it is just one very like it. On waking in the morning you may have a brief 'who am I?' moment, but these appear to be familiar toenails and pyjamas. So, however reluctantly, you get up, perform the usual matutinal rituals and necessities and go to work. What awaits you there? An interview with the boss or a session with a distressed client? Probably you do not present the same *persona* to both. One is perhaps defensive, the other sympathetic. Quite probably neither is entirely sincere, so, in some sense, in either case you are shifting your identity, whatever that may be. If, in either case, you present yourself aggressively, the case may be different.

Simple identity reaches its physical extreme in immunology: the biology of recognizing self and non-self. As described in detail by Philippa Marrack in 'Immunological Identity', knowing oneself comes down to the molecular level – the presence of specific forms of molecules expressed on the surface of one's cells. Exceptions to such strict molecular rules occur only in cases where non-self is unrecognized or self is suppressed. However, while biological self appears uncontroversial (if imperfectly known), and there is one generally accepted grammar and syntax in mathematics (which gives everyone the same proof), it is often difficult to agree on the properties of elements on either side of non-mathematical equations. Most descriptions are not closed systems, so one has to look at *relevant* properties of identity, since *all* properties would be too numerous to let us get anywhere: as suggested by Marcus du Sautoy's predecessor in the Oxford mathematical world, Charles Lutwidge Dodgson:

> 'When *I* use a word,' Humpty Dumpty said in rather a scornful tone, 'it means just what I choose it to mean – neither more nor less.'
>
> 'The question is,' said Alice, 'whether you *can* make words mean different things.'
>
> 'The question is,' said Humpty Dumpty, 'which is to be master – that's all.'[1]

Humpty Dumpty is arguing for contextual identity, whereas Alice prefers a more essentialist view. Context is, of course, the key to Humpty Dumpty's appearance here: if all the king's horses and all the king's men put him back together again, is he the same egg? It depends on whether your important axis is 'unbroken topology' or 'time'.

As Marcus du Sautoy shows, many central mathematical results, old and new, trivial and profound, are expressed as identities or equations. These identities are often proved by counting the same set in two different ways, or by looking at the same object in two different ways: identifying one object with another. Here are two examples, one trivial and one not so trivial. Most people, when asked to explain why $a(b+c) = ab + ac$, have nothing to say. But suppose that a, b and c are positive whole numbers. Take a rows, each containing $b + c$ counters, and split this up into two sets of counters, one with a rows of b counters, and one with a rows of c counters. Now counting the same set of counters in two ways gives a small child a taste of how identities can be proved. On a less trivial level, Newton proved the identity

$$\pi = 6\left(\frac{1}{2} + \frac{1}{2}\times\frac{1}{3}\times\frac{1}{2^3} + \frac{1\times 3}{2\times 4}\times\frac{1}{5}\times\frac{1}{2^5} + \frac{1\times 3\times 5}{2\times 4\times 6}\times\frac{1}{7}\times\frac{1}{2^7} + \cdots\right).$$

[1] Lewis Carroll, *Through the looking glass and what Alice found there* (London: Macmillan, 1871), 114.

This formula (in fact a variant on this formula) enabled Newton to compute π to 16 decimal places (though this was not the record). Now π is the ratio of the circumference of a circle to its diameter, and ancient calculations of π inefficiently estimated this directly. But Newton identifies π with the area of a circle, identifies the area with an integral, identifies the integral with a power series, using his famous generalization of the binomial theorem, and out pops the result.

Many, perhaps most, of the great mathematicians have produced famous identities: Newton, Euler, Gauss, Stokes, Hilbert, Ramanujan, du Sautoy's particular hero Riemann and, of course, the great mathematicians of today. The search for new identities will always remain at the core of mathematics.

Adrian Poole's chapter, 'Identity of meaning', highlights the importance of context, exploring the difference between words and what they convey. Different readings of plays like *Henry V* demonstrate that words on a page are only the beginning of communication: resonances differ according to the audience. The inevitability of such pluralism of interpretation should be recognized: as Poole points out, for better or for worse we are identified by others, each of whom sees what they want to see. This accords with Milan Kundera's view of identity: that *I* cannot know anything about *you* that is separate from myself and my standpoint. In Kundera's novel *Identity* two characters fail to communicate their thoughts to one another and, through a series of missed contacts, physical and mental, demonstrate that, no matter how much they stare into each other's eyes, neither will ever know what lies behind the other's eyelids during a blink.[2]

Ludmilla Jordanova's 'Visualizing identity' approaches the question from the angle of portraiture. Since identity, in the sense of personality, is here in the eye of the beholder, portraits frequently give clues to perceived features of identity that would not be picked up by a simple passport photograph. These may be conveyed by stance and expression in such a way that the style of execution gives an impression of the character of the sitter, while devices in the background frequently also represent concrete things emblematic of their profession, status or

[2] Milan Kundera, *L'Identité* (Paris: Gallimard, 1997).

preoccupations. The importance of the observer in establishing identity is just a special case of realizing that the criteria used to establish identity have to be the same, between presenter and observer.

Metaphysical questions exploring the essential nature of Theseus' ship after rebuilding, Locke's socks after darning, my grandfather's axe after replacement of handle and head, whether I can step in the same river twice and indeed whether Humpty Dumpty is the same egg ever again are only solved with reference to some criterion that matters in a given case. Leibniz might be invoked here – that nothing can ever have the 'same properties and relations' as anything else, and thus nothing is identical to anything else.[3] But this ignores the frame of reference in which most people care about rebuilt ships, darned socks, reconstituted axes, rivers and opinionated eggs sitting on walls.

In the absence of a clearly definable, long-term view, what matters above all else is that the hierarchy of characteristics which make up an identity – and their importance and mutability – be key to exploring current common usages of identity. While John Locke's metaphysical socks are still in his possession, it's the possession through time that counts, rather than the materials that constitute them. If possession is insufficient to the enquiry at hand, they cease to be the same socks once they've been darned, and stop being metaphysically interesting.

Lionel Bently's chapter, 'Identity and the law', explores the weighing of contingent characteristics in the context of property: where voice, name, appearance and so on are treated as representative of identity and thus used to imply endorsement by the owner of the identity. Bently points out that property in identity is problematic, because identity extends into so many areas – in complex human life it's unlikely that one specific characteristic can be taken as sufficient to distinguish someone – and identity so characterized can thus provide no solid foundation for property law. Nevertheless, the idea that something might be able to encapsulate identity – like a fingerprint on a human or in a computer – is extremely popular in these days of informational overload.

[3] Gottfried Leibniz, 'Discourse on metaphysics', in *Philosophical papers and letters*, ed. and trans. Leroy E. Loemker, 2nd edn (Dordrecht: D. Reidel, 1969).

Peter Crane's chapter, 'Species-identity', explores the degree to which Linnean binomials serve as fingerprints in current biological research. Only to a first approximation do names refer to comparable entities. In the absence of an ability to detect species and speciation (which probably has something to do with reproduction, immunology, anatomy… though we can't tell how much or what, a priori) all we have is bottom-up collections of individuals, or top-down observations of populations through time. Biologists endeavour to understand what these organisms share, or what distinguishes a population – seeking unique diagnostic criteria in the long list of features, criteria to which the species epithet is attached. Species descriptions are at best Platonic shadows with names, set down in the literature until some indeterminate intermediate makes us amend the criteria pertaining to the name. Complex systems of rules for attaching names to biology are actually silent on the biology – the zoological and botanical codes of nomenclature are only about names (ICZN, 4th edn, 1999; ICBN St Louis Code, 2000). But – although this may shock non-biologists – the fact a species epithet doesn't convey 'essence' doesn't mean that identities attached to names are unimportant or arbitrary. The name is there so that we know that the botanist, farmer, gardener, herbalist, poisoning victim, toxicologist, judge and jury are all talking about the same thing. The name is being used as an heuristic for the complex ecophysiological identity of a plant – so the distinguishing criteria attached to that name have to be adequate in all the different contexts where the name matters. Thus looking for something repeatable, and to do with a process apparently independent of our observation (such as evolution), is usually a good guiding principle for taxonomy, as for any form of finding shortcuts for identity. Biology gets it right more easily in other areas – Philippa Marrack, in her chapter, 'Immunological identity', discusses how recognition of non-self is often a good indicator that 'this is not me': for example an animal's innate immune system reacting to (uniquely) bacterial lipopolysaccharide, which suggests that this non-self will be very different from anything like the animal.

Distilling information about identities down to key characteristics like fingerprints has the advantage of ease and speed of communication. But the possibility of over-generalization always lurks, with doomsayers predicting disenfranchised Orwellian hordes at the mercy of a

government wanting to impose identity cards on all the creative individuals that make up British society. Ludmilla Jordanova points out the failure of biometric information, or passport photos, to capture who we really are – the difference between fingerprint and portrait. We prefer portraits. But with so many of us here on the planet, administration prefers fingerprints, as a fast way of determining that most of us are harmless. Of course over-generalization stemming from fingerprints is precisely what many people are afraid of: the possibility that someone else could steal a place under the mantle of harmlessness, by stealing the details of someone else's day-to-day life. Identity theft brings home to us the point of bothering with trying to understand identities: self-determination. Although bank account fraud is where most of us chiefly think about identity theft, it's actually the bigger things that matter: one can usually recover the money stolen from bank cards – but what about getting arrested for a crime you haven't committed? We hang on to our identity because we want to control what we do with it – and we can't know what someone else will do with it – whether that someone be a criminal or a government facilitating with identity cards an unexpected attack of myopia. Adrian Poole points out that 'Identity is a powerful magnetizer and divider of "us" against "them", especially when annexed to class, gender, ethnicity or nation' – so hanging on to the high dimensionality of one's identity – and appreciating that of others – would seem to be key to promoting harmony. Politicians go a long way to try to convince the public that they, the rulers, share an identity with the ruled: if this is convincing it can lead the public to feel happy with having politicians extrapolate on their behalf. Frequently the extrapolation is from somewhere conveniently one-dimensional, and serves to silence groups who would perhaps prefer a different identity. A nice example is the magazine of the British National Party – too appropriately called *Identity*.

So the answer clearly matters when Adrian Poole asks, 'How do I know who I am? How do *you* know who I am?' Raymond Tallis may just provide the answer we need, in 'Identity and the mind'. The concept of identity that he advances here – the Existential Intuition – is the first-person mental and physical sense of being, within the context of the world: it is, in a way, taking responsibility for one's own biochemistry.

It is strictly in the first person: how *I* know who *you* are depends entirely on how I relate to you. Obviously, this identity-relation is only made explicit by wondering about identity – if you can't wonder about yourself, then your identity is imposed from without by something that *can* wonder about you. This brings us back to self-determination being a useful application of identity. The Existential Intuition implies that people can only know about themselves – making careful communication of the details of identity all the more important.

Some things, however, still defy all our attempts to pick out which details matter. Identity is complex – can we get at it when we don't know the relevant criteria, when all we have is the '=' but not the algebraic grammar to know how to deal with X and Y? Ludmilla Jordanova elaborates on the theme of visual recognition of people being based on a complex constellation of features; Christopher Hogwood's chapter, 'Musical identity', explores how we recognize the difference between Mozart and Haydn, and 'what *are* Brahms?'. Most of us can recognize faces, and most of us (with sufficient training) can recognize different pieces of music by the same composer, but we're not very articulate when we try to tell someone else about that recognition process. Despite knowing the salient features, say, of Mozart's style, and being able to trace these as influences from particular schools of composition, even the most informed musicologists have been known to misattribute work by Mozart's contemporaries. Is musical identity just too hard to recognize? Likewise, is visual identity still too difficult, in these days when a 'photo-fit' reconstruction of a face is almost pointlessly unnatural, but a witness can still recognize the face they've failed to reconstruct? Both visual and musical recognition are active areas of enquiry in machine learning, where one trains a computer to 'read' data and sort it into piles, in the hope that the computer will eventually decide what the rules are that keep the piles distinct. It's also possible to recognize individual recordings of music based on physical parameters like zero crossing rate (wavelength measurement when you have more than one note present), the distribution of frequencies across the spectrum. These techniques seem to be capturing important aspects of identity in modern popular music in the digital era, where the currency is specific recordings.

Western classical art music remains somewhat elusive, neither recognized by acoustic fingerprinting applications like Shazam, nor successfully synthesized by programmers of musical rules such as David Cope's *Experiments in Musical Intelligence*.[4] The latter area of enquiry, discovering the rules of style, harmony and counterpoint as known to a specific composer, and how to encode them in a way that a computer will find useful, is also an active area of enquiry. If successful, it could tell us all sorts of things beyond the compositional identity of a specific score: music is often a specifically personal reaction to perceptions of life and times in a particular society. These extremely complex types of identity might act as heuristics for much more than just one face or one song, if only we could work out the important criteria of recognition and how they relate to the wider world. But for the moment, 'music takes over where words leave off' – some areas of identity have to be understood in ways other than the plain English of this book.

[4] http://arts.ucsc.edu/faculty/cope/experiments.htm.

1 Identity of meaning

ADRIAN POOLE

Some titles are instantly intelligible. This is not one of them. So let me begin with some examples of what 'identity of meaning' might mean. Slightly less than 300 years before the birth of Christ, seventy-two translators travelled from Jerusalem to Alexandria. They were charged with rendering the Hebrew Scriptures into ancient Greek, and the result was known as the Septuagint. Seventy-two seems a sensible number for such a vast undertaking. It would be crazy to expect one man to do it all by himself. Yet the story that developed was indeed absurd, or miraculous. The legend was that the seventy-two all worked on all the Scriptures, but independently of each other. Incredibly, each arrived at exactly the same text. Unsurprisingly, the result carried enormous authority. When Jerome embarked on his historic translation of the same Scriptures into Latin he decided to go back to the original Hebrew and Aramaic texts. His colleague Augustine told him not to be silly. Who did Jerome think he was to challenge the divinely inspired translators of the Septuagint?

The Septuagint represents a great dream of redeeming the chaos of Babel and the confusion of tongues, akin to the legend of Pentecost. Yet a shift of perspective could easily turn this dream into nightmare, the bleak vision of George Orwell's *1984* in which a supreme political authority imposes a single common language from on high: Newspeak. Umberto Eco mildly notes that 'the dream of a perfect language has always been invoked as a solution to religious or political strife.'[1]

[1] U. Eco, *The search for the perfect language*, trans. James Fentress (Oxford: Blackwell, 1995), 19.

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My second exhibit is a renowned short story by the Argentinian writer Jorge Luis Borges, entitled 'Pierre Menard, author of the *Quixote*'. This tale purports to memorialize a French man of letters whose greatest work is unfinished and unpublished. The narrator – let us call him Borges – tells us that Menard set out not to copy the work of Cervantes, nor to write another *Don Quixote*, but to create a new original, *ab initio*. Menard thinks of immersing himself in the past, of forgetting the history of Europe between 1602 and 1918, of identifying totally with Cervantes and his world. But this, he thinks, would be too easy: 'To be, in some way, Cervantes and reach the *Quixote* seemed less arduous to him – and, consequently, less interesting – than to go on being Pierre Menard and reach the *Quixote* through the experiences of Pierre Menard.'[2] And so, after innumerable drafts and immeasurable pains, Menard produces his fragments of a new *Don Quixote*, original, authentic, his own. It is, word for word, identical with Cervantes'. And yet, so the narrator asserts, this *Don Quixote* is quite different. Written in the twentieth century, the same words do not mean the same as they did in the early 1600s. When the seventeenth-century writer speaks of 'truth, whose mother is history, rival of time, depository of deeds, witness of the past, exemplar and adviser to the present, and the future's counsellor', it is 'a mere rhetorical praise of history'. When the twentieth-century writer speaks of 'truth, whose mother is history, rival of time, depository of deeds, witness of the past, exemplar and adviser to the present, and the future's counsellor', the idea is 'astounding'.[3] Identity of words, but not identity of meaning.

Thirdly, an anecdote from my old teacher and then colleague Theodore Redpath. In his memoir of Wittgenstein Redpath recalls buying some gramophone records. The ferocious philosopher called round and asked Redpath whether the records were 'any good'. Redpath replied, in the fashion of those days: 'It depends what you mean by "good".' Wittgenstein's response was 'rapid and decisive: "*I* mean what *you* mean." This shook me up,' confesses Redpath, 'and seemed to me tremendously illuminating. It still does.'[4] On a less theological level

[2] J. L. Borges, 'Pierre Menard, author of the Quixote', in *Labyrinths*, ed. Donald A. Yates and James E. Irby (Harmondsworth: Penguin, 2000), 66.
[3] Ibid., 69.
[4] T. Redpath, *Ludwig Wittgenstein: a student's memoir* (London: Duckworth, 1990), 68.