

Maria Konnikova

The Limits of Friendship



By [Maria Konnikova](#)
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Photograph by Nick Hannes/Hollandse Hoogte/Redux

Robin Dunbar came up with his eponymous number almost by accident. The University of Oxford anthropologist and psychologist (then at University College London) was trying to solve the problem of why primates devote so much time and effort to grooming. In the process of figuring out the solution, he chanced upon a potentially far more intriguing application for his research. At the time, in the nineteen-eighties, the [Machiavellian](#)

Intelligence Hypothesis (now known as the Social Brain Hypothesis) had just been introduced into anthropological and primatology discourse. It held that primates have large brains because they live in socially complex societies: the larger the group, the larger the brain. Thus, from the size of an animal's neocortex, the frontal lobe in particular, you could theoretically predict the group size for that animal.

Looking at his grooming data, Dunbar made the mental leap to humans. "We also had humans in our data set so it occurred to me to look to see what size group that relationship might predict for humans," he told me recently. Dunbar did the math, using a ratio of neocortical volume to total brain volume and mean group size, and **came up** with a number. Judging from the size of an average human brain, the number of people the average person could have in her social group was a hundred and fifty. Anything beyond that would be too complicated to handle at optimal processing levels. For the last twenty-two years, Dunbar has been "unpacking and exploring" what that number actually means—and whether our ever-expanding social networks have done anything to change it.

The Dunbar number is actually a series of them. The best known, a hundred and fifty, is the number of people we call casual friends—the people, say, you'd invite to a large party. (In reality, it's a range: a hundred at the low end and two hundred for the more social of us.) From there, through qualitative interviews coupled with analysis of experimental and survey data, **Dunbar discovered** that the number grows and decreases according to a **precise formula**, roughly a "rule of three." The next step down, fifty, is the number of people we call close friends—perhaps the people you'd invite to a group dinner. You see them often, but not so much that you consider them to be true intimates. Then there's the circle of fifteen: the friends that you can turn to for sympathy when you need it, the ones you can confide in about most things.

The most intimate Dunbar number, five, is your close support group. These are your best friends (and often family members). On the flipside, groups can extend to five hundred, the acquaintance level, and to fifteen hundred, the absolute limit—the people for whom you can put a name to a face. While the group sizes are relatively stable, their composition can be fluid. Your five today may not be your five next week; people drift among layers and sometimes fall out of them altogether.

When Dunbar consulted the anthropological and historical record, he found remarkable consistency in support of his structure. The average group size among modern hunter-gatherer societies (where there was accurate census data) was 148.4 individuals. Company size in professional armies, Dunbar found, was also remarkably close to a hundred and fifty, from the Roman Empire to sixteenth-century Spain to the twentieth-century Soviet Union. Companies, in turn, tended to be broken down into smaller units of around fifty then further divided into sections of between ten and fifteen. At the opposite end, the companies formed battalions that ranged from five hundred and fifty to eight hundred, and even larger regiments.

Dunbar then decided to go beyond the existing evidence and into experimental methods. In one early study, the first empirical demonstration of the Dunbar number in action, he and the Durham University anthropologist Russell Hill [examined](#) the destinations of Christmas cards sent from households all over the U.K.—a socially pervasive practice, Dunbar explained to me, carried out by most typical households. Dunbar and Hill had each household list its Christmas card recipients and rate them on several scales. “When you looked at the pattern, there was a sense that there were distinct subgroups in there,” Dunbar said. If you considered the number of people in each sending household and each recipient household, each individual’s network was composed of about a hundred and fifty people. And within that

network, people fell into circles of relative closeness—family, friends, neighbors, and work colleagues. Those circles conformed to Dunbar’s breakdown.

As constant use of social media has become the new normal, however, people have started challenging the continued relevance of Dunbar’s number: Isn’t it easier to have more friends when we have Facebook, Twitter, and Instagram to help us to cultivate and maintain them? Some, like the University of California, Berkeley, professor Morten Hansen, have pointed out that social media has facilitated more effective collaborations. Our real-world friends tend to know the same people that we do, but, in the online world, we can expand our networks strategically, leading to better business outcomes. Yet, when researchers tried to determine whether virtual networks increase our strong ties as well as our weak ones (the ones that Hansen had focussed on), they found that, for now, the essential Dunbar number, a hundred and fifty, has remained constant. When Bruno Gonçalves and his colleagues at Indiana University at Bloomington [looked](#) at whether Twitter had changed the number of relationships that users could maintain over a six-month period, they found that, despite the relative ease of Twitter connections as opposed to face-to-face one, the individuals that they followed could only manage between one and two hundred stable connections. When the Michigan State University researcher Nicole Ellison [surveyed](#) a random sample of undergraduates about their Facebook use, she found, while that their median number of Facebook friends was three hundred, they only counted an average of seventy-five as actual friends.

There’s no question, Dunbar agrees, that networks like Facebook are changing the nature of human interaction. “What Facebook does and why it’s been so successful in so many ways is it allows you to keep track of people who would otherwise effectively disappear,” he said. But one of the things that keeps face-to-face

friendships strong is the [nature of shared experience](#): you laugh together; you dance together; you gape at the hot-dog eaters on Coney Island together. We do have a social-media equivalent—sharing, liking, knowing that all of your friends have looked at the same cat video on YouTube as you did—but it lacks the synchronicity of shared experience. It's like a comedy that you watch by yourself: you won't laugh as loudly or as often, even if you're fully aware that all your friends think it's hysterical. We've seen the same movie, but we can't bond over it in the same way.

With social media, we can easily keep up with the lives and interests of far more than a hundred and fifty people. But without investing the face-to-face time, we lack deeper connections to them, and the time we invest in superficial relationships comes at the expense of more profound ones. We may widen our network to two, three, or four hundred people that we see as friends, not just acquaintances, but keeping up an actual friendship requires resources. “The amount of social capital you have is pretty fixed,” Dunbar said. “It involves time investment. If you garner connections with more people, you end up distributing your fixed amount of social capital more thinly so the average capital per person is lower.” If we're busy putting in the effort, however minimal, to “like” and comment and interact with an ever-widening network, we have less time and capacity left for our closer groups. Traditionally, it's a sixty-forty split of attention: we spend sixty per cent of our time with our core groups of fifty, fifteen, and five, and forty with the larger spheres. Social networks may be growing our base, and, in the process, reversing that balance.

On an even deeper level, there may be a physiological aspect of friendship that virtual connections can never replace. This wouldn't surprise Dunbar, who discovered his number when he was studying the social bonding that occurs among primates through grooming. Over the past few years, Dunbar and his colleagues have been looking at the importance of touch in

sparkling the sort of neurological and physiological responses that, in turn, lead to bonding and friendship. “We underestimate how important touch is in the social world,” he said. With a light brush on the shoulder, a pat, or a squeeze of the arm or hand, we can communicate a deeper bond than through speaking alone. “Words are easy. But the way someone touches you, even casually, tells you more about what they’re thinking of you.”

Dunbar [already knew](#) that [in monkeys](#) grooming activated the endorphin system. Was the same true in humans? In a series of studies, Dunbar and his colleagues demonstrated that very light touch triggers a cascade of endorphins that, in turn, are important for creating personal relationships. Because measuring endorphin release directly is invasive—you either need to perform a spinal tap or a PET scan, and the latter, though considered safe, involves injecting a person with a radioactive tracer—they first looked at endorphin release indirectly. In [one study](#), they examined pain thresholds: how long a person could keep her hand in a bucket of ice water (in a lab), or how long she could maintain a sitting position with no chair present (back against the wall, legs bent at a ninety degree angle) in the field. When your body is flooded with endorphins, you’re able to withstand pain for longer than you could before, so pain tolerance is often used as a proxy for endorphin levels. The longer you can stand the pain, the more endorphins have been released into your system. They found that a shared experience of laughter—a synchronous, face-to-face experience—prior to immersion, be it in the lab (watching a neutral or funny movie with others) or in a natural setting (theatre performances at the 2008 Edinburgh Fringe Festival) enabled people to hold their hands in ice or maintain the chair position significantly longer than they’d previously been able to.

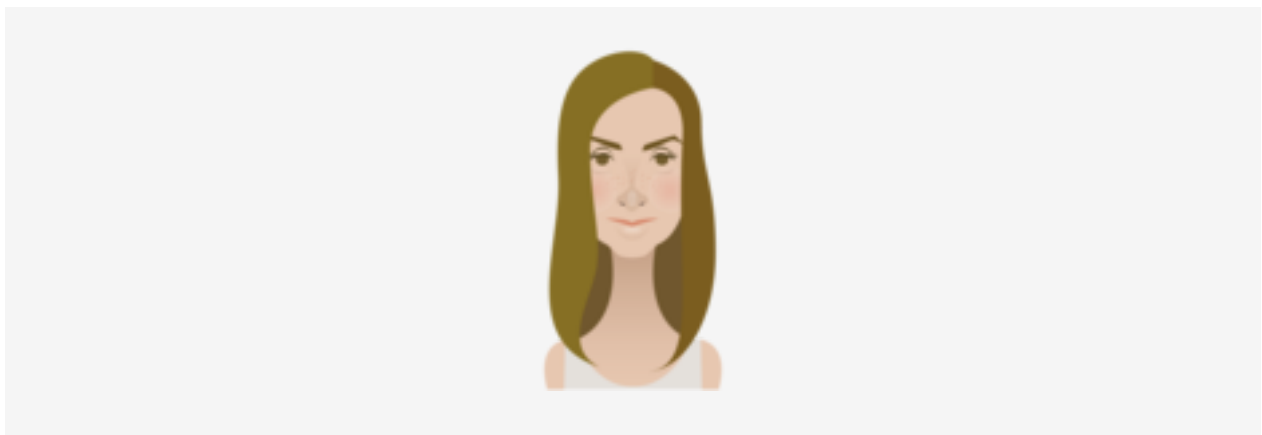
Next, in an ongoing study, Dunbar and his colleagues looked at how endorphins were activated in the brain directly, through PET scans, a procedure that lets you look at how different neural

receptors uptake endorphins. The researchers saw the same thing that happened with monkeys, and that had [earlier been demonstrated](#) with humans that were viewing positive emotional stimuli: when subjects in the scanner were lightly touched, their bodies released endorphins. “We were nervous we wouldn’t find anything because the touch was so light,” Dunbar said. “Astonishingly, we saw a phenomenal response.” In fact, this makes a great deal of sense and answers a lot of long-standing questions about our sensory receptors, he explained. Our skin has a set of neurons, common to all mammals, that respond to light stroking, but not to any other kind of touch. Unlike other touch receptors, which operate on a loop—you touch a hot stove, the nerves fire a signal to the brain, the brain registers pain and fires a signal back for you to withdraw your hand—these receptors are one-way. They talk to the brain, but the brain doesn’t communicate back. “We think that’s what they exist for, to trigger endorphin responses as a consequence of grooming,” Dunbar said. Until social media can replicate that touch, it can’t fully replicate social bonding.

But, the truth is, no one really knows how relevant the Dunbar number will remain in a world increasingly dominated by virtual interactions. The brain is incredibly plastic, and, from [past research](#) on social interaction, we know that [early childhood experience](#) is crucial in developing those parts of the brain that are largely dedicated to social interaction, empathy, and other interpersonal concerns. Deprive a child of interaction and touch early on, and those areas won’t develop fully. Envelop her in a huge family or friend group, with plenty of holding and shared experience, and those areas grow bigger. So what happens if you’re raised from a young age to see virtual interactions as akin to physical ones? “This is the big imponderable,” Dunbar said. “We haven’t yet seen an entire generation that’s grown up with things like Facebook go through adulthood yet.” Dunbar himself doesn’t have a firm opinion one way or the other about whether

virtual social networks will prove wonderful for friendships or ultimately diminish the number of satisfying interactions one has. “I don’t think we have enough evidence to argue either way,” he said.

One concern, though, is that some social skills may not develop as effectively when so many interactions exist online. We learn how we are and aren’t supposed to act by observing others and then having opportunities to act out our observations ourselves. We aren’t born with full social awareness, and Dunbar fears that too much virtual interaction may subvert that education. “In the sandpit of life, when somebody kicks sand in your face, you can’t get out of the sandpit. You have to deal with it, learn, compromise,” he said. “On the internet, you can pull the plug and walk away. There’s no forcing mechanism that makes us have to learn.” If you spend most of your time online, you may not get enough in-person group experience to learn how to properly interact on a large scale—a fear that, some [early evidence suggests](#), may be materializing. “It’s quite conceivable that we might end up less social in the future, which would be a disaster because we need to be more social—our world has become so large” Dunbar said. The more our virtual friends replace our face-to-face ones, in fact, the more our Dunbar number may shrink.



- *Maria Konnikova writes about psychology and*