

INTRODUCTION

<p>Happiness is a fundamental object of human existence, so much so that the World Health Organization is increasingly emphasising happiness as a component of health. Happiness is determined by a complex set of voluntary and involuntary factors. Researchers in medicine, economics, psychology, neuroscience, and evolutionary biology have identified a broad range of stimuli to happiness (or unhappiness), including lottery wins, elections, income, job loss, socioeconomic inequality, divorce, illness, bereavement, and genes. These studies, however, have not addressed a possibly key determinant of human happiness: the happiness of others.</p>	<p>Text</p>
<p>Emotional states can be transferred directly from one individual to another by mimicry and “emotional contagion,” perhaps by the copying of emotionally relevant bodily actions, particularly facial expressions, seen in others. People can “catch” emotional states they observe in others over time frames ranging from seconds to weeks. For example, students randomly assigned to a mildly depressed room-mate became increasingly depressed over a three month period, and the possibility of emotional contagion between strangers, even those in ephemeral contact, has been documented by the effects of “service with a smile” on customer satisfaction and tipping.</p>	<p>Text</p>
<p>Yet, despite the evidence that certain emotions might spread over short periods from person to person, little is known about the role of social networks in happiness or about whether happiness might spread, by a diverse set of mechanisms, over longer periods or more widely in social networks. As diverse phenomena can spread in social networks, we investigated whether happiness also does so. We were particularly interested in whether the spread of happiness pertains not just to direct relationships (such as friends) but also to indirect relationships (such as friends of friends) and whether there are geographical or temporal constraints on the spread of happiness through a social network.</p>	<p>Text</p>

<h2>DISCUSSION</h2>	
<p>1. While there are many determinants of happiness, whether an individual is happy also depends on whether others in the individual’s social network are happy. Happy people tend to be located in the centre of their local social networks and in large clusters of other happy people. The happiness of an individual is associated with the happiness of people up to three degrees removed in the social network. Happiness, in other words, is not merely a function of individual experience or individual choice but is also a property of groups of people. Indeed, changes in individual happiness can ripple through social networks and generate large scale structure in the network, giving rise to clusters of happy and unhappy individuals. These results are even more remarkable considering that happiness requires close physical proximity to spread and that the effect decays over time.</p>	<p>Text</p>
<p>2. Our results are consistent with previous work on the evolutionary basis of human emotions and with work focusing on the fleeting direct spread of emotions. In addition to their internal and psychological relevance, emotions have a specifically social role: when humans experience emotions, they tend to show them. Like laughter and smiling, the emotion of happiness might serve the evolutionarily adaptive purpose of enhancing social bonds. Human laughter, for example, is believed to have evolved from the “play face” expression seen in other primates in relaxed social situations. Such facial expressions and positive emotions enhance social relations by producing analogous pleasurable feelings in others, by rewarding the efforts of others, and by encouraging ongoing social contact. Given the organisation of people (and early hominids) into social groups larger than pairs, such spread in emotions probably served evolutionarily adaptive purposes. There are thus good biological, psychological, and social reasons to suppose that social networks—both in terms of their large scale structure and in terms of the interpersonal ties of which they are composed—would be</p>	<p>Text</p>

<p>relevant to human happiness.</p>	
<p>3. Our data do not allow us to identify the actual causal mechanisms of the spread of happiness, but various mechanisms are possible. Happy people might share their good fortune (for example, by being pragmatically helpful or financially generous to others), or change their behaviour towards others (for example, by being nicer or less hostile), or merely exude an emotion that is genuinely contagious (albeit over a longer time frame than previous psychological work has indicated). Psychoneuroimmunological mechanisms are also conceivable, whereby being surrounded by happy individuals has beneficial biological effects.</p>	<p>Text</p>
<p>4. The spread of happiness seems to reach up to three degrees of separation, just like the spread of obesity and smoking behaviour. Hence, although the person to person effects of these outcomes tend to be quite strong, they decay well before reaching the whole network. In other words, the reach of a particular behaviour or mood cascade is not limitless. We conjecture that this phenomenon is generic. We might yet find that a “three degrees of influence rule” applies to depression, anxiety, loneliness, drinking, eating, exercise, and many other health related activities and emotional states, and that this rule restricts the effective spread of health phenomena to three degrees of separation away from the ego.</p>	<p>Text</p>
<p>5. Our findings have relevance for public health. To the extent that clinical or policy manoeuvres increase the happiness of one person, they might have cascade effects on others, thereby enhancing the efficacy and cost effectiveness of the intervention. For example, illness is a potential source of unhappiness for patients and also for those individuals surrounding the patient. Providing better care for those who are sick might not only improve their happiness but also the happiness of numerous others, thereby further vindicating the benefits of medical care or health promotion.</p>	<p>Text</p>
<p>6. There is of course a tradition of community approaches to mental health, but this longstanding concern is now being coupled with a burgeoning interest in health and social networks. More generally, conceptions of health and concerns for the wellbeing of both individuals and populations are increasingly broadening to include diverse “quality of life” attributes, including happiness. Most important from our perspective is the recognition that people are embedded in social networks and that the health and wellbeing of one person affects the health and wellbeing of others. This fundamental fact of existence provides a conceptual justification for the specialty of public health. Human happiness is not merely the province of isolated individuals.</p>	<p>Text</p>