



## Discover Generics

Cost-Effective CT & MRI Contrast Agents



FRESENIUS  
KABI

WATCH VIDEO

# AJNR

## The Social Network of Loneliness

M. Castillo

*AJNR Am J Neuroradiol* 2014, 35 (12) 2207-2208

doi: <https://doi.org/10.3174/ajnr.A3964>

<http://www.ajnr.org/content/35/12/2207>

This information is current as  
of June 16, 2025.

## The Social Network of Loneliness

M. Castillo, *Editor-in-Chief*

Unlike other countries, we Americans like our heroes to be lonely, and some that come to mind immediately are cowboys, explorers, and scientists patiently working in their laboratories while remaining decontextualized from their surroundings, and perhaps the loneliest of them all: astronauts. Thus, it should come as no surprise that in some of the better recent movies, *Gravity* (Sandra Bullock) and *All Is Lost* (Robert Redford), the main characters find themselves completely alone, and at the end, they are portrayed as heroes. As our social exchange structure changes, Americans are more lonely than ever before, despite our increasing population and our ability to communicate with each other more often and faster.

Although one can argue about the differences and similarities of the following terms: aloneness, isolation, retreat, and seclusion, what I would like to briefly address here is “loneliness,” which I take to mean a lack of companionship that may occur even when surrounded by or “connected” to others. Nowadays, our connections are basically electronic and, to many my age or younger, accomplished through Facebook and other “social media.”

As of this writing, our main modern social communication tool, Facebook, had 1.31 billion subscribers and 680 million mobile users.<sup>1</sup> Here are some more Facebook statistics that amaze me: 640 billion minutes per month are spent on it, nearly 50% of those 18–34 years of age use it, and it has more than 1 trillion page views per month and 2.7 billion “likes” every day. At the time of this writing, the *American Journal of Neuroradiology* (AJNR) had 5461 “likes” and *Radiology* had 28,521 “likes” on their Facebook pages. Thus, it seems that we radiologists are indeed, true Facebook aficionados. For those who like a more concise communication, it will be a relief to learn that Twitter is not doing badly at all. It has nearly 646 million users and hosts nearly 10,000 tweets per second,<sup>2</sup> and just to be fair to Google, I need to mention that its social network (Google+) now has more than 300 million monthly users who upload 1.5 billion pictures every week.<sup>3</sup>

As our electronic social media grow, we seem to get lonelier. The number of US households tripled between 1940 and 2010, but while in 1940, 90% of them contained families, in 2010 only 66% did.<sup>4</sup> About 27% of households have only 1 person, a number 3 times higher than 50 years ago, and 33% of households now have childless couples.

Is loneliness biologic? Cole et al<sup>5</sup> from the University of California, Los Angeles (UCLA) published, in 2007, an interesting article on this topic. He and his coauthors suggested that changes in genes that are related to inflammation also drive chronic high levels of feelings of isolation and loneliness. This study revealed that the levels of gene expressions may be different depending not only on how many people you know but also related to the number of those you feel close to. Intuitively, a relationship between

feeling lonely and one’s immune system makes sense to me. The greater the number of close friends one has, the more your immune system must be ready to combat the germs they carry. Conversely, a lesser number of friends may result in a lazier immune system, making your health more fragile; it is well-known that the lonely have precarious health. The way the brain perceives and reacts is also different in the lonely. When examined with fMRI, lonely individuals showed less activation of the ventral striatum, which correlated with a feeling of being less rewarded by social stimuli.<sup>6</sup> Nonlonely people showed higher activation of this region, implying that social interactions resulted in a pleasurable event. Lonely individuals also appeared to be more drawn to the distress of others. These studies and others seem to indicate that a lack of perceived pleasure from social interactions is at the core of loneliness.

To avoid loneliness, one must have personal relationships—that is, having a lot of friends on Facebook will not relieve one’s feelings of isolation. Conversely, it could be that lonely individuals spend all of their time on Facebook trying to build up a large network of “friends.” Moira Burke from the Carnegie Mellon University studied Facebook users and concluded that only those for whom Facebook served as a conduit to establishing direct communications with other individuals leading to friendship seemed to avoid feelings of loneliness.<sup>7</sup> That is, having a large number of friends write on your Facebook wall or communicating with them by terse Twitter-like exchanges will not decrease loneliness. Another study concluded that if one has a lot of friends in real life, one will also have a lot of them on Facebook and be a successful user of it.<sup>8</sup> Simply consuming and broadcasting trivial life events on social media makes one more, not less lonely. The popularity of Facebook may reflect the increasing desire to find oneself among friends (31% in 2010 versus 37% today). Groups of individuals who make and keep friends easier are the Millennial generation (47%), Hispanics (47%), and never-married adults (44%).<sup>9</sup>

To measure loneliness, one of the most popular methods is the UCLA scale. This 20-question scale is easy to use and apparently reproducible. You may find it at <http://www.tactileint.com/portfolio/uclalone.html>, and when I took the test, I scored a 19, which is the average score for school teachers (I guess I must share with them some frustrations and feelings of isolation perhaps even leading to loneliness). Using this scale, the American Association for Retired Persons (AARP) has found that 35% of adults consider themselves lonely, especially those in poor health, the socially isolated, those with a new residence (less than 1 year), and females; but it also concluded that as we get older overall we feel less and not more lonely.<sup>10</sup> With respect to electronic communications, AARP found that those using e-mail felt that they had fewer deep friendships than before. Not surprisingly, AARP also reported that isolation and loneliness increase a person’s risk of death. Loneliness increases circulating cortisol levels that may contribute to brain and cerebrovascular disease and affect sleep patterns that may lead to depression. The common threads between heart and brain vascular disease could be related to the fact

that the lonely have an increased incidence of hypertension and smoke more (on average, 15 cigarettes per day).

Is loneliness genetic in nature? Some studies suggest a strong genetic effect, but because loneliness is highly influenced by environmental situations, its expressions vary from childhood to adulthood and from individual to individual. In 1 highly regarded study, loneliness was assessed in 8387 twins.<sup>11</sup> The conclusions of the study were that heritability of differences in feelings of loneliness was 48%, no unique environmental influences were discernible, genetic contributions to loneliness were similar in children and adults, and the heritability of loneliness showed no sex differences. The authors suggested that individuals are unable to control their loneliness as a response to external stimuli.

Why does loneliness hurt? One hears others saying that “they are so lonely it hurts.” Because social exclusion is a type of loneliness, one fMRI study assessed the brains of individuals who were excluded from a specific activity.<sup>12</sup> The results paralleled those from studies of physical pain. That is, the anterior cingulate cortex was less active during exclusion and correlated with self-reported distress. The right ventral prefrontal cortex was active during exclusion, suggesting that it regulates feelings of loneliness by excluding the function of the anterior cingulate cortex. From a developmental standpoint, the same authors believe that the loneliness system “borrowed” its computations from the pain system to prevent its harmful effects.

Perhaps some of the loneliest moments may be experienced within a marriage. Married people are healthier, live longer, and are less lonely but only if their spouses are confidants. This is, again, loneliness is related to the quality of the relationship and not to the relationship per se. One’s immediate circle of confidants also extends to one’s best friends. Nevertheless, how often you do hear American adults say they have a best friend to confide in? The answer is not often. In 1985, the number of confidants a person had was close to 3; in 2004, it had decreased to 2; and today 25% of Americans claim to have no one to confide in.<sup>13</sup> This seems to be paradoxical when the average American has 634 electronic social ties, but the truth is that most if not all of these ties are superficial and eventually meaningless. When Facebook data are analyzed, it has been found that the largest single group (22%) of “friends” a user has consists of people he or she knew in high school followed by extended family and coworkers. I personally feel that the connection between myself and those I went to high school with is now basically nonexistent, but then, I do not have a Facebook page (I do have a Facebook account that I use to check *AJNR*’s page) and do not respond to any Facebook invitations. What is even worse is that up to 7% of Facebook “friends” are strangers whom the user has not and will never meet.

Since our ever-expanding dependency on electronic communications seems to be making us lonelier, it seems ironic that several sites, such as the Web of Loneliness, offer on-line help via chat rooms and blogs and other types of virtual support groups,

many through Facebook and Twitter. Another such site is the UK’s Campaign to End Loneliness, which, again, contains a plethora of posts (most are useless) and some pictures of their followers, mostly octogenarians whom I doubt know how to use Twitter or Facebook. These sites state that 5 million older British individuals have, as their sole companion, their television. Of course, many of these sites have a scamlike scent and accept donations via Pay Pal, but some like the UK one are supported by philanthropic foundations.

As in many other situations in our lives, loneliness is multifactorial. Our pursuit of space and individualism (an idea ingrained in American culture) and the desire to be alone drove city populations into the suburbs and beyond. So do as country music legend Willie Nelson says: “Mamas, don’t let your babies grow up to be cowboys, they’ll never stay home and they’re always alone, make ’em be doctors and lawyers and such. . . .” Moreover, I should add: keep them away from Facebook and Twitter.

## REFERENCES

1. STATISTIC BRAIN. Facebook Statistics. <http://www.statisticbrain.com/facebook-statistics>. Accessed March 19, 2014
2. STATISTIC BRAIN. Twitter Statistics. <http://www.statisticbrain.com/twitter-statistics>. Accessed March 19, 2014
3. Barr A. **Google’s social network sees 58% jump in users.** *USA TODAY*. October 29, 2013. <http://www.usatoday.com/story/tech/2013/10/29/google-plus/3296017>. Accessed November 11, 2013
4. Jacobsen LA, Mather M, Dupuis B. Population Reference Bureau. Household change in the United States. <http://www.prb.org/Publications/Reports/2012/us-household-change.aspx>. Accessed November 11, 2013
5. Cole SW, Hawkey LC, Arevalo JM, et al. **Social regulation of gene expression in human leucocytes.** *Genome Biol* 2007;8:R189
6. Cacioppo JT, Norris CJ, Decety J, et al. **In the eye of the beholder: individual differences in perceived social isolation predict regional brain activation to social stimuli.** *J Cogn Neurosci* 2009;21:83–92
7. Burke M, Kraut R, Marlow C. **Social capital on Facebook: differentiating uses and users.** *CHI* 2011. May: 7–12, 2011. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.227.6644&rep=rep1&type=pdf>. Accessed May 5, 2014
8. Quercia D, Lambiotte R, Stillwell D, et al. **The personality of popular Facebook users.** <http://dl.acm.org/citation.cfm?id=2145346>. Accessed April 24, 2014
9. BarnaGroup. How the last decade changed American life. <https://www.barna.org/barna-update/culture/624-how-the-last-decade-changed-american-life#.UoEdduKO51N>. Accessed April 24, 2014
10. Anderson G. **Loneliness among older adults: a national survey of adults 45+.** [http://www.aarp.org/personal-growth/transitions/info-09-2010/loneliness\\_2010.html](http://www.aarp.org/personal-growth/transitions/info-09-2010/loneliness_2010.html). Accessed November 11, 2013
11. Boomsma DI, Willemsen G, Dolan CV, et al. **Genetic and environmental contributions to loneliness in adults: the Netherlands twin registry study.** *Behav Genet* 2005;35:745–52
12. Eisenberger NI, Lieberman MD, Williams KD. **Does rejection hurt? An fMRI study of social exclusion.** *Science* 2003;302:290–92
13. Kornblum J. **Study: 25% of Americans have no one to confide in.** *USA TODAY*. June 22, 2006. [http://usatoday30.usatoday.com/news/nation/2006-06-22-friendship\\_x.htm](http://usatoday30.usatoday.com/news/nation/2006-06-22-friendship_x.htm). Accessed March 19, 2014