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ABSTRACT

In all of the coverage of climate change in the popular press, relatively little attention has been paid to one aspect: mental health. Rising seawaters, increasingly strong storms, and more ferocious droughts caused by climate change are not only devastating to physical infrastructure but also affect human beings in other ways as well: people lose their homes, their jobs, their family members, and their communities. Researchers have found that climate change can cause not only posttraumatic stress disorder (PTSD) from the trauma of displacement from extreme weather events such as Hurricane Katrina but also “pre-traumatic” stress disorder, or, moderate to extreme anxiety about a looming crisis. This paper describes some of these effects, who is most vulnerable to them, some of the social factors involved, and offers some suggestions for possible solutions.

KEYWORDS

Climate change; mental health; natural disasters; PTSD; extreme weather

Climate change is about more than rising sea levels and polar bears; it affects mental health, too. Think about it: if you are the victim of a climate change-induced flood, you may lose not only your physical house but also your psychological home, with its prized mementos and all that is associated with them. In the worst case, you may lose family members and friends. No wonder climate-connected floods and drought are often accompanied by anxiety, shock, depression, grief, despair, numbness, aggression, sleep disruptions, interpersonal difficulties, acute and posttraumatic stress disorder (PTSD), substance abuse, and suicide (Clayton, Manning, and Hodge 2014; Doherty 2015). Similarly, climate change-related heat waves are associated with increased aggression – including homicide, suicide, and spousal abuse – and with increases in hospital admissions among those with preexisting mental health challenges (Dodgen et al. 2016; Doherty 2015). A future in which climate-related disasters are more common across the globe, leaving many people living with mental health problems, is easy to imagine.

Before, during, and after

Climate change can affect mental health even before its actual appearance. Distress related to impending environmental change, such as habitual ecological worrying and “eco-anxiety,” has been increasingly noted. Habitual ecological worrying has been described as an adaptive response to a changing climate that is generally associated with pro-environmental attitudes and

actions (Verplanken and Roy 2013). Eco-anxiety is characterized by severe and debilitating worry about risks that may be insignificant and is not associated with the more proactive behavior associated with habitual ecological worrying (Rabinowitz and Poljak 2003). It can elicit dramatic reactions, such as loss of appetite, sleeplessness, and panic attacks, among those affected (Nobel 2007). Even without these symptoms, many people are often unconsciously anxious, unaware of just how concerned they truly are about impending environmental changes. This lack of awareness often slowly diminishes, to be replaced by increasingly severe anxiety about how dire the situation has become. The National Wildlife Federation has estimated that 200 million Americans will eventually experience emotional distress as a result of the effects of climate change (NWF 2011).

Others faced with the impending reality of climate change feel powerless to improve the situation, leaving them with an unresolved sense of loss, helplessness, and frustration (Moser 2013). The 30-plus “dragons of inaction” (Gifford 2011) often immobilize even well-intentioned individuals in the face of large-scale problems. The degree of distress one feels about climate change is often related to how directly and perceptibly one’s environment is altered or threatened (NWF 2011).

Of course, victims also experience mental health-related problems during the event itself such as during a forest fire or flood. Rapid events obviously cause problems, but so do slow ones: the gradual change to

a familiar landscape, typical among those who are now witnessing climate change firsthand in places like Northern Canada, has been found to elicit a sense of sadness and loss known as “solastalgia” (Albrecht et al. 2007).

The effects also occur *after* a climate-related event. Acute stress reactions such as shock and grief often precede longer-term psychological trauma including depression, despair, and PTSD, as individuals struggle to cope with the changes and losses brought by disaster (Clayton, Manning, and Hodge 2014). For example, three months after Hurricane Andrew devastated Southern Florida, 38 percent of affected children in one study were still experiencing symptoms consistent with a PTSD diagnosis, and 10 months following the storm, 18 percent were still experiencing these symptoms (Silverman, Vernberg, and Prinstein 1996).

Similarly, nearly a quarter of Hurricane Katrina evacuees reported experiencing severe symptoms of PTSD, while almost 40 percent were afflicted with moderate symptoms (Satcher, Friel, and Bell 2007). Those living with symptoms of PTSD are more likely to experience anxiety, depression, substance abuse, violence, and aggression, as well as interpersonal and job-related difficulties (Simpson, Weissbecker, and Sephton 2011). Another 29 percent of those who had experienced loss during Katrina developed “complicated grief,” a condition in which grief is experienced more strongly and for a longer period of time (Shear et al. 2011).

Challenges to interpersonal relationships elicited by climate change-related disasters include difficulties caused by the destruction of home, school, and work environments (Simpson, Weissbecker, and Sephton 2011). Without the physical safety and familiarity of these environments, relationships may be more difficult to nurture and sustain, families and friends may be separated, and jobs may be lost.

Along with PTSD and complicated grief, other mental health issues persist beyond the immediate disaster into seemingly calmer times. Many of these issues are more gradual and subtle in nature, making them more difficult to measure (Doherty 2015). For example, some residents of tornado-prone areas have developed pathological fears of extreme weather events, so severe that they are afraid of leaving their homes (Westefeld 1996).

Another longer-term consideration is vector-borne illness, which is on the rise in many countries as a result of warming climates. Individuals infected with the West Nile virus and Lyme disease are at risk for the development of depression, impaired cognitive function, pain, and fatigue, among other mental health disturbances (Isaac and Larson 2014; Murray, Resnick, and Miller 2007).

A third, longer-term issue is food. Increases in the level of carbon dioxide may be responsible for reducing the nutritional value of some foods, which in turn can cause fatigue and depression among developing children and adolescents (NCTSN 2003). Similarly, increases in carbon dioxide and climate change have been linked to higher incidences of food allergies, which can cause stress and anxiety among those afflicted (Beggs and Walczyk 2008; Teufel et al. 2007).

The more vulnerable among us

Some people are, and will be, more affected. These groups include women, children, older adults, military employees, and first responders, those with preexisting mental health issues, individuals with fewer economic resources, and entire communities with fewer resources (Clayton, Manning, and Hodge 2014; Dodgen et al. 2016; Doherty 2015; NWF 2011; Weissbecker and Czinez 2011).

In general, women tend to experience more mental health issues than men, including greater stress and anxiety, a heightened sense of vulnerability, and higher rates of PTSD following disaster (Corrarino 2008; Norris et al. 2002; Trumbo et al. 2011). Pregnant women are particularly vulnerable during catastrophes (Xiong et al. 2010). Domestic abuse, which primarily affects women, is heightened following disaster (Fritze et al. 2008).

Children face special challenges. PTSD is common among children following catastrophe, as is depression, aggression, social withdrawal, and clinginess (Simpson, Weissbecker, and Sephton 2011). Such symptoms are more likely to persist and impair children than adults (Norris et al. 2002). They may further alter children’s stress responses, putting them at risk for mental health problems such as anxiety and depression, and later physiological health challenges (Simpson, Weissbecker, and Sephton 2011).

One illustration of this anxiety comes from a survey of Australian children’s responses to severe drought: A quarter of them believed that the world would come to an end within their lifetimes (Tucci, Mitchell, and Ringwood 2007). Another comes in the guise of a condition called “climate change delusion,” which was documented by a physician who attended to a 17-year-old boy who was hospitalized for the condition. This depressed teenager refused to drink water out of concern for the health and safety of individuals affected by the drought in Australia (NWF 2011).

Of greater widespread concern, however, is the rising rate of respiratory conditions such as asthma among youth, which of course can cause significant

anxiety for both affected children and their families (Shea and the Committee on Environmental Health 2007). The developing lungs of children are not only more vulnerable to pollution, but children breathe at a faster rate and spend more time outdoors than do adults (NWF 2011).

Older adults also have increased sensitivity to changing climates. The majority of deaths associated with the 2003 European heat wave, for example, were those of older adults (Robine et al. 2008). Seniors are also more vulnerable to air pollution, which has been associated with cognitive decline and impaired cognitive function among older adults (Dodgen et al. 2016). Problems experienced by the aged are likely to be compounded by higher rates of untreated depression and physiological health challenges among this demographic (Dodgen et al. 2016). Older adults tend to use fewer effective coping mechanisms and often are less resilient than their younger counterparts following flood disasters. For example, stoicism, or the tendency to suppress strong emotion, is more prevalent among older generations (Bei et al. 2013). Compounding these considerations, the proportion of older adults is growing. Individuals over the age of 65 are expected to represent 23.6 percent of the American population by 2060, a 50 percent increase over the current 15 percent (US Census Bureau 2014).

Fourth, the 5–15 percent of the American population who already have mental health problems are most likely to be hit hard by climate change-related heat waves and disasters (Berry, Bowen, and Kjellstrom 2010; NWF 2011). Mood disorders, substance abuse, reactive psychoses, and suicides increase following disaster, especially among those already experiencing social isolation (Dodgen et al. 2016; NWF 2011). Many medications that are used for the treatment of mental illness increase one's sensitivity to heat and impair the body's heat regulation ability, which likely led to the increased rates of hospitalizations in the 2003 French and 2012 Wisconsin heat waves (Berko et al. 2014; Christenson, Geiger, and Anderson 2013; Martin-Latry et al. 2007). Finally, disaster is likely to exacerbate and emphasize preexisting limitations to access to mental health care, with obvious consequences (Dodgen et al. 2016).

Social factors

Climate change is a social justice issue. People with access to fewer economic resources are more vulnerable to its impacts (Doherty 2015). For example, they are less able to evacuate in case of emergency, more often exposed to poor air quality and the impacts of extreme

heat, more likely to live with health and mobility issues and to have less access to resources, goods, and services that could buffer the effects of extreme weather (Bourque and Cunsolo Willox 2014; Swim et al. 2010). Americans of lower socioeconomic status are more likely to struggle with the consequences of climate change, because many are employed in climate-dependent sectors such as fishing and agriculture (NWF 2011).

On a larger scale, lower-income countries usually have fewer resources for offering protection to their residents (Doherty 2015). Already-strained mental health-care systems are at further disadvantage following resource-depleting disasters (Jacob et al. 2007; Jones et al. 2009), and outdated physical infrastructure may also be less resilient to extreme weather (Clayton, Manning, and Hodge 2014). Unfortunately, communities with more vulnerable populations – that is, with more children, older adults, and persons with mental health issues – also tend to fare less well in catastrophic times (Weissbecker and Czinez 2011).

Climate-driven migration threatens the preservation of traditional culture when climate refugees seek new, safe homes in foreign countries (Nelson, West, and Finan 2009; Reuveny 2008). This perceived or actual cultural disruption, in concert with lost social and environmental ties, is likely to cause increased grief, anxiety, and adjustment disorders in the host community (Doherty 2015), in addition to the impact on the emigrants' own mental health and cultural collisions with the new conditions.

Psychological and social factors also have impacts upon a community's resilience following disaster. Greater vulnerability has been linked with lower levels of social cohesion, higher rates of social inequality, and distrust between community dwellers and institutions (Norris et al. 2008). For example, higher rates of PTSD have been identified in people who perceive individuals in their community to be less supportive of one another (Ursano et al. 2014).

Media portrayals can strongly influence how a disaster is perceived. If a disaster is labeled as climate related, for example, rates of anxiety within the community will likely climb (Clayton, Manning, and Hodge 2014). The very understanding that climate change-related disasters are caused by human behavior can propagate community distrust and divisiveness. When natural disasters are understood to be “acts of God,” positive community responses tend to ensue, but when disasters are understood to be fueled by human-made climate change, they sometimes evoke anger and distrust (Doherty 2015; NWF 2011). Reckoning with the negative impact that cumulative, collective human actions have had on beloved plant and animal species

can lead to feelings of failure and despair (Chivian and Bernstein 2008).

Climate change has, however, become a direct threat to more than just plant and animal life. Dan Christman, the vice president for International Affairs for the US Chamber of Commerce, has suggested that climate change has become the primary cause of conflict globally, and that climate change will be the main reason for the United States to go to war in the coming decades (NWF 2011).

Toward solutions

Now that some of the more threatening possibilities of climate change on our individual and collective mental health have been broached, some solutions must be explored to remind us that human ingenuity can still offer hope. Sources for this hope are abundant; they include the media, our education and health-care systems, research, and, ultimately, ourselves and our communities.

The first solutions-oriented goal is to provide accurate, consistent, and persuasive information about climate change and its impact on mental health. Trusted and knowledgeable organizations must disseminate information to the public. It should be framed in a positive and encouraging manner, and offer solutions and suggestions. Positive, hopeful messages are more motivating than attempting to encourage people through fear. Confidence can be promoted through media messages that acknowledge strong emotions, provide a local context, encourage collective action, and use appropriate imagery. Fostering a positive, cohesive sense of community is also a powerful tool to promote well-being in the face of uncertainty (Clayton, Manning, and Hodge 2014).

Second, structures and systems for promoting mental health must be adequately funded and supported. Health-care providers, particularly first responders, should be educated about how to deal with mental health crises. They must actively advocate for public policy that promotes mental health, posttraumatic growth, and resilience (Doherty 2015).

Third, researchers should advance knowledge; several areas are worthy of further investigation. These include studies of the effects of mass evacuation as a result of extreme weather, the influence of attitude toward climate change on psychological coping, and how differing media presentations of the effects of climate change affect viewers' mental health, among many others (Dodgen et al. 2016).

Finally, psychological vulnerability to the impact of climate change is mediated by the resilience and

empowerment of individuals and their communities. One approach is to view climate change as a challenge to be met with social engagement and pro-environmental behavior, attitudes that serve to buffer negative impact (Fritze et al. 2008). More vulnerable segments of the population must be attended to, and social ties within communities must be strengthened in order to foster a sense of trust and control. Health-care services, particularly those that attend to psychological trauma, should be bolstered. Spiritual growth and optimism are also tools that can provide strength, promote positive action, and speed recovery even in the most threatening of situations (Clayton, Manning, and Hodge 2014).

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Notes on contributors

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Robert Gifford is a professor of Psychology and Environmental Studies at the University of Victoria. He is a fellow of the American Psychological Association, the Canadian Psychological Association, and the Association for Psychological Science, and the recipient of Career Awards from the Environmental Design Research Association and the American Psychological Association. Gifford is the author of over 125 refereed publications and book chapters, five editions of *Environmental psychology: Principles and practice* and editor of *Research methods for environmental psychology*. He has been the chief editor of the *Journal of Environmental Psychology* for 14 years, and has served as the President of the Environmental Psychology division of the International Association of Applied Psychology, APA's Population and Environment Division, and CPA's environmental section.

References

- Albrecht, G., G.-M. Sartore, L. Connor, N. Higginbotham, S. Freeman, B. Kelly, H. Stain, A. Tonna, and G. Pollard. 2007. "Solastalgia: The Distress Caused by Environmental

- Change.” *Australasian Psychiatry* 15: S95–S98. doi:10.1080/10398560701701288.
- Beggs, P. J., and N. E. Walczyk. 2008. “Impacts of Climate Change on Plant Food Allergens: A Previously Unrecognized Threat to Human Health.” *Air Quality, Atmosphere & Health* 1: 119–123. doi:10.1007/s11869-008-0013-z.
- Bei, B., C. Bryant, K.-M. Gilson, J. Koh, P. Gibson, A. Komiti, H. Jackson, and F. Judd. 2013. “A Prospective Study of the Impact of Floods on the Mental and Physical Health of Older Adults.” *Aging & Mental Health* 17: 992–1002. doi:10.1080/13607863.2013.799119.
- Berko, J., D. D. Ingram, S. Saha, and J. D. Parker. 2014. *Deaths Attributed to Heat, Cold, and Other Weather Events in the United States, 2006–2010*, 15 pp. Hyattsville, MD: National Center for Health Statistics.
- Berry, H. L., K. Bowen, and T. Kjellstrom. 2010. “Climate Change and Mental Health: A Causal Pathways Framework.” *International Journal of Public Health* 55: 123–132. doi:10.1007/s00038-009-0112-0.
- Bourque, F., and A. Cunsolo Willox. 2014. “Climate Change: The Next Challenge for Public Mental Health?” *International Review of Psychiatry* 26: 415–422. doi:10.3109/09540261.2014.925851.
- Chivian, E., and A. Bernstein. 2008. *Sustaining Life: How Human Health Depends on Biodiversity*. Oxford: Oxford University Press.
- Christenson, M. L., S. D. Geiger, and H. A. Anderson. 2013. “Heat-Related Fatalities in Wisconsin during the Summer of 2012.” *WMJ* 112: 219–223.
- Clayton, S., C. M. Manning, and C. Hodge. 2014. *Beyond Storms & Droughts: The Psychological Impacts of Climate Change*. Washington, DC: American Psychological Association and ecoAmerica. http://ecoamerica.org/wp-content/uploads/2014/06/eA_Beyond_Storms_and_Droughts_Psych_Impacts_of_Climate_Change.pdf.
- Corraro, J. E. 2008. “Disaster-Related Mental Health Needs of Women and Children.” *MCN The American Journal of Maternal/Child Nursing* 33: 242–248. doi:10.1097/01.NMC.0000326079.26870.e3.
- Dodgen, D., D. Donato, N. Kelly, A. La Greca, J. Morganstein, J. Reser, J. Ruzek, et al. 2016. “Ch. 8: Mental Health and Well-Being.” In *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*, edited by A. Crimmins, J. Balbus, J. L. Gamble, C. B. Beard, J. E. Bell, D. Dodgen, R. J. Eisen, N. Fann, M. D. Hawkins, S. C. Herring, L. Jantarasami, D. M. Mills, S. Saha, M. C. Sarofim, J. Trtanj, and L. Ziska, 217–246. Washington, DC: U.S. Global Change Research Program. doi:10.7930/J0TX3C9H.
- Doherty, T. J. 2015. “Mental Health Impacts.” In *Climate Change and Public Health*, edited by B. S. Levy, and J. A. Patz, 195–213. New York, NY: Oxford University Press.
- Fritze, J., G. A. Blashki, S. Burke, and J. Wiseman. 2008. “Hope, Despair and Transformation: Climate Change and the Promotion of Mental Health and Wellbeing.” *International Journal of Mental Health Systems* 2 (1): 13. doi:10.1186/1752-4458-2-13.
- Gifford, R. 2011. “The Dragons of Inaction: Psychological Barriers that Limit Climate Change Mitigation and Adaptation.” *American Psychologist* 66: 290–302.
- Isaac, M. L., and E. B. Larson. 2014. “Medical Conditions with Neuropsychiatric Manifestations.” *Medical Clinics of North America* 98: 1193–1208. doi:10.1016/j.mcna.2014.06.012.
- Jacob, K. S., P. Sharan, I. Mirza, M. Garrido-Cumbrera, S. Seedat, J. J. Mari, V. Sreenivas, and S. Saxena. 2007. “Mental Health Systems in Countries: Where are We Now?” *The Lancet* 370 (9592): 1061–1077. doi:10.1016/S0140-6736(07)61241-0.
- Jones, L., J. B. Asare, M. El Masri, A. Mohanraj, H. Sherief, and M. van Ommeren. 2009. “Severe Mental Disorders in Complex Emergencies.” *The Lancet* 374 (9690): 654–661. doi:10.1016/S0140-6736(09)61253-8.
- Martin-Latry, K., M. P. Goumy, P. Latry, C. Gabinski, B. Bégaud, I. Faure, and H. Verdoux. 2007. “Psychotropic Drugs Use and Risk of Heat-Related Hospitalisation.” *European Psychiatry* 22: 335–338. doi:10.1016/j.eurpsy.2007.03.007.
- Moser, S. C. 2013. “Navigating the Political and Emotional Terrain of Adaptation: Community Engagement When Climate Change Comes Home.” In *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World*, edited by S. C. Moser, and M. T. Boykoff, 289–305. New York, NY: Routledge.
- Murray, K. O., M. Resnick, and V. Miller. 2007. “Depression after Infection with West Nile Virus.” *Emerging Infectious Diseases* 13: 479–481. doi:10.3201/eid1303.060602.
- NCTSN. 2003. *Review of Child and Adolescent Refugee Mental Health: White Paper from the National Child Traumatic Stress Network Refugee Trauma Task Force*, 49 pp. Los Angeles, CA: National Child Traumatic Stress Network.
- Nelson, D. R., C. T. West, and T. J. Finan. 2009. “Introduction to ‘In Focus: Global Change and Adaptation in Local Places.’” *American Anthropologist* 111 (3): 271–274. doi:10.1111/aman.2009.111.issue-3.
- Nobel, J. 2007. “Eco-Anxiety: Something Else to Worry About.” *The Philadelphia Inquirer*, April 9.
- Norris, F. H., M. J. Friedman, P. J. Watson, C. M. Byrne, E. Diaz, and K. Kaniasty. 2002. “60,000 Disaster Victims Speak: Part I. an Empirical Review of the Empirical Literature, 1981–2001.” *Psychiatry: Interpersonal and Biological Processes* 65: 207–239. doi:10.1521/psyc.65.3.207.20173.
- Norris, F. H., S. P. Stevens, B. Pfefferbaum, K. R. Wyche, and R. L. Pfefferbaum. 2008. “Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness.” *American Journal of Community Psychology* 41: 127–150. doi:10.1007/s10464-007-9156-6.
- NWF (National Wildlife Federation). 2011. “The Psychological Effects of Global Warming on the United States: And Why the U.S. Mental Health Care System is Not Adequately Prepared.” *National Forum and Research Report*, February 2012. https://www.nwf.org/pdf/Reports/Psych_Effects_Climate_Change_Full_3_23.pdf.
- Rabinowitz, P. M., and A. Poljak. 2003. “Host-Environment Medicine: A Primary Care Model for the Age of Genomics.” *Journal of General Internal Medicine* 18 (3): 222–227. doi:10.1046/j.1525-1497.2003.11101.x.

- Reuveny, R. 2008. "Ecomigration and Violent Conflict: Case Studies and Public Policy Implications." *Human Ecology: An Interdisciplinary Journal* 36 (1): 1–13. doi:10.1007/s10745-007-9142-5.
- Robine, J.-M., S. L. K. Cheung, S. Le Roy, H. Van Oyen, C. Griffiths, J.-P. Michel, and F. R. Herrmann. 2008. "Death Toll Exceeded 70,000 in Europe during the Summer of 2003." *Comptes Rendus Biologies* 331 (2): 171–178. doi:10.1016/j.crvi.2007.12.001.
- Satcher, D., S. Friel, and R. Bell. 2007. "Natural and Manmade Disasters and Mental Health." *JAMA* 298 (21): 2540–2542. doi:10.1001/jama.298.21.2540.
- Shea, K. M., and the Committee on Environmental Health. 2007. "Technical Report: Global Climate Change and Children's Health." *Pediatrics* 120 (5): 1359–1367. doi:10.1542/peds.2007-2646.
- Shear, M. K., K. A. McLaughlin, A. Ghesquiere, M. J. Gruber, N. A. Sampson, and R. C. Kessler. 2011. "Complicated Grief Associated with Hurricane Katrina." *Depression & Anxiety* 28 (8): 648–657. doi:10.1002/da.20865.
- Silverman, W. K., E. M. Vernberg, and M. J. Prinstein. 1996. "Symptoms of Posttraumatic Stress in Children after Hurricane Andrew: A Prospective Study." *Journal of Consulting and Clinical Psychology* 64 (4): 712–723. doi:10.1037/0022-006X.64.4.712.
- Simpson, D. M., I. Weissbecker, and S. E. Sephton. 2011. "Extreme Weather-Related Events: Implications for Mental Health and Well-Being." In *Climate Change and Human Well-Being: Global Challenges and Opportunities*, edited by I. Weissbecker, 57–78. New York: Springer.
- Swim, J., S. Clayton, T. Doherty, R. Gifford, G. Howard, J. Reser, P. Stern, and E. Weber. 2010. *Psychology and Global Climate Change: Addressing a Multi-Faceted Phenomenon and Set of Challenges*, 108 pp. Washington, DC: The American Psychological Association Task Force on the Interface between Psychology and Global Climate Change.
- Teufel, M., T. Biedermann, N. Rapps, C. Hausteiner, P. Henningsen, P. Enck, and S. Zipfel. 2007. "Psychological Burden of Food Allergy." *World Journal of Gastroenterology* 13: 3456–3465. doi:10.3748/wjg.v13.i25.3456.
- Trumbo, C., M. Lueck, H. Marlatt, and L. Peek. 2011. "The Effect of Proximity to Hurricanes Katrina and Rita on Subsequent Hurricane Outlook and Optimistic Bias." *Risk Analysis* 31: 1907–1918. doi:10.1111/risk.2011.31.issue-12.
- Tucci, J., J. Mitchell, and C. G. Ringwood. 2007. *Children's Fears, Hopes and Heroes: Modern Childhood in Australia*. Ringwood: Australian Childhood Foundation and National Research Centre for the Prevention of Child Abuse, Monash University.
- Ursano, R. J., J. B. A. McKibben, D. B. Reissman, X. Liu, L. Wang, R. J. Sampson, and C. S. Fullerton. 2014. "Posttraumatic Stress Disorder and Community Collective Efficacy following the 2004 Florida Hurricanes." *PLoS ONE* 9: e88467. doi:10.1371/journal.pone.0088467.
- US Census Bureau. 2014. *National Population Projections: Summary Tables. Table 4: Projections of the Native-Born Population by Sex and Selected Age Groups for the United States: 2015 to 2060 (NP2014-T4)*. Washington, DC: U.S. Department of Commerce.
- Verplanken, B., and D. Roy. 2013. "My Worries Are Rational, Climate Change Is Not": Habitual Ecological Worrying Is an Adaptive Response." *PLoS ONE* 8 (9): e74708. doi:10.1371/journal.pone.0074708.
- Weissbecker, I., and J. Czinez. 2011. "Humanitarian Crises: The Need for Cultural Competence and Local Capacity Building." In *Climate Change and Human Well-Being: Global Challenges and Opportunities*, edited by I. Weissbecker, 79–96. New York, NY: Springer.
- Westefeld, J. S. 1996. "Severe Weather Phobia: An Exploratory Study." *Journal of Clinical Psychology* 52 (5): 509–515.
- Xiong, X., E. W. Harville, D. R. Mattison, K. Elkind-Hirsch, G. Pridjian, and P. Buekens. 2010. "Hurricane Katrina Experience and the Risk of Post-Traumatic Stress Disorder and Depression among Pregnant Women." *American Journal of Disaster Medicine* 5: 181–187. doi:10.5055/ajdm.2010.0016.