

An Interdisciplinary Perspective on Meteorological Learning for Person-centered Psychotherapists Facing Earth's Changing Climate and Everyday Weather

Matthew J. Bolton¹

College of Arts and Sciences, Saint Leo University, Saint Leo, FL
How The Weatherworks, Naples, FL

H. Michael Mogil²

How The Weatherworks, Naples, FL

Alan E. Stewart³

College of Education, University of Georgia, Athens, GA

Author note: Bolton was supported academically during the period of this work by a U.S. National Weather Service-sponsored and American Meteorological Society-awarded Graduate Fellowship. The opinions, conclusions, and/or recommendations expressed here are those of the authors and do not necessarily reflect the views of the National Weather Service or American Meteorological Society.

***Abstract.** This paper presents an interdisciplinary, person-centered perspective on the need for, and resources to enable, meteorological learning among humanistic and other psychotherapists.*

Ecological and environmental psychological perspectives on the person-centered psychotherapeutic approach are not new (see, e.g., Blair, 2011, 2014; Neville, 1999; Stouder, 2014; Tudor, 2014). However, they are becoming ever-more important as the Earth's weather regimes continue to shift toward extremes. Recent dataⁱ and computer model predictionsⁱⁱ have indicated, to showcase just a few emerging trends, that in the years to come society will face hotter temperatures; larger, more frequent droughts and wildfires; more or less rain, depending on location; and tendencies for

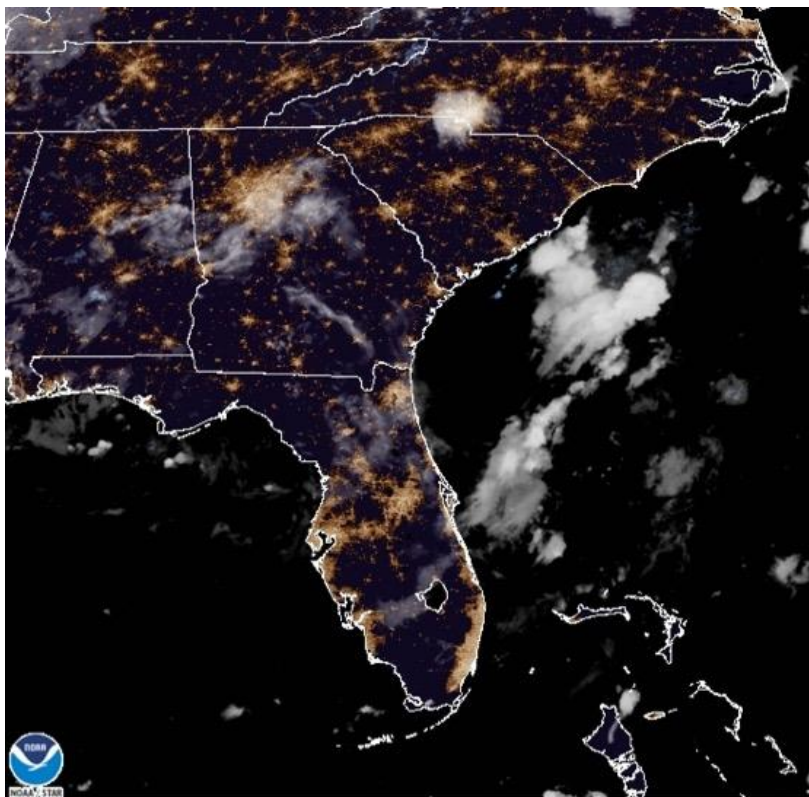
¹ Matthew Bolton is a graduate student in psychology primarily interested in the person-centered approach; he has research interests at the intersection of meteorology and psychology. Correspondence regarding this manuscript should be addressed to Matthew Bolton, College of Arts and Sciences, Saint Leo University, Saint Leo, FL and How The Weatherworks, Naples, FL. Email: Matthew.Bolton@email.saintleo.edu

² H. Michael Mogil is a Certified Consulting Meteorologist and facilitator of nationwide weather learning; he has been a facilitator of hands-on, minds-on weather learning, and proponent of person-centered learning and mentorship since the 1970s. He has also been involved (as a weather expert) in some 150 legal and insurance cases.

³ Dr. Alan Stewart is a weather and climate psychologist.

greater numbers of tornadoes and stronger tropical cyclones (Intergovernmental Panel on Climate Change [IPCC], 2018).

What's more, a growing coastal population means that even without weather and climate changes, individuals in particular locations may be subjected to certain adverse outcomes (e.g., coastal flooding, tropical cyclone landfalls—one need only briefly look at a nighttime GeoColor satellite image to see just how densely populated the Florida coastline has become). In other words, the climate's natural variability may increase to extreme levels and translate, due in part to interaction with other factors, to increased negative weather/climate-based impacts on physical, economic, and/or mental health.



*Figure 1.
NOAA/NESDIS
GeoColor
Satellite Image
for August 12,
2020, 09:11
UTC.*

It is with this background context in mind that we want to provide an interdisciplinary perspective on the need, and resources and recommendations, for humanistic psychotherapists to more formally become familiar with meteorology and climatology topics on at least a basic level. Note that elements of this perspective might be beneficial to other therapists as well, given the wide applicability of person-centered principles within the therapeutic relationship and across modalities (Rogers, 1962; Wampold, 2019). If current environmental predictions verify, psychotherapists will be essential first-responders in the fight against climate change and extreme weather, and they need to be adequately equipped to help others with psycho-meteorological difficulties.

A Person-centered View of Human-Weather Interactions

Since their earliest days, person-centered views have been rooted in the therapist's striving for a holistic consideration of the entire person and the belief that individuals have a natural tendency towards growth. Perhaps the most heralded person-centered characteristic aside from these, which quickly differentiates the family of person-centered approaches from other psychotherapy modalities, is non-directiveness and the associated, synonymous belief that the client is his or her own expert in experiencing the world. Hence, the client should not have treatment dictated or driven by the therapist but rather by his or her own self-learning and exploration.

These principles have informed not just a therapeutic modality but a manner of existing in many areas of life (e.g., Henderson, O'Hara, Barfield, & Rogers, 2007; Proctor, Cooper, Sanders, & Malcolm, 2006; Rogers, 1995a). Bolton (2020), Bolton and Mogil (2020), and Mogil and Bolton (2019) provide similar insights on person-centered mentorship. The principles inherent to person-centered approaches justify and encourage the person-centered therapist's meteorological education, useful in treating clients with a range of environment-related issues—including climate change anxiety and grief, weather fears, and more clinically-presenting phobias (the latter two of which are included within the American Psychiatric Association's *Diagnostic and Statistical Manual* specific phobia, natural environmental classification; Choy, Fyer, & Lipsitz, 2007; LeBeau et al., 2010).

Other therapeutic modalities have developed understandings of meteorological phenomena to better facilitate client healing and coping. For example, cognitive-behavioral approaches have been used to treat seasonal affective disorder (Rohan, Tierney Lindsey, Roeklein, & Lacy, 2004; Rohan et al, 2007; Rohan et al. 2015) and both thunder (Barkham & Hobson, 1989; Matthey, 1988) and winter storm phobias (Wang, 2000). Cognitive-behavioral perspectives have been influential, as well, in discussions of both sub-clinical and clinical weather anxiety and phobia (Coleman, Newby, Multon, & Taylor, 2014; Greening & Dollinger, 1992; Lonigan, Shannon, Taylor, & Finch, 1994; Watt & DiFrancesantonio, 2012; Westefeld, 1996; Westefeld, Less, Ansley, & Yi, 2006). Meanwhile, Stewart (2007a, 2007b) provided an Adlerian perspective for understanding human-weather-climate interactions; and Weintrobe (2012), among others, provided a psychoanalytic perspective.

Non-directiveness grounds person-centered therapists with a highly unique perspective on human-weather interactions. For the classical person-centered therapist, therapy sessions are not about re-shaping the client's anxieties or cognitive or behavioral aversions—nor are they about

sensitization, exposure, body relaxation, mindfulness, or among other tools the challenging of some belief. Rather, they are all about providing an environment for safe psychological contact (with the therapist, but also with one's self), in which the client feels empowered to formulate for him or herself new internal meanings and schemas for the altering of attitudes, self-concepts, and behaviors. Further, psychological techniques in person-centered therapy—the uses of simile and metaphor and the gentle, careful inviting of the client towards and through difficult emotions—are engineered to suggest, not set concretely in stone, new meanings and understandings which the client may accept or modify into, or reject from, his or her self-structure (the individual's inner cognitive schema for the way the world works; Tolan & Cameron, 2017).

Just as specialized knowledge of client processes associated with sexual abuse (Hawkins, 2014), autism (Rutten, 2014), and dissociation and psychosis (Warner, 2014), among other conditions, can powerfully strengthen the therapeutic relationship, it is *because* person-centered therapists, including those who are somewhat more directive,ⁱⁱⁱ desire to facilitate the client's own self-striving for growth that their learning of meteorological concepts and contexts is essential. After all, the lives of both therapists and clients occur within and under the weather's influence. Examining our existence within the atmosphere's scope and influence, as a phenomenological and personally-significant event (Kelly, 1955; Stewart & Blau, 2019; Stewart & Oh, 2019), may lead to greater self-awareness of the foundations of our own being and allow change to better take place within the client.

The therapist's success fostering congruence, a sense of mutual genuineness, with the client is predicated on achieving what Rogers called "a sensitive empathy" (see Rogers, 1995a, pp. 142-145). One cannot properly understand the client's experience as an expression and personification of his or her presenting feeling or mental state (Rogers, 1995b) without conceptual awareness for that psychological phenomenon. So too is it with meteorological stimuli, which might present as psychologically troublesome in-session. That's just one reason we have begun theorizing, from an emotion-focused therapy perspective, about trauma responses among meteorologists (Bolton, Stewart, & Mogil, 2020). Such knowledge informs mental healthcare for meteorologists and others as well; just one benefit is that it allows the person-centered therapist to formulate more effective and appropriate similes and metaphors which are sensitive to the potentially traumatic nature of dangerous weather events. For example, one may avoid or more appropriately tailor such statements as "*you just felt flooded*" or "*it was like a whirlwind of emotions*," to describe a client's experience of overwhelming feelings.

Moreover, it is important for psychotherapists to possess conceptual awareness and understanding so that they themselves are not frightened or overwhelmed by the client's presenting problems and so they can understand how to best be of help. This cannot be underscored enough, for it is only when one fully understands a thing that it can be properly symbolized in awareness and integrated or re-integrated into one's self-structure. This applies to the therapist as well as the client. Meteorological elements severe enough to be dangerous and, therefore, psychologically troubling, are often traumatizing. Hail stones which pummel vehicles, leaving them "totaled;" near-miss, cloud-to-ground lightning strikes and loud thunder; violent tornadoes which rip even well-secured buildings off their foundations; hurricanes, which can leave entire towns and cities devastated through combined torrential rains, strong winds, and flooding—not to mention the occasional tornado. All of these weather elements (and others) can significantly tear into the substrate, the fabric, that is one's sense of being in the world: Through them, the individual's self-structure and experiences of the world become dis-integrated, leaving the person psychologically unbalanced as well as possibly physically displaced.

Recent climatic change has heralded in a series of psychological problems related to perceptions of changing, long-term weather patterns (see Swim et al., 2010, and Doherty & Clayton, 2011 for a broad overview). Thus far, psychoanalytic perspectives have dominated theoretical conversation around this topic. Climate change-related grief (Albrecht et al., 2009; Bourque & Cunsolo Wilcox, 2014; Cunsolo & Ellis, 2018), characterized by an abiding distress for perceived threats to one's natural environment and ecosystem; and climate change-related anxiety (Clayton, 2020; Clayton & Karazsia, 2020; Searle & Gow, 2010; Stokols, Misra, Runnerstrom, & Hipp, 2009; Wandersman & Hallman, 1993), alongside other emotions like despair (Randall, 2009; Weintrobe, 2012), are two sets of psycho-meteorological stressor. Denial and avoidance play, with these, into a motivated apathy for climate change (Lertzman, 2017; Moser, 2007).

To take an emotion-focused perspective, such primary emotional responses as these, followed by secondary numbness, are characterized by habituation to the "drumbeat of news about various overwhelming environmental and societal problems" (Moser, 2007, p. 68; Schinko, 2020; Verplanken & Roy, 2013) that prevent individuals' learning about and responding in an informed manner to climate and weather threats. Although we may learn to react to weather- and climate-related news and even to weather events, how much do we really *know* about our own inner, phenomenological experiences of ordinary, sublime, and severe and dangerous weather events? Are we fully in touch with and can we readily

identify and cope with our emotions and mental states that arise due to changes in the weather and climate patterns?

Yet a third reason for this overall discussion is the need for greater awareness of the mental health impacts that can occur for individuals *working* in the earth and atmospheric sciences (Bolton & DePodwin, 2019; Bolton et al., 2020; Gilford, Moser, DePodwin, Moulton, & Watson, 2019; Tucker & Horton, 2019). Mental health matters to meteorologists, too. Anecdotal discussion with meteorologists at professional conferences and elsewhere has revealed, from some who take advantage of mental health services, that psychotherapists tend not to have an appreciation for the cognitively (and, often physically) taxing nature of the work meteorologists perform daily and around-the-clock. This lends itself to an overall weakening of the therapeutic relationship. A greater awareness for the workings of the professional weather workplace and particular strains and stressors of that workplace is paramount for therapists who might engage with meteorologists; it is the only easily-opened window into the meteorologist's mind.

Meteorological Education and the Psychotherapist

School-based education efforts often fail in the teaching of weather and climate science, according to Mogil (2018, public testimony to Collier County, Florida, Public School Board). Mogil, serving as an independent, community-based reviewer of K-12 science textbooks for Collier County Public Schools in its most recent textbook adoption cycle, found numerous scientific errors and omissions in the areas of weather and climate. He discovered an eroded presentation of basic atmospheric science principles and understanding of these, akin to the removal of grade-school geography in favor of other social science topics (Camera, 2015). Increasingly within educational efforts, he is observing a much greater emphasis is placed on "selling" the dangers of climate change, without an appropriate understanding of the background weather science. Mogil likens this understanding of climate, but not weather, to a brain surgeon who lacks an understanding of basic human anatomy and physiology.

For this reason, psychotherapists may be well-served in checking the meteorological comprehension of the client who presents with psychometeorological difficulties. Here, from the vantage point of working pluralistically and providing psychoeducation (Cooper & McLeod, 2011, 2019; Thompson & Vivino, 2014), they can work to ensure the client has a basic and appropriate understanding of weather and climate physical processes as they relate to the client's presenting problem. In our experience as weather learning facilitators (Bolton and Mogil) and as a psychotherapist (Stewart), an accurate understanding of meteorological phenomena

portends a lessening of weather-related fears. We have anecdotally observed, for example, that once the weather-anxious or phobic individual has a reasonably accurate perception for the way thunder and lightning work, they are perceived as less uncertain and scary and can be better integrated into the individual's self-structure. Bolton's own childhood experience with debilitating weather phobia, which turned to positive and passionate weather curiosity upon his learning of physical meteorological processes, also speaks to the curative effect of this type of processing.

It is important to note that online weather and climate websites, while often informative, can also be filled with erroneous information. This includes both social and mainstream media sources. Often, extreme or outrageous claims are designed to hype or sell the web link or media source, and photos of severe and dangerous weather phenomena are frequently edited to appear even more menacing and ominous. Distinguishing between reputable and unreliable information is not necessarily easy. This may be an important matter to address in working with clients doing "homework" between sessions.

How can such awareness—for dangerous weather phenomena, and for stressors of the meteorological workplace—be obtained? First, there are many accessible online resources that host credible, easily-digestible meteorological information for a range of knowledge levels. One of the best for general weather knowledge is the Jetstream website hosted by the U. S. National Weather Service (NWS; <https://www.weather.gov/jetstream/>). The NWS' Storm Prediction Center has excellent information pages for tornadoes (<https://www.spc.noaa.gov/faq/tornado/>) and derechos (long-lived, widespread wind storms typically accompanied by strong thunderstorms; <https://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm>). A comparable wealth of information about hurricanes and storm surge can be found at the NWS' National Hurricane Center (<https://www.nhc.noaa.gov/>). Those looking for a deeper learning than these resources provide can engage with distance learning materials from several universities (see <https://www.ametsoc.org/index.cfm/ams/education-careers/careers/career-guides-tools/distance-learning-courses/> for a listing maintained by the American Meteorological Society). Otherwise, exposing oneself to severe and dangerous weather situations through online video footage is a sure way to put oneself in the shoes of the weather-phobic or anxious client.

Finally, one can easily become more familiar with climate science. The first challenge in this regard is to recognize that climate and climate change educational material often fails to adequately differentiate the two

types of climate. There is a geographical climate, with reference to the places in which people and animals live and plants, trees, and other life exist; and there is a weather-related climate, with respect to the longer-term sustained averages of moment-to-moment weather happenings. *Climate change* refers to the long-term changes affecting both of these. As far as data is concerned, the NOAA National Centers for Environmental Information generally only consider weather-climate, and then, typically, in long-term trends (“climate normals”) over the latest three decades. As of this writing, normals data exists for the U.S. for the 1971-2000 and 1981-2010 periods (<https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/climate-normals>). An even longer-term climate analysis framework, taking both geographic and weather factors into account within categorization of world regions by weather condition and vegetation type, is the Köppen climate classification system (Beck et al., 2018; National Geographic, n.d.).

A second challenge in climate science education is the proliferation of denialist and skeptic beliefs about global climate change (Antonio & Brulle, 2011; Dunlap & McCright, 2011; Häkkinen & Akrami, 2014; McCright & Dunlap, 2011). We mention this because some who present in therapy, whether or not it is with psycho-meteorological difficulties, may have strong views on climate change. These, to a large degree, appear linked to political ideology (e.g., Dunlap & Jacques, 2013; van der Linden, Panagopoulos, Azevedo, & Jost, 2020), a broader belief in conspiracy theories, and lowered pro-social behaviors and acceptance of science (van der Linden, 2015). Those working through such topics with clients may find the work of psychologist Sander van der Linden helpful; he has conducted a substantial amount of research into climate change and misinformation beliefs and methods by which to counteract scientific misinformation, denialist beliefs, and skepticism.

The NASA climate website (<https://climate.nasa.gov/>), with its synthesis of informational guides, may also be helpful to both psychotherapists and their clients, while a more engaging method to learn about Earth’s changing climate is to actually examine real data. One can access easy-to-read climographs for weather stations and readily observe historical change in various atmospheric conditions, both spatially and temporally (<https://drought.unl.edu/Climographs.aspx>; note, the University of Nebraska site has an international, as well as U.S.-centered, listing). Much other atmospheric data can be found at <https://www.climate.gov/maps-data/datasets>. In all of these meteorological and climatological learning facilitation circumstances with clients, familiarity with methods by which to effectively communicate numerical

and scientific uncertainty may be useful (van der Bles et al, 2019; van der Bles, van der Linden, Freeman, & Spiegelhalter, 2020).

To answer how one can become more familiar with the meteorological workplace, a quick and easy first stop is the NWS webpage at <https://www.weather.gov/about/>. One can “drill down” to learn about various aspects of the U.S. government’s weather agency. To take things a step further, the interested psychotherapist could actually tour an NWS field office and witness forecasters “in action.” The NWS webpage at <https://www.weather.gov/> can be used to navigate to one’s local forecast office webpage, where (typically email-based) contact info can be located in order to arrange such a tour. One may also reach out to local television meteorologists for tours of their facilities.

Many meteorologists are happy to engage with those interested in learning about meteorology and the nuances of the profession itself. There is also an expanding literature one can read: Sociologists Gary Fine (2010) and Phaedra Daipha (2015) have written accounts of the NWS workplace and psychologist Robert Hoffman and colleagues wrote the interdisciplinary *Minding the Weather: How Expert Forecasters Think* (Hoffman, LaDue, Mogil, Roebber, & Trafton, 2017), on much of the psychology that goes on in the NWS trenches. Television meteorologists Janice Dean (2019), James Spann (2019), and Ginger Zee (2017) have all documented their own lives—including deep dive discussions into the meteorological profession and related mental health matters. Other insightful books, on the phenomenological experiences of people who have lived through severe and dangerous weather, include:

- | | |
|---|--|
| <i>Storm of the Century: The Labor Day Hurricane of 1935</i> (Drye, 2019) | <i>Storm Warriors</i> (Carbone, 2001) |
| <i>Isaac’s Storm</i> (Larson, 1999) | <i>The Children’s Blizzard</i> (Laskin, 2004) |
| <i>Faces From the Flood</i> (Moore & Barnes, 2004) | <i>Weather in the Imagination</i> (Boia, 2005) |
| <i>The Cloud Collector’s Handbook</i> (Pretor-Pinney, 2011) | <i>Soul of the Sky: Exploring the Human Side of Weather</i> (Adler & Thurlow, 1999) |
| <i>Storm Chaser: In Pursuit of Untamed Skies and The Ultimate Storm Survival Handbook</i> (Faidley, 1996; 2006) | <i>Into the Storm: Violent Tornadoes, Killer, Hurricanes, and Death-defying Adventures in Extreme Weather</i> (Timmer, 2011) |

Although the following films are based on “popular” conceptualizations and even myths, one can gain important insights as to the basis of client weather anxieties and phobias by viewing *The Day After Tomorrow*, *The Perfect Storm*, and *Twister* (in which one of the primary characters, brought to life by actress Helen Hunt, exhibits adult storm fascination and sensation-seeking behaviors related to storm chasing as a result of childhood tornado exposure). An insightful non-fiction documentary, about New Orleans during and after 2005’s Hurricane Katrina, is *When the Levees Broke: A Requiem in Four Acts*.

Finally, it is important to be familiar with emerging research on the psychological functioning of meteorologists, particularly with respect to mental health and personality tendencies. Bolton, Ault, Greenberg, and Baron-Cohen (2018), and Bolton and Ault (2020) have explored the mental health and wider personality tendencies of meteorologists in two studies. The first (Bolton et al. 2018) examined broad between-groups differences in meteorologists' personality traits and mental health tendencies with respect to those of engineers and physicists. The workplaces and job-roles of engineers, physicists, and meteorologists are highly dissimilar. However, they were compared because another hypothesis tested links between meteorologists and autism, building on 20 years' worth of work linking autism and the physical sciences (e.g., Baron-Cohen, Wheelwright, Stott, Bolton, & Goodyer, 1997; Baron-Cohen, 1998; Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001; Baron-Cohen, 2015). This included testing links to general autistic-like traits as well as the empathizing and systemizing cognitive styles of autism.

The meteorologists were higher in empathizing and systemizing, extraversion, conscientiousness, and agreeableness, and less stressed, depressed, and anxious than the combined engineer/physicist group. This promisingly suggests meteorologists have a tendency toward a healthy personality profile (Bleidorn, 2018), and that meteorologists have a flexible, hybrid cognitive style that switches between empathic, intuitive and more rational, rule-based thinking (Brosnan, Hollinworth, Antoniadou, & Lewton, 2014). They also scored comparably, in terms of autistic traits, to the engineers and physicists.

The second study (Bolton & Ault, 2020) examined individual differences in trait personality, mental health, and subjective wellbeing across meteorological employment sectors. Television meteorologists were significantly more burnt-out at work and personally, were higher in extraversion, and were highest in anxiety. NWS meteorologists were most burnt-out in working with partners (i.e., those working in other areas of the meteorological community, such as television meteorologists and emergency management professionals). A miscellaneous grouping (a

combination of academic, private sector, military, and non-NWS operational meteorologists) showed more agreeableness and greater job satisfaction than broadcasters and those in the NWS. There was no cross-sector difference for traits that might be relatively uniform among meteorologists: Grit, life satisfaction, self-concept clarity, subjective happiness, stress, and depression. Altogether, this research begins to paint a picture of the meteorologist's psychological disposition, an understanding for which would be helpful to the psychotherapist.

Concluding Thoughts

As society mounts a defense against Earth's changing weather and climate patterns and even just everyday weather, it is important for psychotherapists of *all* modalities, not just those who are person-centered, to possess meteorological and climatological understanding for the benefit of the client. This paper therefore presents a person-centered view of human-weather-climate interactions, and resources, to enable therapists so inclined to effectively learn about the meteorological workplace as well as physical atmospheric processes and the human impacts of those physical processes (e.g., tornadoes, lightning, and hail).

Nonetheless, it possesses elements relevant to all psychotherapy practitioners wishing to provide more sensitive and nuanced care to those with psycho-meteorological difficulties and working within meteorology. The paper also presents resources enabling therapists so inclined to effectively learn about the meteorological workplace. These learnings, altogether, will allow therapists to work more effectively with clients who present with psycho-meteorological problems or problems—such as unique variations of secondary traumatic stress—that might relate specifically to the meteorological workplace. We hope readers find this perspective insightful and will carry our ideas forward in discussion and debate.

References

- Adler, C. R., & Thurlow, D. (1999). *Soul of the sky: Exploring the human side of weather*. Mount Washington Observatory.
- Afifi, W. A., Felix, E. D., & Afifi, T. D. (2011). The impact of uncertainty and communal coping on mental health following natural disasters. *Anxiety, Stress, & Coping: An International Journal*, 25(3), 329–347. <https://doi.org/10.1080/10615806.2011.603048>
- Albrecht, G., Sartore, G.-M., Connor, L., Higginbotham, N., Freeman, S., Kelly, B., Stain, H., ... Pollard, G. (2007). Solastalgia: The distress caused by environmental change. *Australasian Psychiatry*, 15(1), 595–598. <https://doi.org/10.1080/10398560701701288>
- Antonio, R. J., & Brulle, R. J. (2011). The unbearable lightness of politics: Climate change denial and political polarization. *The Sociological Quarterly*, 52, 195–202.
- Barkham, M., & Hobson, F. F. (1989). Exploratory therapy in two-plus-one sessions. II: A single case study. *British Journal of Psychotherapy*, 6, 89–100.
- Beck, H. E., Zimmerman, N. E., McVicar, T. R., Vergopolan, N., Berg, A., & Wood, E. F. (2018). Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Scientific Data*, 5, 180214. <https://doi.org/10.1038/sdata.2018.214>
- Blair, L. (2011). Ecopsychology and the person-centered approach: Exploring the relationship. *Counselling Psychology Review*, 26(1), 47–56.
- Blair, L. (2014). Ecopsychology: Challenges for person-centered therapy. *Person-centered & Experiential Psychotherapies*, 12(4), 368–381. <https://doi.org/10.1080/14779757.2013.855134>
- Bolton, M. J. (2020). Hello neighbor: A process of person-centered mentorship inspired by Carl and Fred Rogers. *The Person-Centered Journal*, 25, 32-58.
- Bolton, M. J., & Ault, L. K. (2020). Weathering the storms: Workplace wellbeing, mental health, and the U.S. meteorologist. *International Journal of Undergraduate Research and Creative Activities*, 12(4), 1–13. <http://doi.org/10.7710/2168-0620.0293>
- Bolton, M. J., Ault, L. K., Greenberg, D. M., & Baron-Cohen, S. (2018). Exploring the human side of meteorology: A brief report on the psychology of meteorologists. *Journal of Operational Meteorology*, 6(3), 23–32. <https://doi.org/10.15191/nwajom.2018.0603>
- Bolton, M. J., & Mogil, H. M. (2020). The spirit of person-centered mentorship, in meteorology and life. *Bulletin of the American Meteorological Society*, 101(1), 12-13.

- Bolton, M. J., Stewart, A. E., & Mogil, H. M. (2020). An integrationist, meteorologist-oriented perspective on trauma and mental health coping. *PsyArxiv*, preprint. <https://doi.org/10.31234/osf.io/wfntj>
- Boia, L. (2005). *The weather in the imagination*. Reaction Books.
- Bourque, F., Cunsolo Wilcox, A. (2014). Climate change: The next challenge for public mental health? *International Review of Psychiatry*, 26(4), 415–422.
<https://doi.org/10.3109/09540261.2014.925851>
- Bromet, E. J., Atwoli, L., Kawakami, N., Navarro-Mateu, F., Piotrowski, P., King, A. J., ... Kessler, R. C. (2016). Post-traumatic stress disorder associated with natural and human-made disasters in the World Mental Health Surveys. *Psychological Medicine*, 47(2), 227–241. <https://doi.org/10.1017/s0033291716002026>
- Brosnan, M., M. Hollinworth, K. Antoniadou, and M. Lewton. (2014). Is empathizing intuitive and systemizing deliberative? *Personality and Individual Differences*, 66, 39–43.
<https://doi.org/10.1016/j.paid.2014.03.006>
- Camera, L. (2015, October 16). U.S. students are really bad at geography. Retrieved from
<https://www.usnews.com/news/articles/2015/10/16/us-students-are-terrible-at-geography>
- Carbone, E. (2001). *Storm warriors*. Alfred A. Knopf.
- Choy, Y., Fyer, A. J., Lipsitz, J. D. (2007). Treatment of specific phobia in adults. *Clinical Psychology Review*, 27(3), 266–286.
<https://doi.org/10.1016/j.cpr.2006.10.002>
- Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders*, 74, 102263.
<https://doi.org/10.1016/j.janxdis.2020.102263>
- Clayton, S., & Karazsia, B. T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology*, 69, 101434.
<https://doi.org/10.1016/j.jenvp.2020.101434>
- Coleman, J. S. M., Newby, K. D., Multon, K. D., & Taylor, C. (2014). Weathering the storm: Revisiting severe-weather phobia. *Bulletin of the American Meteorological Society*, 95(8), 1179–1183.
<https://doi.org/10.1175/bams-d-13-00137.1>
- Cunsolo, A., & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change*, 8, 275–281. <https://doi.org/10.1038/s41558-018-0092-2>
- Cooper, M., & McLeod, J. (2011). Person-centered therapy: A pluralistic perspective. *Person-Centered and Experiential Psychotherapies*, 10(3), 210–223.

- Cooper, M., & McLeod, J. (2019). Person-centered therapy: A pluralistic perspective. Retrieved from <https://mick-cooper.squarespace.com/new-blog/2019/4/23/person-centered-therapy-a-pluralistic-perspective>
- Daipha, P. (2015). *Masters of uncertainty: Weather forecasters and the quest for ground truth*. University of Chicago Press.
- Dean, J. (2019). *Mostly sunny*. HarperCollins Publishers.
- Doherty, T. J., & Clayton, S. (2011). The psychological impacts of global climate change. *American Psychologist*, 66(4), 265–276. <https://doi.org/10.1037/a0023141>
- Dunlap, R. E., & McCright, A. M. (2011). Organized climate change denial. In J. S. Dryzek, R. B. Norgaard, & D. Schlosberg (Eds.), *The Oxford handbook of climate change and society* (pp. 144–159).
- Dunlap, R. E., & Jacques, P. J. (2013). Climate change denial books and conservative think tanks: Exploring the connection. *American Behavioral Scientist*, 57(6), 699–731.
- Drye, W. (2019). *Storm of the century: The Labor Day Hurricane of 1935*. Lyons Press.
- Espinel, Z., Galea, S., Kossin, J. P., Caban-Aleman, C., & Shultz, J. M. (2019). Climate-driven Atlantic hurricanes pose rising threats for psychopathology. *The Lancet Psychiatry*, 6(9), 721–723. [https://doi.org/10.1016/S2215-0366\(19\)30277-9](https://doi.org/10.1016/S2215-0366(19)30277-9)
- Espinel, Z., Kossin, J. P., Galea, S., Richardson, A. S., & Shultz, J. M. (2019). Forecast: Increasing mental health consequences from Atlantic hurricanes throughout the 21st century. *Psychiatric Services*, 70, 1165–1167. <https://doi.org/10.1176/appi.ps.201900273>
- Elliot, R. (2011). *Emotion-focused therapy and the person-centered approach: Past, present, and future*. Paper presented at the Counselling Unit Twentieth Anniversary Conference, University of Strathclyde, Glasgow, Scotland. Retrieved from <https://strathprints.strath.ac.uk/31333/>
- Faidley, W. (1996). *Storm chaser: In pursuit of untamed skies*. Independent Pub Group.
- Faidley, W. (2006). *Ultimate storm survival handbook*. Rutledge Hill Press.
- Fine, G. A. (2010). *Authors of the storm: Meteorologists and the culture of prediction*. University of Chicago Press.
- Foa, E. B., Stein, D. J., & McFarlane, A. C. (2006). Symptomatology and psychopathology of mental health problems after disaster. *Journal of Clinical Psychiatry*, 67(2), 15–25.

- Goldmann, E., & Galea, S. (2014). Mental health consequences of disasters. *Annual Review of Public Health, 35*, 169–183.
<https://doi.org/10.1146/annurev-publhealth-032013-182435>
- Greenberg, L. S., Rice, L. N., & Elliot, R. K. (1993). *Facilitating emotional change: The moment-by-moment process*. Guilford Press.
- Greening, L., & Dollinger, S. J. (1992). Adolescents' perceptions of lightning and tornado risks. *Journal of Applied Social Psychology, 22*, 755–762.
- Häkkinen, K., & Akrami, N. (2014). Ideology and climate change denial. *Personality and Individual Differences, 70*, 62–65.
<https://doi.org/10.1016/j.paid.2014.06.030>
- Hawkins, J. (2014). Person-centered therapy with adult survivors of childhood sexual abuse. In P. Pearce and L. Sommerbeck (Eds.), *Person-centered practice at the difficult edge*. PCCS Books, 14–26.
- Hayes, K., Blashki, G., Wiseman, J., Burke, S., & Reifels, L. (2018). Climate change and mental health: Risks, impacts and priority actions. *International Journal of Mental Health Systems, 12*(28).
<https://doi.org/10.1186/s13033-018-0210-6>
- Henderson, V.L., O'Hara, M., Barfield, G. L., & Rogers, N. (2007). Applications: Beyond the therapeutic context. In M. Cooper, M. O'Hara, P.F. Schmid & G. Wyatt (Eds.), *The handbook of person-centred psychotherapy and counselling* (pp.305–324). Palgrave MacMillan.
- Hoffman, R. R., LaDue, D. S., Mogil, H. M., Roebber, P. J., & Trafton, G. J. (2017). *Minding the weather: How expert forecasters think*. MIT Press.
- IPCC [Intergovernmental Panel on Climate Change]. (2018, October). Global warming of 1.5°C. Retrieved from
<https://www.ipcc.ch/report/sr15/>
- Kelly, G. A. (1955). *The psychology of personal constructs*. New York: Norton.
- Kölves, K., Kölves, K. E., & De Leo, D. (2012). Natural disasters and suicidal behaviors: A systematic literature review. *Journal of Affective Disorders, 146*(1), 1–14.
<https://doi.org/10.1016/j.jad.2012.07.037>
- Laskin, D. (2004). *The children's blizzard*. HarperCollins Publishers.
- Larson, E. (1999). *Isaac's storm: A man, a time, and the deadliest hurricane in history*. Vintage Books.
- LeBeau, R. T., Glenn, D., Liao, B., Wittchen, H.-U., Beesdo-Baum, K., Ollendick, T., & Craske, M. G. (2010). Specific phobia: A review of DSM-IV specific phobia and preliminary recommendations for

- DSM-V. *Depression and Anxiety*, 27(2), 148–167.
<https://doi.org/10.1002/da.20655>
- Lertzman, R. (2017, September 18). Tackling apathy and denial. Retrieved from <https://www.climate2020.org.uk/tackling-apaty-denial/>
- Lonigan, C. S., Shannon, M. P., Taylor, C. M., & Finch, A. J. (1994). Children exposed to disaster. II: Risk factors for the development of post-traumatic symptomatology. *Journal of the American Academy of Child and Adolescent Psychiatry*, 33, 94–105.
- Maclean, J. C., Popovici, I., & French, M. T. (2016). Are natural disasters in early adulthood associated with mental health and substance use disorders as an adult? *Social Science & Medicine*, 151, 78–91.
<https://doi.org/10.1016/j.socscimed.2016.01.006>
- Matthey, S. (1988). Cognitive-behavioural treatment of a thunder-phobic child. *Behaviour Change*, 5(2), 80–84.
<https://doi.org/10.1017/S0813483900008111>
- McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. *Global Environmental Change*, 21(4), 1163–1172.
<https://doi.org/10.1016/j.gloenvcha.2011.06.003>
- Mogil, H. M., & Bolton, M. J. (2019). Weather camps – where REAL mentoring happens! *National Weather Association Monthly Newsletter*, 19(4). <https://doi.org/10.31219/osf.io/sgb5e>
- Moser, S. C. (2007). More bad news: The risk of neglecting emotional responses to climate change information. In S. C. Moser & L. Dilling (Eds.), *Creating a climate for change* (pp. 64–80). Cambridge University Press.
<https://doi.org/10.1017/CBO9780511535871.006>
- Moore, R., & Barnes, J. (2004). *Faces from the flood: Hurricane Floyd remembered*. University of North Carolina Press.
- National Geographic. (n.d.). Resource library | encyclopedia entry: Köppen climate classification system. Retrieved August 11, 2020 from <https://www.nationalgeographic.org/encyclopedia/koppen-climate-classification-system/>
- Neville, B. (1999). The client-centered ecopsychologist. *The Person-Centered Journal*, 6(1), 59–74. Retrieved from <https://www.adpca.org/system/files/documents/journal/V6%20N1%209.pdf>
- O’Donnell, M. L., & Forbes, D. (2016). Natural disaster, older adults, and mental health—a dangerous combination. *International Psychogeriatrics*, 28(1), 9–10.
<https://doi.org/10.1017/S1041610215001891>
- Pretor-Pinney, G. (2011). *The cloud collector’s handbook*. Chronicle Books.

- Proctor, G., Cooper, M., Sanders, P. & Malcolm, B. (2006). Politicising the person-centred approach: An agenda for social change. PCCS Books.
- Randall, R. (2009). Loss and climate change: The cost of parallel narratives. *Ecopsychology, 1*, 118–129. <https://doi.org/10.1089/eco.2009.0034>
- Rogers, C. R. (1957). The necessary and sufficient conditions of therapeutic personality change. *Journal of Consulting Psychology, 21*(2), 95–103.
- Rogers, C. (1962). The interpersonal relationship: The core of guidance. *Harvard Educational Review, 32*(4). Retrieved from <https://centerfortheperson.org/pdf/the-interpersonal-relationship.pdf>
- Rogers, C. R. (1995a). *A way of being*. Houghton Mifflin. (Original work published 1980)
- Rogers, C. R. (1995b). *On becoming a person: A therapist's view of psychotherapy*. Houghton Mifflin. (Original work published 1961)
- Rohan, K. J., Tierney Lindsey, K., Roeklein, K. A., & Lacy, T. J. (2004). Cognitive-behavioral therapy, light therapy, and their combination in treating seasonal affective disorder. *Journal of Affective Science, 80*, 273–283. [https://doi.org/10.1016/S0165-0327\(03\)00098-3](https://doi.org/10.1016/S0165-0327(03)00098-3)
- Rohan, K. J., Roeklein, K. A., Tierney Lindsey, K., Johnson, L. G., Lippy, R. D., Lacy, T. J., & Barton, F. B. (2007). A randomized controlled trial of cognitive-behavioral therapy, light therapy, and their combination for seasonal affective disorder. *Journal of Consulting and Clinical Psychology, 75*(3), 489–500. <https://doi.org/10.1037/0022-006X.75.3.489>
- Rohan, K. J., Mahon, J. N., Evans, M., Ho, S.-Y., Meyerhoff, J., Postolache, T. T., & Vacek, P. M. (2015). Randomized trial of cognitive-behavioral therapy versus light therapy for seasonal affective disorder: Acute outcomes. *American Journal of Psychiatry, 172*(9), 862–869. <https://doi.org/10.1176/appi.ajp.2015.14101293>
- Rutten, A. (2014). A person-centred approach to counselling clients with autistic process. In P. Pearce and L. Sommerbeck (Eds.), *Person-centered practice at the difficult edge*. PCCS Books, 74–87.
- Schinko, T. (2020). Overcoming political climate-change apathy in the era of #FridaysForFuture. *One Earth, 2*(1), 20–23. <https://doi.org/10.1016/j.oneear.2019.12.012>
- Schwartz, R. M., Liu, B., Lieberman-Cribbin, W., & Taioli, E. (2017). Displacement and mental health after natural disasters. *The Lancet Planetary Health, 1*(8), E314. [https://doi.org/10.1016/S2542-5196\(17\)30138-9](https://doi.org/10.1016/S2542-5196(17)30138-9)

- Searle, K., & Gow, K. (2010). Do concerns about climate change lead to distress? *International Journal of Climate Change Strategies and Management*, 2(4), 362–379.
<https://doi.org/10.1108/17568691011089891>
- Shultz, J. M., Kossin, J. P., & Galea S. (2018). The need to integrate climate science into public health preparedness for hurricanes and tropical cyclones. *Journal of the American Medical Association*, 320, 1637–1638.
- Stewart, A. E., & Blau, J. J C. (2019) Weather as ecological events. *Ecological Psychology*, 31(2), 107–126.
<https://doi.org/10.1080/10407413.2018.1552496>
- Stewart, A. E. (2007a). Individual and environmental psychology. *Journal of Individual Psychology*, 63, 67–85.
- Stewart, A. E. (2007b). The use of weather as a safeguarding strategy. *Journal of Individual Psychology*, 63, 345–352.
- Stewart, A. E., & Oh, J. (2019). Weather and climate as events. Contributions to the public idea of climate change. *International Journal of Big Data Mining for Global Warming*, 1(2).
<https://doi.org/10.1142/S2630534819500050>
- Stokols, D., Misra, S., Runnerstrom, M. G., & Hipp, J. A. (2009). Psychology in an age of ecological crisis: From personal angst to collective action. *American Psychologist*, 64, 181–193.
<https://doi.org/10.1037/a0014717>
- Stouder, D. B. (2014). Jung, ecopsychology, and the person-centered approach: Seeking wholeness in counseling, life coaching, and clinical spiritual care. *WebmedCentral Psychology*, 5(4). Retrieved from
https://www.webmedcentral.com/wmcpdf/Article_WMC004603.pdf
- Spann, J. (2019). *Weathering life*. Crest Publishers, LLC.
- Swim, J., Clayton, S., Doherty, T., Gifford, R., Howard, G., Reser, J., Stern, P., ... Weber, E. (2010). Psychology and global climate change: Addressing a multi-faceted phenomenon and set of challenges. Retrieved from
<https://www.apa.org/science/about/publications/climate-change>
- Thompson, B. J., & Vivino, B. L. (2014). Am I a person-centered therapist? *Psychotherapy Bulletin*, 49(4), 18-21. Retrieved from
<https://societyforpsychotherapy.org/am-i-a-person-centered-therapist/>
- Timmer, R. (2011). *Into the storm: Violent tornadoes, killer hurricanes, and death-defying adventures in extreme weather*. Berkley.
- Timulak, L., & Pascual-Leone, A. (2014). New developments for case conceptualization in emotion-focused therapy. *Clinical Psychology*

- and Psychotherapy*, 22(6), 619–636.
<https://doi.org/10.1002/cpp.1922>
- Tolan, J., & Cameron, R. (2017). *Skills in person-centred counselling and psychotherapy*. SAGE Publications.
- Tudor, K. (2014). Person-centered psychology and therapy, ecopsychology and ecotherapy. *Person-centered & Experiential Psychotherapies*, 12(4), 315–329.
<https://doi.org/10.1080/14779757.2013.855137>
- van der Bles, A. M., van der Linden, S., Freeman, A. L. J., Mitchell, J., Galvao, A. B., Zaval, L., ... Spiegelhalter, D. J. (2019). Communicating uncertainty about facts, numbers and science. *Royal Society Open Science*, 6, 181870.
<https://doi.org/10.1098/rsos.181870>
- van der Bles, van der Linden, S., Freeman, & Spiegelhalter, D. (2020). The effects of communicating uncertainty on public trust in facts and numbers. *Proceedings of the National Academy of Sciences*, 117(10), 5111–5112.
- van der Linden, S. (2015). The conspiracy-effect: Exposure to conspiracy theories (about global warming) decreases pro-social behavior and science acceptance. *Personality and Individual Differences*, 87, 171-173.
- van der Linden, S., Panagopoulos, C., Azevedo, F., & Jost, J. T. (2020). The paranoid style in American politics revisited: An ideological asymmetry in conspiratorial thinking. *Political Psychology*, early online release. <https://doi.org/10.1111/pops.12681>
- Vitaliano, P. P., Maiuro, R. D., Bolton, P. A., & Armsden, G. C. (1987). A psychoepidemiologic approach to the study of disaster. *Journal of Community Psychology*, 15(2), 99–122.
[https://doi.org/10.1002/1520-6629\(198704\)15:2%3C99::aid-jcop2290150202%3E3.0.co;2-q](https://doi.org/10.1002/1520-6629(198704)15:2%3C99::aid-jcop2290150202%3E3.0.co;2-q)
- Verplanken, B., & Roy, D. (2013). “My worries are rational, climate change is not”: Habitual ecological worrying is an adaptive response. *PLoS ONE*, 8(9), e74708.
<https://doi.org/10.1371/journal.pone.0074708>
- Wampold, B. E. (2019). *The basics of psychotherapy: An introduction to theory and practice*. American Psychological Association.
- Wandersman, A. H., & Hallman, W. K. (1993). Are people acting irrationally? Understanding public concerns about environmental threats. *American Psychologist*, 48, 681–686.
<https://doi.org/10.1037/0003-066X.48.6.681>
- Wang, A. G. (2000). Storm phobia: A North Atlantic phenomenon. *Nordic Journal of Psychiatry*, 54, 67–68.

- Warner, M. (2014). Client processes at the difficult edge. In P. Pearce and L. Sommerbeck (Eds.), *Person-centered practice at the difficult edge*. PCCS Books, 121–137.
- Watt, M. C., & DiFrancesantonio, S. L. (2012). Who's afraid of the big bad wind? Origins of severe weather phobia. *Journal of Psychopathological Behavior Assessment*, 34, 440–450. <https://doi.org/10.1007/s10862-012-9308-3>
- Weintrobe, S. (Ed). (2012). *Engaging with climate change: Psychoanalytic and interdisciplinary perspectives*. Routledge.
- Westefeld, J. S. (1996). Severe weather phobia: An exploratory study. *Journal of Clinical Psychology*, 52, 509–515. [https://doi.org/10.1002/\(SICI\)1097-4679\(199609\)52:53.0.CO;2-I](https://doi.org/10.1002/(SICI)1097-4679(199609)52:53.0.CO;2-I)
- Westefeld, J. S., Less, A., Ansley, T., & Yi, H. (2006). Severe-weather phobia. *Bulletin of the American Meteorological Society*, 87, 747–749. <https://doi.org/10.1175/BAMS-87-6-747>
- Zee, G. (2017). *Natural disaster: I cover them. I am one*. Kingswell.