

Collective Safety

written by Kathleen M. Pike, PhD

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An afternoon with my honeybees got me thinking about what these buzzing yellow and black beauties can teach us about our health, and particularly our mental health, at this moment in our journey with COVID-19.



*The *apis mellifera*, or western honeybee, can only survive as part of a high functioning and highly complex colony. With tens of thousands of adult bees living in a hive that is less than one cubic meter, they tell a story of the power of the collective.*

1. The Honeybee Superorganism. Honeybees cannot survive by themselves for an extended period outside their respective colonies. They are born into a highly sophisticated world where each bee has a specialized role that contributes to the greater good of the entire colony. This eusocial organization is characterized by shared responsibilities for care of offspring, overlapping generations of adults within a colony, specialized division of labor, and complex communications, including the marvelous [waggle dance](#). When we recognize and behave with the awareness that our human collectives are also complex social systems where each of us depends on the contributions of so many others, we create conditions that optimize the health, including the mental health, of everyone in the hive.

2. Innate and Acquired Immunity. Honeybees have a limited innate immune system that includes specific genes for odor receptors and regulation of pollen and nectar collection. Honeybees do not have acquired immune capacity. In other words, they cannot form antibodies when exposed to new pathogens. So here, humans depart from honeybees. We humans are able to develop acquired immunity. It happens naturally as we are exposed to various pathogens in the environment and intentionally with vaccines. This is how we develop resilience to viruses like COVID-19. The same is true in developing resilience psychologically. Sometimes it happens naturally with emotionally and psychologically challenging experiences that help us expand and develop effective coping skills. Sometimes it takes more: targeted interventions, including medication and

psychotherapy, help us achieve greater mental health. This capacity for people to acquire what's needed to optimize health, including mental health, is extraordinary.

3. Social Immunity. Given the limitations of the honeybee's innate immune genes and lack of capacity to develop acquired biological immunity, honeybees depend on [social defenses to protect the health of their colonies](#). Honeybees seek out certain compounds that possess potential antimicrobial properties, such as resins, plant pollens, and complex plant secretions. They use them to produce a sticky substance called propolis to coat the hive's interior, which helps [decrease pathogen loads](#) in the colony. They also adapt their behavior - engaging in allogrooming, changing worker-worker interactions, switching from in-hive tasks to foraging, and removing parasites and diseased brood to reduce the transmission of pathogens and parasites between individuals in the hive. The honeybees remind us that specific social and behavioral adaptations can result in a healthier hive. True with COVID. True with mental health.

4. Averting Colony Collapse. Almost half of the honeybee colonies in the United States died over the course of the past year (between April 2020 to April 2021). Pesticides, weakened immune systems, nutrition and parasites are all part of this life-threatening story. A combination of abrupt, cumulative, and toxic environmental changes has overwhelmed the honeybees' existing capacity to respond. The same is true with COVID-19, as evidenced by more than 4.34 million deaths worldwide. It is also true in terms of mental health. When disaster strikes, elevated stress and [mental health consequences](#) such as anxiety and depression are common. Mitigating damages - whether for honeybees or people - requires both effective immediate response and longer-term planning to avert future crises. For mental health, this means better treatments for those with acute mental health problems and greater investment in public health strategies that protect mental health and prevent mental health impairment in the first place.

5. And then we make honey. A single bee makes only 1/12 teaspoon of honey in its entire lifetime. This means that the work of 864 bees, including visits to almost 2 million flowers, is contained in a single 12-ounce jar. No wonder it is called liquid gold. The honey lovers among us are eternally grateful. But even if you rarely consume honey, about [one out of every three](#) mouthfuls of food that you consume is, in some way, a product of honeybee pollination - from fruits to nuts to coffee beans. Recognizing that when we individually act with the greater good in mind, we set the conditions for better outcomes - for COVID and for our mental health. [Research](#) by Northwestern University neuropsychologist Joan Chiao and colleagues illustrates this very point, demonstrating how collectivist cultures' prioritization of belonging and group harmony advantages mental health and acts as a buffer against the risk of depression.

I am proud to say that my honeybee colonies survived this past year. As they buzz in and around their hives, these yellow and black beauties remind me of how interconnected we are and the honey that is found in the collective.