Preaching with the Sciences

Edward Foley♦

Abstract: The sciences are seldom employed by Roman Catholic preachers in the homiletic event. This article demonstrates how various contributions from the sciences can stimulate fresh metaphors and imaginative analogies for preaching. Besides considering how the sciences can be employed "in" the preaching event, the paper further demonstrates how understanding the neuroscience "behind" preaching can also enable more effective preaching.

Keywords: Preaching • Homily • Science • Neuroscience

Introduction

Several years ago, a chance click of the television remote led to a program on Katy Payne. Trained in music and biology, she helped develop the field of bioacoustics that studies animal vocalizations. With her husband, Roger, she explored the singing of humpback whales who communicate through complex patterns similar to birdsong. Later Payne was visiting the Portland Zoo, when she felt more than heard a rumbling communication between two elephants, on opposite sides of a concrete enclosure. With two other acoustic-biologists Payne discovered that elephants vocally transmit at a

♦ Edward Foley, Capuchin, is a Roman Catholic priest and member of the Province of St. Joseph of the Capuchin Franciscan Order. The Duns Scotus Professor Emeritus of Spirituality and Retired Professor of Liturgy and Music at Catholic Theological Union, he was the founding director of the Ecumenical Doctor of Ministry degree jointly offered by Catholic Theological Union, the Lutheran School of Theology at Chicago and McCormick Theological Seminary. An award winning author and celebrated preacher, he has been honored with lifetime achievement awards from national and international organizations and is a recent recipient of a major grant for preaching from the John Templeton Foundation. He also serves his Capuchin community as the Vice-Postulator for the Canonization cause for Blessed Solanus Casey. Email address: foley@ctu.edu

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very low frequency, dramatically below the threshold of human hearing. She documented how these apparently silent goliaths deploy a sophisticated communication system, capable of broadcasting across many miles through African forests. Subsequently the Elephant Listening Project was officially established at Cornell University. Their valuable work protects elephants against poaching and other environmental dangers.

That Animal Planet program ambushed me while fretting about an impending homily for the Second Sunday of the Year, Cycle B with its famous reading of the Lord's call to the young Samuel (1 Samuel 3:3b–10,19). Then it struck me. Judeo-Christian revelation asserts that God is One who constantly beckons us to conversations in love. For Christians, the divine vocalization is epitomized in Jesus the enfleshed Word. However, Scripture also recounts how time and again humans have so failed to heed this enduring annunciation that some audaciously suggest that God no longer speaks.

Payne's scientific work offered fresh metaphors for preaching about our collective journey into the mystery of God. Empirical evidence reveals that pachyderms are not mute, but that we are uncalibrated to their frequency. Analogously, our deafness to God's summons is not evidence of a silent divinity but is symptomatic of our flawed ability to tune to the Spirit and our limited aptitude for perceiving the salvific bandwidth revealed in Jesus.

This elephant chat not only relieved my homiletic anxiety one particular Sunday, but it also triggered a slow conversion to the promise of that constellation of knowledge labeled STEM (Science-Technology-Engineering-Math) in the preaching enterprise. For me high school chemistry was a nightmare, and college math was almost the undoing of my Capuchin vocation. While

majoring in philosophy and the arts, I was required an advanced math course at our college seminary. During the final exam, the instructor sauntered by my desk, viewed my test with some consternation, and then drolly commented "stick to music!"

While I did stick to music and still draw upon it and other arts for homiletic inspiration, Payne's work opened a new acoustic in my preaching, that unveiled resonances between the mystery of God and the mysteries scientists relentlessly pursue.

Since returning to Chicago from studies in the early 1980's, I have served for almost three decades as preacher and presider in two vibrant communities: St. Mary's and Old St. Patrick's Church. Preaching year after year in the same parish is deeply enriching and appropriately terrifying. Having traversed the entire lectionary cycle 16 times and counting, cumulative panic arises not only about what to preach but also how to frame each homily without resorting to ambo babble, or the unreflective repetition of ideas or insights that effortlessly reduces an assembly to a spiritually comatose state. Thus, I concur with the assessment a gifted colleague that preaching in the Sunday assembly amounts to 10 minutes of recyclable terror. The sciences as an unexpected dialogue partner has newly energized my preaching and moderately lowered my blood pressure as I pursue this graced yet daunting ministry

Science and religion

Science and religion in the West have clearly had their ups and downs. Theorists have offered a variety of schemas for framing this engagement. Influential here is

Ian Barbour's prize winning *When Science Meets Religion.*[1]

According to Barbour, possible relationships between religion and science can be characterized through multiple models. First is the conflict model, contending that science and religion are in perpetual and principal conflict. This model is epitomized in the 1633 Vatican trial of Galileo, which found him guilty of heresy for his heliocentric views. It only took the Vatican 350 years to acknowledge that Galileo was not some astronomical heretic!

Next is the independence model, which holds that science and religion explore separate domains, ask distinct questions and exist in two different worlds. They are not in conflict, but also not in any position to craft a shared conversation; the chasm is too great. The dialogue model assumes that there is common ground between them and proposes their mutual relationship without necessarily being in conflict. Finally, the integration model looks for ways to unify science and theology.

While the integration model holds much promise for future theologies concerned with relevance in the current age, I find the dialogue model most helpful for preaching where images and ideas, discoveries and failures, provide a cornucopia of analogies for engaging the mysteries we struggle to unfold from the pulpit.

The imaginative gift

Through decades of studies, I was never instructed to consider imagination a useful theological category. Sacramental theology, biblical exegesis, canon law, and systematics were not about "imagining" but about getting the categories, methods and the morality, analysis and

[1] Ian Barbour, *When Science Meets Religion* (New York: HarperSanFrancisco, 2000).

legal frameworks right. So we learned to explain transubstantiation, to understand the historical-critical method, to distinguish between liceity and validity, and to understand what Rahner was saying and discern if it made any difference.

Ironically, many of our theological and spiritual frameworks are imaginaries. What theologian has ever seen "substance"? Or original sin? Or the last judgment? Then there are all those medieval angels dancing on the head of a pin!

Religious faith is a way of imagining the world. Believing that we are sustained by a loving Creator who is present yet invisible, requires a vivid imagination. This is not suggesting that faith is a fantasy but recognizing that belief is an ability to see the world in a particular and powerful way.[2] No less a scripture scholar than Walter Brueggemann defines biblical revelation itself as "an act of faithful imagination that buoyantly and defiantly mediates a … wondrously demanding alternative to the world … visibly at hand."[3] Thomas Aquinas stressed the importance of imagination, writing: "The image is the principle of our knowledge. It is that from which the intellectual activity begins, not as a passing stimulus, but as an enduring foundation. When the imagination is choked, so also is our theological knowledge."[4]

> Then there is Ignatius of Loyola, whom Mark Thibodeaux considers a master daydreamer… (for) through daydreaming Ignatius learned to determine God's will for his life. By daydreaming in the context of prayer, Ignatius was able to allow those great desires

[2] James Whitehead, "By Virtue of Imagination," *Reflective Practice: Formation and Supervision in Ministry* 32 (2012): 25.

[3] Walter Brueggemann, *The Prophetic Imagination* (Philadelphia: Fortress Press, 1978), 45.

[4] Thomas Aquinas, *Opusculum* 16, *De Trinitate,* 6.2, *ad* 5.

> [for faith, hope and love] to surface. Doing so … reveal[ed] God's will [and …] fire[d] him up to have the necessary passion to perform these great works.[5]

In his play *Saint Joan*,[6] George Bernard Shaw dramatizes Joan pleading for backing in her crusade against English. She is depicted soliciting the support of the Robert de Braidicourt for her campaign. In their conversation, Joan reveals that she hears voices and had been instructed to petition Robert by one such voice. The squire is taken aback: "How do you mean? Voices?" "I hear voices telling me what to do," Joan replies, adding, "They come from God." Robert is unconvinced: "They come from your imagination." To which Joan answers, "Of course. That is how messages of God come to us."[7]

It is easy to slander scientists as dull empiricists, intent upon sucking the mystery out of the cosmos. However, modern scholarship has effectively refuted such assertions, documenting how central imagination and creativity are to great science.[8] For example, while not the originator of heliocentric theory Nicolaus Copernicus (d. 1543) established its plausibility through astronomical imaginings that could not be unequivocally proven even by Galileo's observations. It was only in the 19th century that astronomer F.W. Bessel established heliocentricity through his successful measurement of a

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[5] Mark E. Thibodeaux, *Reimagining the Ignatian Examen: Fresh Ways to Pray from your Day* (Chicago: Loyola Press, 2015), 81.

[6] I am grateful to David Lose for this example, "Imagination and Preaching," in *A Handbook for Catholic Preaching,* ed. Edward Foley (Collegeville: Liturgical Press, 2015), 190.

[7] George Bernard Shaw, *Saint Joan* (New York, Penguin Classics, 2001), 59.

[8] See, for example, Tom McLeish, *The Poetry and Music of Science: Comparing Creativity in Science and Art* (Oxford: Oxford University Press, 2019).

parallax ellipse.[9] Copernicus' math combined with rudimentary observations could not suffice for the theoretical advancement here. Rather, it required the additional gift of imagination. It was only such a partnership that could promote the plausibility of this yet widely rejected theory. Copernicus imagined the heliocentric system long before it could be proven.

Innumerable other milestones in science were first imagined before being empirically validated: Newton's development of gravitational laws,[10] Madame Curie's work in radioactivity, Charles Darwin's theory of evolution, Albert Einstein's theory of relativity, Werner Heisenberg's work in quantum mechanics, Edwin Hubble's vision of an expanding universe, and Stephen Hawking's area theorem on black hole mechanics.

It is important that as preachers we bring our experiences and learning, our prayer life and faith to the pulpit. Such is not always sufficient, however, for assisting God's Spirit in moving the baptized to collaborating in God's reign. A dose of science may help. For example, in the United States we lament the political polarization that flies in the face of Jesus' example to love neighbors, even strangers as ourselves. When befuddled about how to preach bridging the divide of red states and blue states, red households and blue households the natural world provide startling hints of collaboration across the unlikeliest of partners. It is well documented, for example, that many large mammals collaborate with certain bird species.[11] Grazing behemoths will tolerate

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[9] https://sci.esa.int/web/gaia/-/53197-seeing-and-measuring-farther.

[10] Especially noteworthy is his "thought experiment" on gravitation published in his *A Treatise of the System of the World,* (London: Fayram, 1728), 6.

[11] See, for example, Charles L. Nunn et al., "Mutualism or Parasitism? Using a Phylogenic Approach to Characterize the

the birds employing them as a moving perch, since they remove threatening parasites in exchange for an easy meal. Their mutualism goes further, as some birds will raise alarms for their lumbering hosts about impending dangers, for example, alerting short-sighted rhinos that it is time to evade humans.

An even crazier example comes from Brazil, where dolphins and humans have created a fishing alliance.[12] Common bottlenose dolphins will chase schools of mullets toward shore, where fishermen stand waist-deep in the water. The fishermen cannot see the fish through the murky water, so they watch the dolphins. When the dolphins slap heads or tails against the water, it cues the fishermen to cast their nets, which then breaks up the schools and makes individual fish easier for dolphins to catch.

Nature demonstrates that humans, like other species, evolved because we have the capacity to collaborate. So if you are preaching downstream from contentions elections, looking for a fresh way to address the bounty of divisiveness, consider looking to nature. If oxpeckers and gazelles can collaborate, if bottle nosed dolphins and Brazilian fishermen can collaborate, maybe Christians from different political parties can also collaborate in furthering God's reign.

This intersection of homiletic need and scientific resources led to my current Preaching with the Sciences project[13] funded by the John Templeton Foundation. The grant created a dialogue between 10 talented homilists

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Oxpecker-Ungulate Relationship," *Evolution* 65, no.5 (2011): 1297-1304, https://doi.org/10.1111/j.1558-5646.2010.01212.x

[12] Alexandre Marcel da Silva Machado et al., "Artisanal fishers' perceptions of the ecosystem services derived from a dolphin-human cooperative fishing interaction in southern Brazil," *Ocean & Costal Management* 173, no.1 (2019): 148-156, https://www.sciencedirect.com/science/article/pii/S0964569118304848

[13] https://ctu.edu/initiatives/preaching-with-the-sciences/

and five world class scientists supported by multiple scientific resources, in order to generate over 100 homily outlines across the 3-year lectionary cycle of Sundays and feasts.

To date the project has produced dozens of homily outlines, each with hyperlinked scientific resources, illustrating how some aspect of the STEM world might illuminate a specific Sunday or Feast and its appointed lections.

From "In" to "Behind"

The Templeton project raises new questions for me. One of them is to what extent the sciences, especially neuroscience might clarify what engenders effective preaching. In this pursuit I am grateful for the guidance of Prof. Nancy Michael, Notre Dame's director of undergraduate studies for the neuroscience and behavior major.

The Human Condition

The human brain is an enormously complex organ, containing over 86 billion neurons and just as many nonneuronal cells rendering it capable of 100 trillion connections.[14] It has taken millennia for the brain of *homo sapiens* to evolve. There is very little paleographic record of ancestral brains as the soft tissue comprising the brain easily decomposes and the very rare surviving brains that were typically shrunken and deformed before

[14] Beau Lotto, *Deviate: The Creative Power of Transforming your Perception* (London: Weidenfeld & Nicolson, 2017), 159.

becoming fossilized.[15] Thus paleoneurologists often rely on endocasts or internal casts of the cranial vault of our ancestors to calculate the brain's evolution. However, we carry a kind of fossil record of the brain's evolution in our own heads. While often misused to suggest that particular functions are highly localized and confined to a single region of the brain, the image of the triune brain proposed by Paul MacLean in the 1960's yet provides an accessible model for understanding something of the brain's evolution and at least a partial explanation for why our autonomic systems respond the way they do. No less a neurological authority than Robert Sapolsky of Stanford puts forward the schematic of a triune brain as coming in three functional layers.[16] The bottom most and first to appear is the so-called reptilian brain, which has basically the same wiring as in a lizard brain and plays a critical role in all of those body functions that seldom come to consciousness like blood glucose that are essential for keeping our bodies in balance. On top of that is the limbic system, the so called "emotional" part of the brain that evolved in mammals. Sitting on top is the most recently evolved layer known as the cortex, involved in higher processes such as memory, and problem solving. Especially important is the prefrontal cortex, the last part of our brain to mature, broadly responsible for executive functions. Though tradition has taught that we reach the age of reason around 7, the prefrontal cortex actually does not come to maturity until the time we are 25 or so. This fact has influenced decisions by the U.S. Supreme Court over the past decades, ruling that some of the harshest punishments for acts committed by

[15]https://blog.frontiersin.org/2021/03/26/frontiers-scientists-ecology-evolution-paleoneurology-brain-morphology-earliest-land-vertebrates-alice-clement-flinders-university/

[16] https://www.youtube.com/watch?v=hg6XUYWj-pk

children are unconstitutionally cruel and unusual punishment.[17]

It is necessary to parallel this admittedly over-simplified schema of brain architecture with some awareness of why our brains evolved this way. It is easy for academics to assume that our highly developed brains evolved for thinking. Evidence suggests, however, that the human brain developed for a more rudimentary reason: to keep us alive. While all species have a survival drive, none has developed the brain as the primary tool for such survival. Some creatures have developed molecular mechanics that allow it to adopt to extremely cold weather by freezing up to 70% its body; when it warms, the antifreeze-like blood thaws the creature back to life.[18] Other species have survival skills as camouflage, poisonous defenses, speed for fleeing danger, and tougher than armor layers of skin.[19]

Homo sapiens took a different route. According to one author, our fragile bodies were constructed with the biological equivalent of duct tape and lumber scraps.[20] Instead of thick skin or poisonous venom, cheetah speed or natural camouflage, we evolved brains that allowed us to adapt and survive. A startling illustration of the brain as survival mechanism comes from studying the relationship between extreme climate changes and changes in braincase volume. It is not a surprise that *homo sapiens* as the only surviving hominin, who has endured every known habitat across all seven continents, has the largest brain of our species.

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[17] https://juvenilesentencingproject.org/us-supreme-court-decisions/

[18] https://www.nationalgeographic.com/animals/article/frog-antifreeze-blood-winter-adaptation

[19] https://a-z-animals.com/blog/the-top-ten-animals-with-the-toughest-skin/

[20] https://www.quora.com/Why-is-the-human-body-so-fragile-1

This comparatively massive organ, however, comes with significant cost. It requires a disproportionate amount of the body's energy: up to 20% of our total energy output.[21] Even in sleep, the brain is a constant energy drain, performing critical operations largely incompatible with wakefulness.[22] One way the brain conserves energy is by relying upon previously devised responses rather than thinking through familiar tasks anew. This saves time and energy and quickly decreases ambiguity,[23] which some argue is the ultimate foe of the human brain. Neuroscientists Beau Lotto argues, "Existing in uncertainty is exactly what our brains evolved to avoid…. Overcoming uncertainty and predicting usefully … is arguable the fundamental task that the human brain evolved to solve."[24]

Thus, the brain is not some biological computer precisely documenting the stimuli around us and calculating the most appropriate response; that takes too much time and energy. Rather, the human brain is a kind of data base of personal and ancient responses.[25] It stores perceptions and inherited reflexes that were useful but not necessarily objectively accurate.[26] So when we touch a hot surface, we pull away. When a mosquito penetrates the skin, we slap it down. When a bright light assaults our retinas, we shield our eyes. The speed of these inborn reflexes is almost beyond comprehension with information traveling at the neuron level in milliseconds. It is also well documented that our awareness of the intention to do something trails the initial wave of brain activity

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[21] https://www.scientificamerican.com/article/why-does-the-brain-need-s/#:~

[22] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5732842/

[23] Michael McGuire, *Believing: The Neuroscience of Fantasies, Fears and Convictions* (Amherst: Prometheus Books, 2013), 201.

[24] Lotto, 247.

[25] Ibid., 68.

[26] Ibid., 102.

associated with that action by about 300 milliseconds; so three-tenths of a second lapses between the brain making a choice and our awareness of that choice.[27] This is a lifesaver when we instinctively slam on the breaks when a child runs out in front of us on the road.

There are, however, significant downsides to our neurobiology. In its evolutionary instinct to conserve energy, the nervous system moves instantaneously to recognize danger before we are able to reflect upon the urged action. Stephen Porges calls this neuroception:[28] "a neural process, distinct from perception, capable of distinguishing environmental features that are safe, dangerous, or life-threatening. Our sense organs communicate with lightning speed to our brain … which informs the rest of our body through electrical signals and chemical messengers, directing us towards the next action required to keep us safe."[29] Our brains, for example, produce us/them dichotomies with stunning speed: a 50-millisecond exposure to the face of someone of another race, gender or social status automatically activates the amygdala.[30] Thus, some neuroscientist prefer not to talk about "free will," but "free won't," contending that a sense of will kicks in 150 to 200 milliseconds before the muscle moves, and with it the power to call a halt to the proceedings. From this

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[27] Michael Shermer, *The Believing Brain* (New York: Times Books, 2011), 72.

[28] Stephen Porges, "The Polyvagal theory: new insights into adaptive reactions of the autonomic nervous system," *Cleveland Clinic Journal of Medicine* 76, Suppl 2 (2009): S86-S90. https://doi.org/10.3949/ccjm.76.s2.17

[29] Craig Weiner, "Neuroception and What Happens When Our Warming System is Mis-Programmed," https://eftuniverse.com/research-studies/neuroception-what-happens-when-our-safety-danger-programming-goes-awry/

[30] Robert Sapolsky, *Behave: The Biology of Humans at our Best and Worst* (new York: Penguin Press, 2017), 388.

perspective free will operates not to initiate a voluntary act but to allow or suppress it.[31]

We are wired by our neurobiology and contexts to instinctively categorize us versus them, to create certainty out of ambiguity, to rigorously justify our positions even in the face of overwhelming disconfirming evidence, to quickly resort to displaced aggression when we have become a victim, and literally to shoot first and ask questions later: "I thought it was a gun, but he was holding a cell phone."

The neurobiology of our behavior nudges me to reimagine original sin. The church teaches that as the result of the sin of Adam, human nature is wounded, we are inclined to concupiscence,[32] and while we still possess free will, it is weakened and diminished.[33] The neurobiological analogy is clear to me: we have evolved to survive, to avoid ambiguity, to seek safety. Such does not always incline us to do good but instead to do what is expedient. This cautions me as a minister and a preacher to avoid simplistic moralizing, especially with adolescents and emerging adults.[34] It also suggests specific interconnected preaching strategies for encouraging and supporting others to act as reflective and ethical followers of Christ. We will consider four of these.

Preaching in the midst of mystery

Mystery is central to our faith: the Christian journey is essentially one of believing not of knowing. As

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[31] Jeffrey Schwartz and Sharon Begley, *The Mind and the Brain: Neuroplasticity and the power of Mental Force* (New York: HarperCollins, 2002), 307.

[32] *Catechism of the Catholic Church*, no. 405.

[33] Council of Trent (Sess. VI, cap. i and v).

[34] This is resonant with Francis' view of preaching in *Evangelii Gaudium,* e.g., no. 143.

Augustine pithily noted: *si enim comprehendis, non est Deus.*[35] Preachers are neither commissioned nor ordained to be know-it-alls. Assuming such a position in the pulpit models neither the ongoing need for spiritual metanoia, nor the ongoing need for modulating our neuroceptions in the face of new challenges. One key characteristic of the human brain is its plasticity, the ability of neurons to forge new connections, blaze new paths through the cortex and even assume new roles.[36] This is most obvious in rapidly evolving young brains with their over-abundance of synapses and capacities to forge enduring circuits that underlie thinking, feeling, responding and behavior.[37]

An extreme example is Ben Underwood.[38] Blind by the time he was 3, through parental prodding he learned to adapt by clicking with his tongue and listening to the sounds that bounced back to him. Through his highly evolved practice of echolocation he literally changed his brain, learning to interpret the world through sound. In this acoustic landscape he could differentiate a parked car from a parked truck, conquered bike riding, learned to played basketball and even beat his brother at video games simply by learning the significance of the different sounds.

Brain plasticity is not simply for the young. The brain retains some of its early malleability throughout life[39] and through the wonder of neurogenesis the remodeling brain retains the capacity to change the way we think and the ways we behave.[40]

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[35] Sermon 117.

[36] Schwartz and Begley, 15.

[37] Ibid., 129.

[38] Beau Lotto, *Deviate: The Science of Seeing Differently* (New York-Boston: Hachette Books, 2017), 66-68.

[39] Schwartz and Begley, 130.

[40] Ibid., 253-254.

Preaching that intentionally or unreflectively enhances personal, religious or political rigidity disables our neurological and spiritual plasticity; it attract like-minded adherents and feeds the phenomenon of confirmation bias which, in the language of one neuro-scientist, "prevents us from living more creative, compassionate, collaborative and courageous lives."[41] Inviting people to live adaptably in the midst of ambiguity, on the other hand, is an invitation into the mystery of the stranger, the unexpected epiphany, and the shock of incarnation in a Nazarene carpenter. For that to happen effectively requires that our preaching establishes a safe place for that journey into conversion.

Create a Safe Space

Polyvagal theory describes how a brain's unconscious sense of safety or danger impacts our emotions and behaviors.[42] Built on the premise that humans are unconsciously and continuously monitoring for friendly or dangerous environments, this sense of safety, danger or threat is posited as the organizing principle for mammalian behavior. A sense of safety is necessary for healthy physical and emotional growth. This is particularly important for infants, who essentially perceive the world through their autonomic nervous system. Infants are born into a chaotic world, unable to control their environment or regulate how they respond to that environment. They are completely dependent upon parents or caregivers for that. When caregivers are "emotionally attuned to the infant's internal affective

[41] Lotto, 9.

[42] Marilyn Sanders and George Thompson, *Polyvagal Theory and the Developing Child: Systems of Care for Strengthening Kids, Families and Communities* (New York: W. W. Norton & Company, 2022), xxi-ii.

world an intersubjective space is created that gradually enables the child to order her chaotic emotional experiences."[43]

Psychologist Allan Schore notes that in the chaotic first years of a child's life nurturing parents mirror the infant's inner emotional life and give it verbal and physical expression. In this dramatic form of neural mirroring, the parents in a sense "lend their brain" to the infant, as the infant uses the output of the parent's right cortex as a template for hardwiring the neuronal circuits in its own cortex in developing a more stable and fulfilling existence.[44]

Preachers are not parents, but we often are called to be nurturing companions in the midst of chaos: when housing markets collapse, hurricanes flatten counties, and school children are executed in their own classrooms. Then there are all those private upheavals from miscarriage to the Alzheimer's diagnosis to family violence. Our preaching, like our worship, needs to provide safe spaces where believers can bring wounded minds and shattered hearts. If we can create safe places through our preaching – radically inclusive and decidedly non-judgmental – it is possible that analogous to a loving caregiver, we can lend not our minds but God's very Sacred Heart to folks so that they might recalibrate their own spirits in our ecclesial embrace that offers them both consolation and hope.

We shape this safe place not just with words but our bodies, not only with what we say but how we say it.

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[43] I am grateful to my colleague David Hogue for introducing me to the work of Allan Schore; see the former's "Because We Are: Practical Theology, Intersubjectivity and the Human Brain," *Practicing Ubuntu,* ed. Jaco Dreyer et al. (Berlin: LIT Verlag, 2017), 184.

[44] Allan Schore, *Affective Regulation and the Origin of the Self: The Neurobiology of Emotional Development* (Hillsdale NJ: Lawrence Erlbaum, 1994), 77.

Many have probably heard overly extroverted preaching instructors offer the frivolous critique that the beginning preacher didn't smile. Who cares if we smile? What difference does that make? Well, actually a lot. Human beings are the only creatures know to have an area of the brain specializing in facial recognition. The fusiform face area in the inferior temporal cortex is part of the human visual system not only tuned to recognizing but also reading faces: their color, the look in the eyes, smiles, and grimaces. We previously noted that our neuroception takes about a 50-millisecond exposure to the face of someone of another race or gender or social status to activate the amygdala. Angry faces do the same.[45]

Then there is that suggestion teetering on the brink of sentimentality to preach like a mother speaks to her child.[46] Maybe it helps to admit the empirical evidence that fetuses can not only hear in the womb, but develop an attachment to the sound of their mother's voice.[47] Further research demonstrates that even a phone call from Mom after a stressful event is just as effective as an in-person hug from Mom in significantly raising the level of oxytocin, the so called "love hormone," strongly associated with emotional bonding, while simultaneously washing away the stress-marking hormone cortisol.[48] So

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[45] Michael P. Ewbank, Elaine Fox and Andrew J. Calder, "The interaction between gaze and facial expression in the amygdala and extended amygdala is modulated by anxiety," *Frontiers in Human Neuroscience* (7 July 2010), https://doi.org/10.3389/fnhum.2010.00056

[46] *Evangelii Gaudium*, no. 139.

[47] Alexandra R. Webb, Howard T. Heller, Carol B. Benson, and Amir Lahav, "Mother's voice and heartbeat sounds elicit auditory plasticity in the human brain before full gestation," *Proceedings of the National Academy of Sciences* 112, no. 10 (23 February 2015): 3152-3157, https://doi.org/10.1073/pnas.1414924112

[48] Leslie J. Seltzer, Toni E. Ziegler, Seth D. Pollak, **"**Social Vocalizations can Release Oxytocin in Humans**,"** *Proceedings of the Royal Society B: Biological Sciences*, 2010, https://doi.org/10.1098/rspb.2010.0567

maybe all those commonly employed evaluation criteria like vocal variation, naturalness of tone, and emotional connection do have some neuroscientific validity.

Few communications signal a safe place as much as empathy, what one colleague defines as "your heart in my chest." The human brain is actually designed for empathy.[49] One scientist notes, "If human existence was simply the result of 'survival of the fittest,' we would be wired solely to dominate others, not to respond to their suffering. Our capacity to perceive and resonate with others' suffering allows us to feel and understand their pain. The personal distress experienced by observing others' pain often motivates us to respond with compassion. The survival of our species depends on mutual aid, and providing it reduces our own distress. Mutual aid exists in the earliest reports of tribal behavior and remains a powerful force in today's world, where thousands of organizations and millions of people work to relieve global suffering."[50]

Demonstrating empathy with an assembly is essential if we wish to prepare a hospitable space for them to bless and to grieve, to hope and endure. It is also an essential strategy in assisting to ongoing conversion. Our neuroplasticity posits the possibility that people can change the way they think, the way they act and the way they believe. Such change can occur through real world events but it is well documented that it can also take place just by thinking.[51] Many understand that, in the previously noted example of Ignatius of Loyola, imag-

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[49] Helen Riess, "The Science of Empathy," *Journal of Patient Experience* 4, no. 2 (2017): 74-77, https://doi.org/10.1177/2374373517699267

[50] James Harris, "The Evolutionary Neurobiology, Emergence and Facilitation of Empathy," in *Empathy in Mental Illness*, eds. Tom Farrow and Peter Woodruff (Cambridge, UK: Cambridge University Press, 2007), 168.

[51] Schwartz and Begley, 217

ining can actually change our neural map.[52] Thinking about perception is the ability to alter it,[53] cognitive rehearsals of new ways of seeing or acting can change us.[54] Imagined perceptions can change our neural architecture,[55] our instincts towards prejudice or exclusion, our attitudes toward the stranger and even our relationship with God.

An effective preacher, who understands the need for creating a safe space facilitated by an informed face-heart connection and conversational voice evincing an empathetic soul Sunday after Sunday and season after season can nurture believers into true metanoia, intentionally and graciously ushering themselves and others into the fullness of God's Reign.

Deviate

In his classic work on narrative preaching,[56] Eugene Lowry laments that one basic error that many preachers make is that they "give away the plot" at the beginning of the sermon. This would be akin to Shakespeare walking to the apron of the Globe theatre before his new production, and explaining that in the play two young people from rival families fall in love, but because of apparently insurmountable obstacles, both commit suicide at the end. Who would stay? His solution is to upset the equilibrium early in the homiletic event (he labels this move "oops"). This unexpected complication creates "an itch born of ambiguity," which positions the

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[52] Lotto, 120.
[53] Ibid., 133.
[54] Ibid., 135.
[55] Ibid., 136.
[56] Eugene Lowry, *The Homiletical Plot,* expanded edition (Louisville: John Knox, 2001).

preacher to move with the assembly toward a salvific resolution.[57]

There is clear resonance between Lowry's emphasis on the "oops" and neuroscientist Beau Lotto's insistence on the need to "deviate" in order to journey creatively into the ambiguity of life with humility and imagination. Recall our previous discussion of brain evolution and the way we are wired for survival and safety. Our neuroperceptions preliminary to any conscious reflections on them, as noted above, can be both life-saving and destructive. Our developed prefrontal cortex is the tool we must deploy in order to monitor the ethics of our instinctive actions.[58]

Lotto explains deviation as an ability to question one's assumptions. Doing so allows the "human brain … to shed constricting assumptions and see beyond the utility with which the past has trained it to see."[59] This deviation from "self-sabotaging" behavior, according to Lotto, begins with awareness.[60] Creating a habitus of mindfulness is thus a powerful tool for altering our instincts for self-sabotage. While mindfulness is a much respected practice across various secular and religious traditions – particularly Buddhism – it is only recently that its potential has been explored neuroscientifically. In the forefront here is the work of Jeffrey Schwartz, who has deployed mindfulness as an effective and much lauded process for helping people overcome mental health disorders such as obsessive-compulsive disorder.[61]

The "oops," from this perspective, is not simply a clever homiletic tactic but also an invitation into gospel

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[57] Ibid., 23ff.

[58] For a general introduction to the field of "neuroethics" see Martha J. Farah, ed. *Neuroethics: An Introduction with Readings* (Cambridge MA: MIT Press, 2010).

[59] Lotto, 12.

[60] Lotto, 147.

[61] This work is well summarized in Schwartz and Begley.

mindfulness. By upsetting the equilibrium – i.e., those generally held assumptions about a lectionary text or church festival, a religious position or inherited conviction – an assembly is invited to challenge previously held beliefs that have the potential to narrow our views of others, ourselves and even God to the point of self-sabotage. This practice is deeply rooted in the gospel portrayal of Jesus who was unusually gifted in upsetting the equilibrium, be that about Samaritan or Syrophoenician women, or about lepers and tax collectors. In the process, he revealed a shocking view of God's reign and redefined the very concept of neighbor.

Finally, tell stories.

One of the most effective strategies for accomplishing these tasks is through narrative. It is a strategy that consistently appeared across the literature I reviewed this semester, from works on moral elevation[62] to theories of innovation,[63] from the neuroscience of convictions[64] to polyvagal theory.[65]

There is a general consensus that human beings are "wired" for stories.[66] Some suggest that our brains developed this narrative capacity in order to make sense out of the chaos that surrounds us, as a kind of defense to organize all of the data that impacts our senses. Cognitive scientists. Keith Oatley images our story

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[62] Z. A. Englander, J. Haidt, J.P., "Neural Basis of Moral Elevation Demonstrated through Inter-Subject Synchronization of Cortical Activity during Free-Viewing," PLoS ONE 7, no. 6 (2012): e39384, https://doi.org/10.1371/journal.pone.0039384

[63] Lotto, 253.

[64] McGuire, *Believing*, 161ff.

[65] Sanders, 134.

[66] An enlightening introduction to this concept is Jonathan Gottschall, *The Storytelling Animal: How Stories make us human* (Boston-New York: Mariner books, 2013).

experiences as a kind of simulator allowing us vivid replication of reality without all of the danger.[67] Oakley summarizes:

> [fiction] is a particularly useful simulation because negotiating the social world effectively is extremely tricky, requiring us to weigh up myriad interacting instances of cause and effect. Just as computer simulations can help us get to grips with complex problems such as flying a plane, so novels, stories and dramas can help us understand the complexities of social life.[68]

Storytelling is an important strategy for building empathy. As a form of protected simulation, narrative is a sheltered arena for experiencing emotions safely. When we read or hear about a character, "we feel something that is perhaps similar to those emotions, but they are not the character's. They are our own. That's how empathy and identification work in fiction." The contribution is that it helps us "improve our mental models of others and ourselves."[69] Research indicates that "a ready capacity to project oneself into a story may assist in projecting oneself into another's mind in order to infer their mental states."[70] A growing body of literature suggests that narrative allows us to help map the way other people believe and think, as it gives us a

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[67] Raymond A. Mar, Keith Oatley, and Jordan B. Peterson, "Exploring the link between reading fiction and empathy: Ruling out individual differences and examining outcomes," Communications 34 (2009) 407-428, https://doi.org/10.1515/COMM.2009.025

[68] Keith Oatley as cited in Annie Murphy Paul, "Your Brain on Fiction," *The New York Times* 17 March 2012., https://www.nytimes.com/2012/03/18/opinion/sunday/the-neuroscience-of-your-brain-on-fiction.html

[69] Keith Oatley, *The Passionate Muse: Exploring Emotion in Stories* (Oxford: Oxford University Press, 2012), 19.

[70] Mar, Oatley, and Peterson, p. 421.

safe arena for understanding and even identifying with the longings and motivations of the various fictional characters we encounter.

Related to fiction's ability to open the door on empathy is storytelling's capacity to generate neural coupling. Researchers at Princeton University have concluded that effective communication results in neural coupling when the brain of the speaker evokes similar neural responses in the brains of the listeners. The result is a "mirroring" of the speaker's brain responses in the brains of the listening. This mirroring creates coherence been the brain of the preacher and those of the assembly, which means the brains of the assembly listeners are also in sync with each other. Uri Hasson and his Princeton colleagues conclude, "The greater the anticipatory speaker-listener coupling, the greater the understanding."[71]

This coupling potential is augmented by during storytelling. Compared to the communication of information alone, effective storytelling can activate multiple brain regions, especially if vivid imagery is employed. As many as three times the brain areas show activity in vivid storytelling compared what happens in the dissemination of ideas or data alone. Combining this broad terrain brain activity with the power of neural mirroring in effective story telling neuro-scientifically confirms what effective storytellers have known for millennium: stories are powerful.

That power is not simply it its entertainment quotient. It is well documented that effective storytelling triggers the release of neuropeptides such as oxytocin in the brains of listeners. There is general agreement that

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[71] Greg J. Stephens, Lauren J. Silbert, and Uri Hasson, "Speaker–Listener Neural Coupling Underlies Successful Communication," *Proceedings of the National Academy of Sciences* 107, nbo. 32 (2010): 14425-24430, https://doi.org/10.1073/pnas.1008662107

oxytocin prompts new levels of generosity in those generally disposed to such action, even between anonymous strangers.[72] Some research has demonstrated that this same dynamic is in play in the aftermath of powerful narrative. Emotionally engaging narrative enhanced by an oxytocin discharge has a heightened potential to inspire positive post-narrative action, post-homiletic action.[73]

Conclusion

In her luminous *The Preaching Life,* Barbara Brown Taylor writes:

> *Watching a preacher climb into the pulpit*
> *Is a lot like watching a tightrope walker*
> *Climb onto the platform as the drum roll begins.*
> *The first clear his throat and spreads out his notes*
> *The second loosens his shoulders and stretches out*
> *One rosin-soled foot to test the taught rope.*
>
> *Then both step out into the air*
> *Trusting everything they have done to prepare for this moment*
> *As they surrender themselves to it*
> *Counting now on something beyond themselves*
> *To help them do what they love and fear*
> *And most want to do.*
> *If they reach the other side without falling,*
> *It is skill but it is also grace*
> *A benevolent God's decision*
> *To let these daredevils tread the high places*

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[72] Paul P Zak, Angela Stanton, Sheila Ahmadi, "Oxytocin Increases Generosity in Humans," *PLoS ONE* 2, no. 11 (2007): e1128, https://doi.org/10.1371/journal.pone.0001128

[73] Ibid.

Where ordinary mortals have the good sense not to go.[74]

To all preachers, I wish you courage as you step out into midair. I wish you peace, as you hold that two-edged sword close. And I hope that gifts from the sciences might help you keep your balance for the sake of the baptized and to the glory of God's name.

[74] Barbara Brown Taylor, *The Preaching Life* (Lanham: Cowley Publications, 1993), 76.

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