

The Mediating Effects of Prayer on the Anterior Cingulate Cortex's Regulation of Anxiety

by Peyton Estes, MS1

In *The Screwtape Letters* Screwtape writes to Wormwood, “There is nothing like suspense and anxiety for barricading a human’s mind against the Enemy. He wants men to be concerned with what they do; our business is to keep them thinking about what will happen with them” (1). Without directly stating it, C.S. Lewis made a profound connection between neurobiology and spiritual formation.

It has been supported that *The Lord’s Prayer* has correlation with activation in several areas of the brain, one of which is the anterior cingulate cortex (ACC), a structure involved with emotions, particularly anxiety, as well as decision-making (2). Furthermore, when a person prays, the same regions of the brain are activated as those which are stimulated during conversations with others (3). Based on this observation, it can be hypothesized that the brain has come to view conversations with God, on a neurobiological level, as quite similar to those that one may have with a close friend or family member. These same regions of the brain are also heavily involved with assessing the past and future experiences of your own life (3). As someone who has struggled with anxiety, I know first hand that it is rooted in an over evaluation of the past and an overthinking of what is to come. Even though Neubauer does not directly reference anxiety, he does highlight the connectivity between prayer and the structures of the brain which impact how you think about yourself. Using functional magnetic resonance imaging (fMRI), the study demonstrated patterns of activation within the ACC during prayer, which provides a theoretical basis for

the hypothesis that prayer can mediate feelings of anxiety and/or, impact the way a person evaluates and dwells on previous life choices, as well as future ones that may be hanging over his/her head (3).

This hypothesis is backed by research that has explored the relationship between spirituality and meditation. A two-week meditation study that evaluated pain, anxiety, mood, and spiritual health pre- and post-test found that those who identify as religious reaped greater benefits from prolonged periods of meditation (4). At the end of the study, the individuals who were classified as spiritual reported significantly larger decreases in anxiety and significantly greater increases in positive mood (4). In contrast to the Neubauer study, this research did not directly reference the ACC, though it did specifically include anxiety as an endpoint. Nevertheless, because of the physiological role of this structure and common activation by emotions (e.g. anxiety), self-reflection on past and future decisions, and prayer, there is a theoretical basis for the hypothesis that the ACC may be heavily involved in the alleviation of anxiety by spiritual meditation and prayer. It is time that meditation, prayer, and the ACC, as a unit, receive the recognition they deserve for the potentially significant impact they may have on the health and well-being of individuals across the world.

References

1. Lewis, C.S. (2015). *The Screwtape Letters*. HarperOne.
2. Mercadillo, R. E., Fernandez-Ruiz, J., Cadena, O., Domínguez-Salazar, E., Pasaye, E. H., & Velázquez-Moctezuma, J. (2017). The Franciscan Prayer Elicits Empathic and Cooperative Intentions in Atheists: A Neurocognitive and Phenomenological Enquiry. *Frontiers in Sociology*, 2. Available from: <https://www.frontiersin.org/article/10.3389/fsoc.2017.00022>
3. Neubauer, R. L. (2014). Prayer as an Interpersonal Relationship: A Neuroimaging Study. *Religion, Brain & Behavior*, 4(2), 92-103. Available from: <https://doi.org/10.1080/2153599X.2013.768288>
4. Wachholtz, A. B., & Pargament, K. I. (2005). Is Spirituality a Critical Ingredient of Meditation? Comparing the Effects of Spiritual Meditation, Secular Meditation, and Relaxation on Spiritual, Psychological, Cardiac, and Pain Outcomes. *Journal of Behavioral Medicine*, 28(4), 369-384. Available from: <https://doi.org/10.1007/s10865-005-9008-5>