International Journal of Paramedicine

Published by the National EMS Management Association (USA)

CONCEPTS

FROM HARM TO HEALING: ADDRESSING THE NOCEBIC EFFECTS OF NEGATIVE LANGUAGE IN EMERGENCY CARE

Bram Duffee, PhD, EMT-P*[1,2]; Andrew Newton, QAM, PhD, FCPara[3]

Author Affiliations: 1. School of Communication and Media, Norman J. Radow College of Humanities and Social Sciences, Kennesaw State University, Kennesaw, GA, USA; 2. First Responder Behavioral Health Institute, Ft Worth, TX, USA; 3. UK College of Paramedics, Bridgwater, UK.

Recommended Citation: Duffee, B. & Newton, A. (2025). From harm to healing: Addressing the nocebic effects of negative language in emergency care. *International Journal of Paramedicine*. (12). 160-166. https://doi.org/10.56068/OPMU6243. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3292.

Keywords: nocebic language, communication strategies, positive language, psychoneurological responses, hypnosis, therapeutic communication, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Received: November 19, 2024
Revised: February 4, 2025
Revised: May 28, 2025
Accepted: May 31, 2025
Published: October 8, 2025

**Corresponding Author*: bduffee@fielding.edu

Author Interview: https://youtu.be/K5aQx3-GKz8

ABSTRACT

This article investigates the significant role of nocebic-effect inducing language in shaping patient outcomes within paramedicine, emphasizing how negative communication can heighten anxiety and intensify pain. It explores the neurophysiological mechanisms underlying these effects, including the activation of stress pathways, disruption of pain modulation, and amplification of emotional distress. The article underscores the critical importance of positive communication strategies in mitigating these adverse effects, fostering patient trust, and enhancing recovery. By advocating for structured training in empathetic and constructive communication, it highlights the potential to transform patient experiences and sets a new standard for compassionate, effective prehospital care.

To become ever more effective, the future of paramedicine will benefit from being shaped by advancing research into the ways language influences patient mental and physical states, just as it is informed by the wider clinical evidence base. The phenomenon of nocebic-effect inducing language, which involves verbal expressions that unintentionally heighten a patient's anxiety and perception of pain, is increasingly well understood and documented in health research (Benedetti et al, 2007; Manaï et al, 2019; Nasiri-Dehsorkhi et al, 2024). It has also been recognized as both frequently present and almost always avoidable, (but in practice rarely avoided) in paramedic practice, (Newton 2024).

This area of study is important because it underscores how a healthcare professional's language, both verbal and non-verbal, can significantly affect both short and possibly longer-term patient outcomes, particularly in terms of anxiety and pain perception. For example, de Soir has suggested that thoughtfully constructed language employed during the acute phase of traumatic injury and acute illness, may reduce the incidence of PTSD (2020). For paramedics, who often operate in high-stress, acute

scenarios, understanding and mitigating nocebic language is therefore relevant to all patient encounters.

Information that is communicated to patients can either reduce or worsen their anxiety levels. In emergency medical situations, paramedics frequently need to explain complex procedures quickly and clearly. Studies have demonstrated that patients who receive detailed verbal briefings about procedures often experience increased anxiety, especially if the information is presented negatively. For instance, when a paramedic explains an urgent medical intervention, using calm, positive language, this can significantly reduce patient anxiety and contribute to better outcomes (Lin et al., 2016).

A relatively new theory has emerged that pushes the limits of "nocebic communication," or nocebic-effect inducing language, also termed "nocebic terminology" (Häuser et al, 2012). This is the understanding that, while nocebic-effect inducing language can occur during any clinician-patient encounter. During the critical first hour following a medical emergency or trauma, patients enter a "modified state of awareness" (Bierman, 1989). This period involves a heightened state of vulnerability, rendering patients highly susceptible to verbal suggestions. This hyper-suggestible condition mirrors a state akin to hypnosis which, for the purpose of this paper, the authors take to mean a form of focused attention (sometimes referred to as a "trance equivalent state") where the words spoken around the patient can significantly influence cognition, thereby affecting their mental and emotional state.

During this vulnerable time, patients often experience confusion, paired with hypnotic phenomena, which heightens the likelihood that they may view statements from paramedics and other responders in a negative light (Erickson & Haley, 1967). The language used by healthcare professionals can, therefore, amplify these effects. Thus, necessitating careful and compassionate communication to prevent exacerbating anxiety and pain. This understanding emphasizes the importance of employing positive and reassuring language (Jacobs & Duffee, 2023).

Linguistic factors that include specific word choice and syntax influence cognitive processes underlying anxiety and pain perception. Anxiety can impair cognitive functions like working memory and decision-making, which are vital in processing verbal information. For example, research has shown that individuals with high anxiety exhibit impaired verbal fluency and memory performance, complicating their ability to engage with healthcare providers effectively (Vytal et al., 2013). This cognitive disruption can create a feedback loop, where increased anxiety leads to poorer communication and understanding, ultimately resulting in worse outcomes.

There is, therefore, a clear parallel between the form of perceptional changes that occur in subjects who undergo hypnosis and the "natural trance [type] state" that occurs in traumatic and medical emergencies (Hansen & Zech, 2019). Given that the "medical environment" is so replete with negative suggestions, there is a consequent opportunity for a paramedic, or other provider, to influence a patient's psycho-physiological functions, without the necessity to conduct a hypnotic induction (Hansen et al, 2010).

The interaction between communication styles in medical emergencies and patient outcomes is deeply rooted in neurophysiological and psychological mechanisms. The weight of evidence underscores that communication during the first critical hour can

either amplify or dampen stress and physiological maladaptions. These effects are mediated by neurotransmitter systems, the hypothalamic-pituitary-adrenal (HPA) axis, and limbic activation, interwoven with psychological states of fear and suggestibility.

Neurotransmitter Activity and Modulation of Pain

Neurotransmitters like dopamine, endogenous opioids, and cholecystokinin (CCK) are central to moderating pain and emotional distress during trauma. Endogenous opioids, which are integral to natural analgesia, activate μ-opioid receptors to suppress nociceptive input (Zubieta et al., 2005). However, nocebic communication has been shown to stimulate CCK release in the central nervous system, antagonizing opioid receptor activity and exacerbating pain (Arrow et al., 2022).

Conversely, dopamine, another key neurotransmitter, facilitates reward signaling and stress resilience. Studies linking dopaminergic activity to communication reveal that positive verbal reinforcement activates dopaminergic pathways, not only alleviating pain but also improving emotional states (Benedetti & Piedimonte, 2019). Furthermore, functional neuroimaging has demonstrated that regions such as the anterior cingulate cortex (ACC) and insula show increased activity during positive clinician-patient interactions, indicative of dopamine and endogenous opioid activation (Bensing & Verheul, 2010).

HPA Axis and Stress Regulation

The HPA axis orchestrates the body's response to acute stress, which is often magnified during medical emergencies. Upon encountering a perceived threat, the hypothalamus releases corticotropin-releasing hormone (CRH), triggering the pituitary gland to secrete adrenocorticotropic hormone (ACTH). This cascade culminates in adrenal cortisol release, leading to heightened glucose availability and temporary suppression of non-essential functions (Hadamitzky et al., 2018).

Nocebic interactions amplify this stress response by increasing amygdala activity, which sends excitatory signals to the hypothalamus. This hyperactivation perpetuates the HPA axis cycle, contributing to sustained cortisol elevation, impaired cognitive function, and heightened pain perception. Neuroimaging studies have identified heightened connectivity between the amygdala and HPA axis-related regions during exposure to negative language, confirming the exacerbation of stress states (Scott et al., 2007).

Limbic System Activation and Emotional Dynamics

The limbic system, particularly the amygdala and hippocampus, plays a pivotal role in processing emotional stimuli, including responses to nocebic or placebo communication. Negative verbal cues intensify amygdala activation, augmenting fear and hyperalgesia. Sajid (2018) demonstrated that nocebic terminology disrupts the neural circuitry responsible for emotional regulation, compounding both psychological and somatic symptoms.

Importantly, framing language positively has been shown to downregulate amygdala activity and promote parasympathetic response, which counteracts the sympathetic overdrive caused by stress. Neuroimaging techniques like functional MRI (fMRI) reveal that during positive clinician-patient interactions, increased activity in prefrontal areas dampens maladaptive limbic responses (Benedetti et al., 2005).

Suggestibility and Hypnosis in Prehospital Care

Trauma and acute critical illness, often induces a heightened state of suggestibility, akin to a natural trance. This state amplifies the impact of verbal suggestions, making it critical for prehospital providers to adopt constructive communication strategies. Research into hypnotic communication shows that framing painful procedures with neutral or positive language can significantly reduce pain perception and stress markers (Erickson & Rossi, 1980).

Expectancy also plays a vital role in modulating these effects. Positive verbal reinforcement has been shown to elicit placebo responses through activation of the medial prefrontal cortex and subcortical areas such as the periaqueductal gray (PAG), which are central to pain modulation networks (Zubieta & Stohler, 2009).

Placebo and Nocebo Mechanisms in Clinical Outcomes

Placebo effects demonstrate the influence verbal, and non-verbal communication has on physiological states. Neurobiological studies show that placebo responses activate endogenous opioid systems across multiple brain regions, including the ACC, orbitofrontal cortex, and hypothalamus (Scott et al., 2008). These activations correspond to reductions in pain and improvements in stress regulation.

Conversely, nocebo effects represent the negative side of this phenomenon. Negative expectations induced by nocebic language activate exaggerated pathways, impair cortisol regulation, and intensify maladaptive fear responses. Neural imaging reveals increased connectivity across the cingula-frontal pain network during nocebo-driven hyperalgesia (Wager et al., 2004).

Integration of Neurophysiology into Clinical Communication

Clinical communication that incorporates an understanding of neurophysiology can drastically improve patient outcomes. Positive communication primes neurobiological mechanisms that enhance resilience, while negative interactions exacerbate physiological stress altogether. Strategies leveraging these insights include structured training in linguistic reframing, active listening, and the use of calm, empathetic language to mitigate hyperactivation of stress and pain pathways.

Explaining Procedures:

Nocebic Communication: "This procedure is going to hurt, but we have to do it."

Positive Communication: "You might feel some altered sensation during this procedure, but we'll do everything we can to make you comfortable and it'll help you get better."

Providing Updates:

Nocebic Communication: "Things are not looking good right now, but we're trying our best."

Positive Communication: "The worst is behind you now and we are making progress step by step."

Reassuring During Transport:

Nocebic Communication: "The ride might be bumpy, but we have your seatbelts on."

Positive Communication: "We'll make the ride as smooth as possible and this safety harness will help us keep you safe. Let us know if you need anything to feel more comfortable."

Addressing Patient Concerns:

Nocebic Communication: "There's a lot that can go wrong, but we'll see what happens."

Positive Communication: "Your body is naturally working in the background even when you are not fully aware of it. We're working with those processes doing everything that is necessary to ensure the best outcome for you. Feel free to share any concerns you have."

Effective communication is not merely about conveying information; it is a multidimensional process that encompasses active listening and empathetic engagement, both of which are pivotal in fostering positive patient outcomes (Moeini et al, 2019). For paramedics, who often operate in high-pressure environments, these skills can significantly influence recovery trajectories. Active listening involves attentively understanding patient concerns, which not only alleviates anxiety but also empowers patients by validating their feelings and experiences. "Learnable language Structures" (Cyna, 2020) which involve consciously applied formats of communication are, therefore, key.

In acute medical situations, communication nuances, including non-verbal cues, are also essential for building trust and rapport between patients and paramedics. Non-verbal communication constitutes a substantial part of interpersonal interactions, with studies indicating that effective non-verbal communication correlates with higher patient satisfaction and compliance (Kelly et al, 2018; Liu et al, 2016). This is particularly relevant in emergency settings, where patients may experience high stress and anxiety, making them more sensitive to the emotional tone and body language of caregivers (Hall et al, 2021).

By prioritizing empathetic communication and trust-building, paramedics can forge therapeutic relationships that promote recovery and elevate their effectiveness (Duffee, 2023). This rapport facilitates a connection that extends beyond immediate medical needs, laying the groundwork for a supportive environment where patients feel understood and cared for. For instance, when explaining a procedure, a paramedic who takes the time to listen to a patient's fears and responds with empathy can demystify the process thereby reducing apprehension. Similarly, when providing updates using a calm, reassuring tone, while actively engaging with the patient's questions, can reinforce trust and confidence in the care being provided.

Reassurance during transport, or addressing patient concerns with empathy, further solidifies this trust. When paramedics express genuine concern for patient comfort and well-being, it not only enhances the immediate care experience but also contributes to better psychological and emotional outcomes for patients. Evaluating these skills involves observing how paramedics interact with patients, noting their ability to listen, respond empathetically and adapt their communication style to meet the needs of the individual. Such practices underscore the importance of interpersonal skills in medical

emergencies, where the positive, human touch can profoundly impact healing and recovery.

Effective communication is at the heart of paramedicine, underscoring the profound influence language has on patient care and outcomes. Understanding the impact of nocebic-effect inducing language reveals the crucial need for paramedics to adopt strategies that foster reassurance and trust. Positive, empathetic communication not only mitigates anxiety and pain but also builds the therapeutic relationships essential for healing and recovery. By refining their verbal and non-verbal interactions, paramedics can greatly enhance patient experiences, offering support during moments of vulnerability. As ongoing research continues to uncover the complexities of language and its neurobiological effects, the future of paramedicine lies in integrating these insights into practice, paving the way for compassionate and effective care that benefits both patients and practitioners alike.

It is important to acknowledge the profound harm that negative language can inflict on patients, it is essential for healthcare providers to implement proactive communication strategies that alleviate stress, cultivate positive expectations, and harness the therapeutic potential of placebo effects (Wiech, 2016; Peerdeman et al., 2016). A new look at ethical practice in healthcare demands an intentional effort to avoid language that may cause harm and replace it with empathetic and supportive communication styles that promote both emotional and physical health. Integrating training programs focused on positive communication skills could serve as a critical step toward minimizing nocebic effects and ensuring ethical compliance in patient care (Ellis et al., 2017; Légaré et al., 2018).

REFERENCES

Arrow, K., Burgoyne, L. L., & Cyna, A. M. (2022). Implications of nocebo in anaesthesia care. *Anaesthesia, 77*(Suppl 1), 11–20. https://doi.org/10.1111/anae.15601

Benedetti, F., Carlino, E., & Pollo, A. (2011). How placebos change the patient's brain. *Neuropsychopharmacology, 36*(1), 339–354. https://doi.org/10.1038/npp.2010.81

Benedetti, F., & Piedimonte, A. (2019). The neurobiological underpinnings of placebo and nocebo effects. *Seminars in arthritis and rheumatism, 49*(3S), S18–S21. https://doi.org/10.1016/j.semarthrit.2019.09.015

Benedetti, F., Lanotte, M., Lopiano, L., & Colloca, L. (2007). When words are painful: Unraveling the mechanisms of the nocebo effect. *Neuroscience, 147*(2), 260–271. https://doi.org/10.1016/j.neuroscience.2007.02.020

Bensing, J. M., & Verheul, W. (2010). The silent healer: The role of communication in placebo effects. *Patient Education and Counseling*, 80(3), 293–299. https://doi.org/10.1016/j.pec.2010.05.033

Bierman S. F. (1989). Hypnosis in the emergency department. *The American Journal of Emergency Medicine, 7*(2), 238–242. https://doi.org/10.1016/0735-6757(89)90145-9

de Soir, E. L. (2020). Acute trauma support for victims and their first responders in times of crisis. *In Risk Management of Terrorism Induced Stress* (pp. 88–96). IOS Press.

Duffee, B. (2023). From greeting to healing: Leveraging hypnosis principles for effective rapport building in first responder communication. *Journal of Emergency Medical Services*. https://www.jems.com/patient-care/leveraging-hypnosis-principles-for-effective-rapport-building/

Erickson, M. H., & Haley, J. (1967). Advanced techniques of hypnosis and therapy: *Selected papers of Milton Erickson, M.D.* Philadelphia, PA: Grune & Stratton.

Hadamitzky, M., Sondermann, W., Benson, S., & Schedlowski, M. (2018). Placebo effects in the immune system. In L. Colloca (Ed.), *International Review of Neurobiology* (Vol. 138, pp. 39–59). Academic Press. https://doi.org/10.1016/bs.irn.2018.01.001

Häuser, W., Hansen, E., & Enck, P. (2012). Nocebo phenomena in medicine: Their relevance in everyday clinical practice. *Deutsches Ärzteblatt International, 109*(26), 459–465. https://doi.org/10.3238/arztebl.2012.0459

Hansen, E., & Zech, N. (2019). Nocebo effects and negative suggestions in daily clinical practice - Forms, impact, and approaches to avoid them. *Frontiers in Pharmacology, 10*, 77. https://doi.org/10.3389/fphar.2019.00077

Jacobs, D. T., & Duffee, B. (2023). *Hypnotic communication in emergency medical settings: For life-saving and therapeutic outcomes*. Routledge.

Lin, S. Y., Huang, H. A., Lin, S. C., Huang, Y. T., Wang, K. Y., & Shi, H. Y. (2016). The effect of an anaesthetic patient information video on perioperative anxiety: A randomised study. *European journal of anaesthesiology, 33*(2), 134–139. https://doi.org/10.1097/EJA.0000000000000307

Manaï, M., van Middendorp, H., Veldhuijzen, D. S., Huizinga, T. W., & Evers, A. W. (2019). How to prevent, minimize, or extinguish nocebo effects in pain: A narrative review on mechanisms, predictors, and interventions. *Pain Reports, 4*(3), e699. https://doi.org/10.1097/PR9.0000000000000699

Nasiri-Dehsorkhi, H., Vaziri, S., Esmaillzadeh, A., & Adibi, P. (2024). Negative expectations (nocebo phenomenon) in clinical interventions: A scoping review. *Journal of Education and Health Promotion, 13*, 106. https://doi.org/10.4103/jehp.jehp_269_23

Newton, A. (2024). Inappropriate use of nocebic language in prehospital care: A cautionary tale. *Journal of Paramedic Practice, 16*(9), 360–368. https://www.paramedicpractice.com/content/leadership-and-management/inappropriate-use-of-nocebic-language-in-prehospital-care-a-cautionary-tale

Sajid, I. (2018) RELIEF: A practical primary care approach to chronic pain. *InnovAiT. 11*(10):547-555. https://journals.sagepub.com/doi/10.1177/1755738018789446

Scott, D. J., Stohler, C. S., Egnatuk, C. M., Wang, H., & Zubieta, J. K. (2007). Individual differences in reward responding explain placebo-induced expectations and effects. *Neuron, 55*(3), 325–336. https://doi.org/10.1016/j.neuron.2007.06.028

Vytal, K., Cornwell, B., Arkin, N., & Grillon, C. (2013). The complex interaction between anxiety and cognition: Insight from spatial and verbal memory. *Frontiers in Human Neuroscience, 7*, 93. https://doi.org/10.3389/fnhum.2013.00093

Wager, T. D., et al. (2004). Placebo-induced changes in fMRI during the anticipation and experience of pain. *Science, 303*(5661), 1162–1167. https://doi.org/10.1126/science.1093065

Zubieta, J. K., Bueller, J. A., Jackson, L. R., Scott, D. J., Koeppe, R. A., Nichols, T. E., & Stohler, C. S. (2005). Placebo effects mediated by endogenous opioid activity on μ-opioid receptors. *Journal of Neuroscience, 25*(34), 7754–7762. https://doi.org/10.1523/JNEUROSCI.0439-05.2005

Zubieta, J. K., & Stohler, C. S. (2009). Neurobiological mechanisms of placebo responses. *Annals of the New York Academy of Sciences, 1156*(1), 198–210. https://doi.org/10.1111/j.1749-6632.2009.04424.x