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Grounding the Body Before the Mind

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ABSTRACT

Performance anxiety is commonly experienced through the physical impacts of stage fright: racing heart, shallow breathing, trembling hands, muscle tension, voice instability, panic sensation, and difficulty thinking clearly under pressure. Although performance anxiety is often described as fear, nervousness, or self-doubt, its most disruptive effects are physical. These symptoms can appear during public speaking, debate, interviews, auditions, and competitions, where they can interfere with speech, memory, vocal control, and composure.

This narrative review examines why these symptoms occur, why they become difficult to control once they begin, and how body-based sensory input can support regulation. It draws from research on performance anxiety, social-evaluative threat, interoception, deep pressure stimulation, affective touch, proprioception, tactile grounding, and sensory-motor feedback. Evaluated performance can be interpreted as a social-evaluative threat because it creates pressure to do well in front of others. Although there is no physical danger, the body's stress-response systems can react to social-evaluative threats in ways that resemble responses to physical danger. A performer can then notice these symptoms, read them as losing control, and become even more anxious.

This review argues that body-based sensory input deserves serious consideration as a complementary, bottom-up approach. The evidence does not prove that one sensory-based intervention can reduce stage fright by itself. However, sustained pressure, affective touch, textured input, and repeated self-generated touch suggest a pathway for helping the body feel steadier during evaluative stress. This framework is promising enough to justify targeted experiments, while still requiring direct testing before being described as an established intervention.

INTRODUCTION

Before a performance begins, the body often reacts before the mind has time to explain what is happening. A student waiting to debate, a speaker walking to the front of a room, an applicant preparing for an interview, or a musician standing backstage may experience the same sudden shift: the familiar physical symptoms of stage fright. These symptoms are commonly associated with stage fright, but they are not just signs of “being nervous.” They are physical changes produced by the body’s stress-response systems under pressure.

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Performance anxiety is the broader scientific term for anxiety that emerges before or during situations in which a person's abilities are evaluated by others. Stage fright is one familiar form of this experience, especially in speaking, artistic, academic, and competitive settings. This paper focuses specifically on the physical impacts of stage fright: the bodily symptoms that can interfere with speech, memory, movement, vocal control, and perceived composure during high-pressure performance moments.

These symptoms matter because they can become part of the performance problem itself. A shaky voice may disrupt delivery. Shallow breathing may make speech harder to control. Trembling hands may affect movement or confidence. These symptoms may create a sudden panic sensation, making the performer feel as if they are losing control. In this way, stage fright is not only a feeling before a performance; it is also a physical response that can shape how the performer thinks, moves, speaks, and interprets their ability to continue.

These physical symptoms occur because the body can interpret evaluated performance as a form of social-evaluative threat. When judgment feels immediate, visible, and personally meaningful, stress-response systems can activate even when there is no physical danger. In a high-pressure performance moment, the brain can struggle to separate actual danger from the pressure to do well, leading the body into sympathetic activation. The sympathetic nervous system drives the immediate physical changes associated with stage fright, while the hypothalamic-pituitary-adrenal (HPA) axis produces a slower hormonal response that becomes more relevant during anticipatory and sustained stress (Bosch et al., 2009; Poppelaars et al., 2019; Woody et al., 2018). Put simply, the body is preparing for threat even though the person is only trying to perform. In a performance setting, that same mobilization can become disruptive because the performer needs steadiness, memory, vocal control, flexible thinking, and presence.

The physical impacts of stage fright are especially difficult because they can feel public. A student may not be thinking, "I am experiencing sympathetic activation." They may be thinking, "My voice is shaking and everyone can tell." A shaky voice, trembling hands, shortened breath, or rigid posture can feel like public evidence of private panic. This visibility is part of what makes stage fright uniquely destabilizing: the symptom is both experienced internally and imagined as being observed externally.

In experimental settings, speech tasks and socially evaluated performance tasks reliably increase anxiety and physiological stress markers, including cardiovascular and endocrine responses (Bosch et al., 2009; Gallego et al., 2021; Poppelaars et al., 2019; Woody et al., 2018). Research on public speaking anxiety shows that stage fright is not just an internal feeling the performer has to push through; it can change how the performance actually unfolds. Higher public speaking anxiety has been linked to shorter speeches and lower speech-quality ratings from both speakers and observers (Gallego et al., 2021). This matters because the physical symptoms of stage fright can affect actual performance, even when heart rate or other physiological measures do not perfectly match how anxious a person feels.

This paper begins from a simple starting point: if stage fright disrupts performance partly through physical symptoms, then body-first regulation strategies deserve more attention in performance settings.

That does not mean replacing breathing exercises, exposure work, cognitive restructuring, coaching, or therapy. It means taking seriously the possibility that sensory input can help steady the body's stress response quickly enough to make those other strategies more usable. In clinical and experimental touch research, calming tactile input has been associated with reductions in state anxiety, pain, cortisol, and autonomic arousal in some contexts, although the evidence is mixed and stronger for some approaches than for others (Eckstein et al., 2020; Packheiser et al., 2024).

Performance anxiety, interoception, deep pressure stimulation, affective touch, sensory modulation, and active tactile feedback are all established topics on their own. What is still missing is a framework that connects these areas directly to the physical symptoms people experience in high-pressure performance moments. The goal is not to stretch one mechanism beyond what the evidence can support, but to understand how several body-based mechanisms may work together.

This paper is a mechanistic narrative review, not a clinical trial or a proposal for an established intervention. Its purpose is to examine the science behind performance anxiety and the science behind bottom-up sensory regulation, then use that evidence to build a framework for future testing. The review argues that external, body-based sensory input is promising enough to justify direct studies in performance-anxiety-inducing situations, but not yet established enough to be described as a proven intervention.

To develop this framework, the review first examines stage fright as a physiological and interoceptive disruption rather than only a cognitive or emotional state. It then explains how physical symptoms can turn into a feedback loop under social evaluation, especially when the performer begins monitoring signs of visible failure. From there, the paper turns to bottom-up sensory regulation, reviewing deep pressure, proprioceptive input, affective touch, tactile grounding, and active sensory-motor feedback as overlapping but distinct mechanisms that can help explain how body-based input could support regulation during anticipatory performance stress.

METHODS

This paper is a narrative literature review, not a systematic review or clinical trial. Because of that, it does not test a new intervention or measure original participant data. Instead, it connects existing research from several related areas to examine how an underexplored bottom-up, body-based approach can help combat the physical symptoms of stage fright. Literature searches were conducted using PubMed, PubMed Central, and Google Scholar. The review prioritized peer-reviewed primary studies, systematic reviews, and meta-analyses relevant to performance anxiety, stress physiology, affective touch, tactile sensory regulation, and sensory-motor feedback. Search terms included combinations of performance anxiety, public speaking anxiety, social-evaluative threat, acute stress, deep pressure stimulation, weighted blanket, C-tactile afferents, affective touch, mechanoreceptors, proprioception, active touch, self-touch, and sensory feedback. Approximately 60 publications were initially screened, with approximately 40 peer-reviewed studies ultimately included and 20 excluded based on their relevance to the proposed framework. Most of the literature reviewed was published between 2010 and 2024, although earlier foundational studies were included when they introduced theories or concepts that remain central to current understanding, including attentional control theory and tactile sensory processing.

Sources were excluded if they relied on unsupported popular statistics, blog-based evidence, were not directly relevant to the proposed framework, or made claims beyond the available evidence. First, the paper does not use the often-repeated "77% of people experience performance anxiety" claim, because a strong academic basis for that exact number was not established here. Second, CT afferents are discussed as one part of affective touch science, not as a catch-all explanation for every calming tactile experience. Third, deep pressure stimulation is treated as a promising but mixed area of research: some randomized and quasi-experimental studies report anxiety reductions, while systematic reviews still describe the evidence base as limited and its mechanisms as not fully understood (Eron et al., 2020). Finally, "grounding" is used as a cautious descriptive term for external sensory anchoring rather than as a reference to established clinical grounding techniques. Although both approaches rely on directing attention toward external sensory input during periods of distress, the present review focuses more narrowly on the physiological rationale for body-based tactile regulation during anticipatory performance anxiety rather than on grounding as it is more broadly used in clinical settings.

Because this is a narrative review, its value is in connecting research areas that are often studied separately. Existing research has shown that social-evaluative threat activates physiological stress systems, that anxiety changes attention and cognitive control, that touch can affect state anxiety and stress markers, that CT-afferent-targeted touch has distinctive affective properties, and that active tactile feedback is central to movement control and perception (Bosch et al., 2009; Chapman, 1994; Conner et al., 2021; McGlone et al., 2014; Packheiser et al., 2024). What is still missing is a framework that connects these findings to the concrete physical symptoms of stage fright and to discreet, body-based regulation strategies that could be used during speeches, debates, interviews, recitals, and presentations.

Strength of Evidence

The evidence in this review varies in how directly it supports the argument. The strongest evidence shows that evaluated performance can trigger real physiological stress responses, including cardiovascular, endocrine, and attentional changes. Other studies support the idea that touch and deep pressure can reduce anxiety-related outcomes in some settings, although the effects are not consistent for every person or every type of input. A third layer of evidence helps explain possible mechanisms: research on CT afferents, proprioception, active touch, and sensory-motor feedback shows why pressure, touch, and movement can influence the body's stress response.

Because of this, the argument of this paper is not that one sensory strategy has already been proven to reduce stage fright. The stronger claim is that several areas of research are beginning to point toward the same possibility: physical symptoms of performance anxiety can be easier to regulate when the body is given a stable, external sensory signal. That possibility deserves direct testing, especially in public speaking, debate, interviews, recitals, and other evaluated performance settings.

RESULTS AND DISCUSSION

Performance Anxiety as Physiological Disruption

Performance anxiety is not just nervousness before a difficult task. It is the body reacting to the pressure of being watched, judged, or evaluated. As discussed in the Introduction, evaluated performance can activate the body's stress-response systems despite the absence of physical danger. Heart rate rises, stress hormones can increase, and attention narrows toward the possibility of making a mistake or visibly losing control. Research on social-evaluative stress supports this idea. The Trier Social Stress Test, which asks participants to complete speech and mental-arithmetic tasks in front of evaluators, reliably produces strong stress responses, including increases in heart rate and salivary cortisol (Poppelaars et al., 2019; Woody et al., 2018). Related work shows that being socially evaluated can increase autonomic and cortisol responses beyond cognitive load alone, which helps explain why performing in front of others can feel so different from practicing the same task alone (Bosch et al., 2009; Woody et al., 2018).

These physical responses matter because the symptoms of stage fright do not stay separate from the performance. They can interrupt the exact skills the performer is trying to use. Rapid breathing can make the voice feel less steady. Trembling can make movement feel harder to control. Muscle tension can affect posture, speech, and expression. A racing heart or tight chest can create a sudden panic sensation, making the performer feel as if they are losing control even when they know the material. Under that pressure, the mind can also go blank. The performer may struggle to recall a practiced point, find the next word, or continue smoothly, not because they are unprepared, but because the body’s stress response is interfering with attention and memory.

Research on public speaking anxiety reflects this double burden. Speech tasks can produce distress, but they can also affect actual performance behaviors, including how long a person speaks and how they judge their own performance (Gallego et al., 2021). Even when self-reported anxiety and physiological measures do not match perfectly, the broader pattern is still clear: evaluated speaking situations can disrupt performance through both what the person feels internally and what the body does physically.

The Anxiety Feedback Loop: When Physical Symptoms Become Threat Cues

The shift from physical symptoms to panic is partly interoceptive. Interoception refers to the way the brain processes signals from inside the body, such as heartbeat, breathing, tightness, or nausea. Recent reviews suggest that anxiety is not simply linked to more accurate heartbeat detection overall. Instead, anxiety is often linked to more negative attention toward bodily sensations, more concern about those sensations, and a stronger tendency to interpret them as threatening (Clemente et al., 2024; Jenkinson et al., 2024). In other words, the anxious person may not just notice internal signals more clearly; they may experience them as more dangerous, more intrusive, and harder to see as harmless.

That is highly relevant to stage fright. A pounding heart is no longer just a pounding heart. A shaky voice becomes “everyone can hear this”, and a tightening chest becomes “I am losing control.” The symptom becomes part of the threat. In performance settings, the body’s symptoms can become internal warning signs: the speaker notices them, gives them meaning, becomes more alert to them, and then feels even more anxious. The loop is partly attentional, partly interoceptive, and partly social-cognitive (Clemente et al., 2024; Valadez et al., 2022).

This feedback loop raises an important question: if anxiety makes bodily sensations feel threatening, why would adding another sensation help rather than make the loop worse? The answer depends on the kind of sensation being added. A racing heart, shaky breath, or tight chest is internal, involuntary, and difficult to control, which makes it easy for the performer to read it as evidence of losing control. External tactile input is different. It is felt on the surface of the body, can be intentionally started and stopped, and can be repeated in a predictable way. Because of that, it can work through three related mechanisms: attentional competition, agency and controllability, and sensory-channel difference. First, it gives the performer a clear external signal to focus on instead of monitoring internal panic symptoms. Second, it restores a sense of agency because the performer is choosing the action rather than only reacting to symptoms. Third, it shifts attention from internal threat cues, such as heartbeat and breathing, toward external touch, which may be easier to interpret as safe and controllable. In this framework, tactile input helps not because it adds more sensation, but because it adds a different kind of sensation: external, chosen, predictable, and controllable.

Why Top-Down Regulation Can Be Difficult During Acute Stress

Anxiety creates cognitive costs at the exact moment when performance demands are highest. Attentional Control Theory argues that anxiety shifts the mind away from goal-directed focus and toward threat-focused attention (Eysenck et al., 2007). Meta-analytic work also suggests that anxiety can limit working memory capacity, while reviews of acute stress show that working memory can be disrupted after stress is triggered (Geißler et al., 2023; Moran, 2016).

Together, these findings help explain why top-down strategies can become difficult to use during live performance. A person can know what to do, but the mental effort needed to use that knowledge is itself under pressure. Breathing exercises, cognitive reframing, visualization, and self-talk can all be useful strategies. However, they require attention, working memory, timing, and conscious control. During acute stress, those same capacities can become harder to access. This creates a practical gap: the person needs regulation most at the moment when deliberate regulation is hardest to perform.

These physiological and cognitive findings create the central opening for bottom-up regulation. If performance anxiety becomes difficult partly because the body’s symptoms capture attention and reduce cognitive control, then a regulatory strategy does not always need to begin by changing thoughts. A body-based strategy can instead work by giving the nervous system a stable, external, and controllable sensory signal before the stress response becomes fully dominant.

Bottom-Up Sensory Regulation: A Theoretical Framework

Bottom-up regulation refers to the regulation of emotional or stress states through the body and senses, rather than only through deliberate thinking. In practical terms, this means that a person may not be able to think their way out of panic immediately, but they can still feel something steady, repeatable, and external.

Touch research provides one of the clearest frameworks for this idea. A growing body of research suggests that touch can function as a safety-related cue under some conditions, change how stress is processed, and influence both emotional experience and body-based signs of stress (Eckstein et al., 2020; Packheiser et al., 2024). A large 2024 meta-analysis found that touch interventions in adults were associated with reductions in both state and trait anxiety, while a broad review of human, animal, and robotic touch concluded that, under appropriate conditions, touch can reduce negative affect and arousal (Eckstein et al., 2020; Packheiser et al., 2024). These effects are not universal, but they are strong enough to justify thoughtful application to performance contexts.

Deep Pressure and Autonomic Regulation

Deep pressure stimulation is one of the most practically relevant body-based inputs considered in this review, but it is also one of the areas where caution matters most. A systematic review of weighted blankets concluded that they can be useful in reducing anxiety in limited settings and populations, while also emphasizing that the evidence base remains sparse and that the mechanism is not fully understood (Eron et al., 2020). Randomized and controlled studies since then have reported reductions in anxiety or related distress in several contexts, including chemotherapy infusion, preoperative care, and inpatient psychiatric settings (Becklund et al., 2021; Payne et al., 2024; Vinson et al., 2020). More recent studies of inflatable or automated deep-pressure systems report promising reductions in physical signs of anxiety for some participants, but they also show mixed results, modest effect sizes, and possible moderation by comfort with touch (Maula et al., 2024). The strongest conclusion is not dismissal or hype. Sustained pressure is promising, but it still needs more direct evidence.

Mechanistically, deep pressure likely works through multiple channels rather than a single receptor or pathway. Pressure deforms skin and underlying tissues, stimulates cutaneous mechanoreceptors, and can increase proprioceptive awareness by changing the felt state of body segments. Some users describe this as containment, organization, or being “brought back into the body.” Those descriptions are subjective, but they are not scientifically empty: they match the possibility that stable pressure can draw attention away from scattered internal panic symptoms and toward a clearer external body cue. Recent vest studies showing pulse-rate decreases after brief deep-pressure sessions are consistent with the possibility that deep pressure can affect the body’s stress response, even if larger and more rigorous trials are still needed (Maula et al., 2024).

Older experimental work on deep pressure similarly suggested that individuals with high trait anxiety can respond especially well, while newer work indicates that personal touch comfort can moderate response to pressure-based interventions (Maula et al., 2024). That point is crucial for scientific caution. Sensory interventions are not universally soothing. For some people, especially those who dislike confinement or certain tactile sensations, pressure can be neutral or even aversive. This matters because the same pressure that feels calming to one person can feel trapping to another. The literature therefore supports a careful conclusion: deep pressure can help some users regulate the body's stress response, but its effects likely depend on the type of pressure used, the setting, the person's comfort with touch, what they expect from the sensation, and the meaning they assign to it.

Mechanoreceptors, Proprioception, and Somatic Grounding

Touch can only affect regulation if the nervous system can actually read it. The skin contains cutaneous mechanoreceptors, or touch receptors, that respond to physical contact, pressure, vibration, and stretch. These receptors help turn touch into neural signals the brain can interpret. Touch is also not processed the same way everywhere on the body. Hairy skin, such as the arm, and smooth, hairless skin, such as the palm, contain different patterns of touch receptors, which means the same type of pressure or texture can feel different depending on where it is applied (McGlone et al., 2014). Reviews of touch science emphasize that touch is not one simple signal. It is shaped by the type of receptor involved, the kind of contact being applied, the body site, and how the brain processes the sensation (McGlone et al., 2014; Schirmer et al., 2023).

This matters for stage-fright regulation because it prevents the argument from becoming too simplistic. A tactile cue does not automatically "activate calm." It gives the nervous system a specific physical signal to process. Whether that signal feels calming, distracting, grounding, or uncomfortable depends on the type of touch, where it is applied, and the context in which the person experiences it.

Proprioception adds another layer. Proprioception is the body's sense of position and movement. It helps the nervous system know where a body part is, how it is moving, and how much pressure or tension is being applied. Although proprioception is often discussed in movement and motor control, it is also important for body awareness (Conner et al., 2021). For someone experiencing performance anxiety, this matters because attention can become scattered and pulled toward internal warning signs, such as the familiar physical effects of stage fright as previously described. A steady pressure cue on one area of the body can help redirect attention toward one clearer body signal. This idea has not been directly tested in stage-fright research yet, but it is supported by broader research on touch, body awareness, and movement.

CT Afferents and Affective Touch

CT afferents are one of the easiest mechanisms to overstate in this field, so precision matters. CT afferents are unmyelinated low-threshold mechanoreceptors associated with affective touch, especially slow, gentle, caress-like stroking on hairy skin (McGlone et al., 2014; Schirmer et al., 2023). They should not be described as "deep pressure receptors," and treating them that way would oversimplify the science. Research on affective touch shows that CT-targeted touch can contribute to the emotional, social, and pleasant qualities of touch, but it does not explain every calming tactile experience (McGlone et al., 2014; Schirmer et al., 2023). Not all affective touch depends on CT afferents, and not all CT-relevant touch is automatically pleasant in every context.

What CT science does support is the importance of hairy skin, including the arm, in affective touch processing. CT afferents are more common in hairy arm skin and sparse in smooth, hairless skin such as the palm. They are especially responsive to slow stroking at skin-like temperature and speeds often rated as pleasant (Ackerley et al., 2014; Watkins et al., 2021). Other studies also connect CT-relevant touch to specific physiological and emotional responses, with pleasantness often peaking in the velocity ranges thought to best engage this system (Ackerley et al., 2014; Ree et al., 2019). This makes the upper arm scientifically interesting, but only for touch patterns that resemble affective stroking. Sustained compression should not be treated as the same mechanism as a gentle caress. A more accurate explanation is that sensory input on hairy upper-arm skin could combine deep-pressure mechanisms with a separate affective-touch pathway if slow stroking or similar exploratory touch is also involved.

This distinction matters because the framework proposed in this review is intentionally layered. Deep pressure and affective touch are treated as complementary mechanisms rather than interchangeable ones. Firm pressure is expected to recruit broader mechanoreceptive and proprioceptive pathways, while slow stroking on hairy skin may engage CT-afferent-related affective-touch pathways. The framework therefore is not limited to a single type of sensory input. A performer could apply gentle pressure, briefly stroke the same area, or combine both actions depending on the situation. If body-based sensory regulation proves effective in performance settings, it is likely because several complementary mechanisms work together rather than because one pathway explains the entire effect.

Tactile Grounding and Sensory-Motor Feedback

Touch can calm not only because of what is felt, but because of what it competes with. Touch research suggests that tactile contact can change how stress is processed, and recent work on self-soothing touch indicates that intentionally applied touch may reduce momentary stress in some populations (Eckstein et al., 2020; Packheiser et al., 2024). A large touch-intervention meta-analysis also found benefits for anxiety in adults across different forms of touch (Packheiser et al., 2024). These findings do not prove that textured tactile input will regulate performance anxiety, but they support the more cautious claim that tactile input can serve as an external sensory anchor during periods of acute stress. This use of the term "grounding" is used more narrowly than it is typically used in clinical settings, where it includes a wide range of external sensory strategies for managing distress. Rather than examining grounding as a clinical technique itself, the present review focuses specifically on the physiological mechanisms through which tactile sensory input may support regulation during anticipatory performance anxiety. Rather than introducing a new concept, the present review examines a more specific application of grounding to anticipatory performance anxiety. When anxious attention keeps turning inward toward heartbeat, breathing, and tremor, textured contact can redirect part of that attention outward toward something stable and controllable.

The active component matters too. In sensory neuroscience, active touch is not the same as passive touch. Voluntary movement changes how touch is predicted, felt, and processed, and sensory feedback is essential for precise movement control (Chapman, 1994; Conner et al., 2021). Research on active touch, passive touch, movement feedback, and self-generated tactile input all points toward the same idea: movement and touch form a loop. The nervous system sends a motor command, predicts what the movement should feel like, receives tactile input, and updates control accordingly (Chapman, 1994; Conner et al., 2021). That loop is central to skilled action, but it also gives a possible explanation for why repeated, deliberate touch could support self-regulation.

This is where a fidget-like but purposeful tactile action becomes scientifically interesting. Random anxious movement often reflects the body's broad stress response. Purposeful movement, by contrast, can be repeatable, intentional, and sensory-rich. Pressing, squeezing, or slowly stroking a textured surface with the opposite hand could create a small sensory-motor sequence: intentional movement, predictable tactile feedback, a renewed sense of control, and repeated access to an external anchor. For a person waiting to speak, that difference matters. The goal is not to eliminate nerves. It is to give the body one small action that feels chosen instead of automatic.

There is little direct evidence yet that this exact kind of textured tactile interaction reduces stage fright, so the claim should remain cautious. Still, the underlying logic is supported by research on active touch and self-touch, as well as by design studies showing that tactile anxiety supports can reduce pre-task anxiety when the interaction itself is calming and intuitive (Chapman, 1994; Conner et al., 2021; Haynes et al., 2022).

Body-Site Considerations in Sensory Regulation

Furthermore, body site is not simply a cosmetic detail: it changes which receptors are involved, how visible the strategy is, how easily a person can use it, and what kind of touch is possible. In the context of sensory-based performance anxiety support, the location of sensory input may influence both the science behind the strategy and how practical it is during a real performance.

The upper arm is one scientifically plausible example of a relevant body site because it can support more than one type of sensory interaction. It offers enough surface area and soft tissue for stable pressure, making mechanoreceptive and proprioceptive input possible without occupying the hand. At the same time, because it is hairy skin, it also allows slow stroking, which is more consistent with CT-afferent-related affective touch (Ackerley et al., 2014; McGlone et al., 2014; Watkins et al., 2021). These actions rely on different physiological mechanisms and therefore should not be treated as interchangeable. Instead, the upper arm is useful because it can accommodate both forms of sensory input while remaining practical and discreet during performance.

These placement arguments should be understood as reasoned inferences from touch science, not as direct evidence that one location is clinically superior. There is not yet enough direct evidence to claim that upper-arm sensory input is more effective than wrist-, hand-, or torso-based approaches for performance anxiety. Still, body site matters because it can affect feasibility, discretion, and the type of sensory input a person can actually use during performance.

The hand is an important comparison. It is highly sensitive and essential for precise touch perception and dexterous movement, but CT-afferent innervation appears sparse in the hand compared with arm skin (Watkins et al., 2021). That does not make wrist- or hand-based approaches useless. It simply means that if the goal is to combine affective-touch plausibility with minimal interference while a person is speaking or performing, the upper arm becomes one reasonable site to consider. The hand can still interact with the sensory input, but the regulatory input does not need to occupy the hand full-time. In a speech or debate context, that may be a meaningful practical advantage.

Integrated Framework: Pressure, Touch, Placement, and Movement

The preceding sections describe several complementary mechanisms that may contribute to body-based sensory regulation. Table 1 summarizes these mechanisms, the current evidence supporting each, their proposed relevance to the physical symptoms of stage fright, and the key supporting sources.

Mechanism	**What it is**	**Evidence base**	**Relevance to stage fright**	**Key sources**
Deep pressure	Sustained pressure providing mechanoreceptive and proprioceptive input	Promising but mixed; limited direct evidence	May reduce physiological arousal and provide a stable external cue	Eron et al., 2020; Maula et al., 2024
Mechanoreceptors and proprioception	Touch and body-position signals	Strong mechanistic evidence; indirect for stage fright	May increase body awareness and redirect attention	Chapman, 1994; Conner et al., 2021
CT-afferent affective touch	Slow stroking on hairy skin	Strong affective-touch evidence; indirect	May support calming through affective-touch	McGlone et al., 2014; Ackerley et al., 2014

		for stage fright	pathways	
Tactile grounding	External tactile sensory anchor	Plausible based on related research	May shift attention away from internal threat cues	Eckstein et al., 2020; Packheiser et al., 2024
Sensory-motor feedback	Intentional movement paired with tactile feedback	Strong motor-control evidence; indirect for anxiety	May increase agency and provide a repeatable external focus	Chapman, 1994; Conner et al., 2021

Table 1: Summary of the Proposed Sensory-Regulation Framework.

Taken separately, each mechanism has limits. Deep pressure is promising but mixed; CT-afferent science applies most clearly to gentle dynamic touch; tactile grounding is plausible but not yet well tested in public-speaking contexts; and sensory-motor feedback is supported more strongly by motor-control research than by direct stage-fright trials. The value of this framework is not that one mechanism fully explains regulation, but that several partial mechanisms may come together during the same high-pressure moment.

The framework that emerges from the literature is built from multiple mechanisms. Rather than relying on a single type of tactile input, it suggests that a brief interaction with the upper arm may include both sustained pressure and slow stroking. Sustained pressure may provide mechanoreceptive and proprioceptive input that increases body awareness and gives attention a more stable external reference point. Slow stroking on hairy skin may separately engage affective-touch pathways associated with CT afferents. Together, these actions could be complemented by textured surfaces that make touch more noticeable and by repeatable self-generated movement that creates a sensory-motor loop, restoring a sense of agency and competing with internal threat monitoring. Rather than relying on a single explanation, the framework suggests that these complementary mechanisms may work together during the anticipatory stage of performance, when the body is beginning to respond to stress but deliberate regulation is still possible.

In practical performance settings, this framework is appealing because discretion matters. A student mid-debate, an applicant in an interview, a founder pitching, or a musician waiting backstage often cannot pause for a visible regulation technique. That is exactly where bottom-up sensory strategies, if supported by future evidence, could be useful: not as replacements for broader anxiety treatment, but as low-visibility supports during brief windows of acute evaluative stress. The literature reviewed here does not establish a specific intervention. Instead, it makes a narrower but important claim: external, body-based sensory input is plausible enough to deserve direct testing in real performance-anxiety situations.

LIMITATIONS AND FUTURE RESEARCH

The clearest limitation is that most of the evidence comes from related areas rather than direct studies of sensory regulation during stage fright. Deep pressure, affective touch, and anxiety reduction have each been studied in some form, but direct trials during speeches, debates, auditions, interviews, and other evaluated performance settings are still limited. That means this review should not be read as proof that any single sensory strategy can reduce stage fright by itself. Even the weighted blanket literature, which is larger than the research on targeted pressure, is still described by systematic reviewers as sparse and limited (Eron et al., 2020).

A second limitation is the risk of stretching the science too far. CT afferents are important in affective touch research, but they should not be used as a universal explanation for calming touch. Pressure-based strategies likely depend on broader cutaneous and proprioceptive signaling, not CT-targeted stroking alone. Tactile grounding and sensory-motor feedback are also useful frameworks, but direct evidence showing exactly how these strategies affect public speaking or performance anxiety is still limited. For that reason, this review separates what is strongly supported, what is a reasonable inference, and what still needs to be tested.

A third limitation is individual variability. Touch comfort, sensory preference, prior experience, and context can all shape whether tactile input feels calming or uncomfortable. Some people find weighted pressure calming; others find it uncomfortable or claustrophobic. Some may prefer movement-based tactile strategies, while others may prefer firm static pressure or conventional top-down techniques. In this paper, that variability is not a weakness in the argument. It is part of the argument. Sensory regulation should be treated as personalized support, not a one-size-fits-all solution.

Future research should be concrete and performance-specific. The most useful next studies would compare deep pressure alone, tactile texture alone, and combined pressure-plus-touch strategies during standardized public-speaking or evaluative-performance tasks. Outcomes could include heart rate, heart rate variability, electrodermal activity, speech duration, observer-rated performance, self-reported grounding, and perceived control. Studies should examine both anticipatory and live performance moments, because sensory strategies may be most useful just before stress peaks rather than during the peak of panic. Researchers should also compare different body sites and performance contexts to determine when and where sensory-based regulation is most effective.

Future studies should also include adolescents and young adults. School-based speaking, debate, interviews, auditions, and performance competitions often happen during years when social judgment feels especially intense. That makes this population important for performance anxiety research, especially because many high-stakes speaking and evaluative experiences begin in classrooms, extracurricular competitions, and early career settings.

Finally, future work should examine whether sensory input changes the anxiety feedback loop itself. Does tactile input make physical symptoms feel less threatening? Does self-generated touch increase a performer's sense of control? Does targeted pressure reduce attention to internal panic cues? These questions would help determine whether body-based sensory input is only comforting in the moment or whether it can actually change how performers experience and respond to stage fright.

CONCLUSION

Performance anxiety is not only a mental experience. It is also physical, and those physical symptoms are one of the main reasons stage fright can derail performance.The body's physical response can become part of the threat itself, especially when the performer believes those symptoms are visible to others.

This review suggests that sensory-based bottom-up regulation deserves more attention in performance anxiety research. Deep pressure, affective touch, proprioception, tactile grounding, and active sensory-motor feedback each have limits, but together they offer a possible way to think about how the body can be supported before deliberate control becomes harder to access. The evidence does not prove that sensory regulation solves stage fright by itself, but it does show that the body deserves a larger place in how performance anxiety is studied.

The goal of body-based support is not to make a performer fearless. It is to help them stay present enough that fear does not take over the entire body.

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