The Relationship Between Polyvagal Theory, Neuroception, and Therapeutic Presence

1. Introduction

The relationship between **polyvagal theory**, **neuroception**, and **therapeutic presence** is central to understanding how safety and connection are established in therapeutic relationships. Polyvagal theory, developed by Stephen Porges, describes how the autonomic nervous system (ANS) supports social engagement and emotional regulation through hierarchical neural circuits, particularly the ventral vagal complex. **Neuroception** refers to the subconscious neural process by which the nervous system detects cues of safety, danger, or life threat, influencing physiological and behavioral responses without conscious awareness. **Therapeutic presence** involves the therapist's attunement and engagement, creating an environment where both client and therapist can experience a felt sense of safety, which is foundational for effective therapy. The integration of these concepts suggests that therapeutic presence can trigger neuroception of safety, activating the social engagement system and downregulating defensive responses, thereby facilitating deeper therapeutic work and co-regulation between therapist and client (Geller & Porges, 2014; Schroeter, 2016; Porges, 2025; Fox, 2025; Sanders & Hall, 2017; Cogan et al., 2025; Sullivan et al., 2018; Morton et al., 2021; Porges, 2003; Porges, 2011). This framework has been applied across diverse clinical contexts, including trauma, attachment, and emotion regulation, and is supported by emerging psychometric tools and clinical interventions (Geller & Porges, 2014; Porges, 2025; Cogan et al., 2025; Morton et al., 2021; Porges, 2003; Flores & Porges, 2017; Roche et al., 2025).

2. Methods

A comprehensive literature search was conducted across over 170 million research papers in Consensus, including databases such as Semantic Scholar and PubMed. The search strategy involved 20 targeted queries grouped into 8 thematic clusters, focusing on foundational concepts, neurophysiological mechanisms, clinical applications, critiques, and adjacent fields. In total, 1,011 papers were identified, 547 were screened, 386 were deemed eligible, and the top 50 most relevant papers were included in this review.

Search Strategy

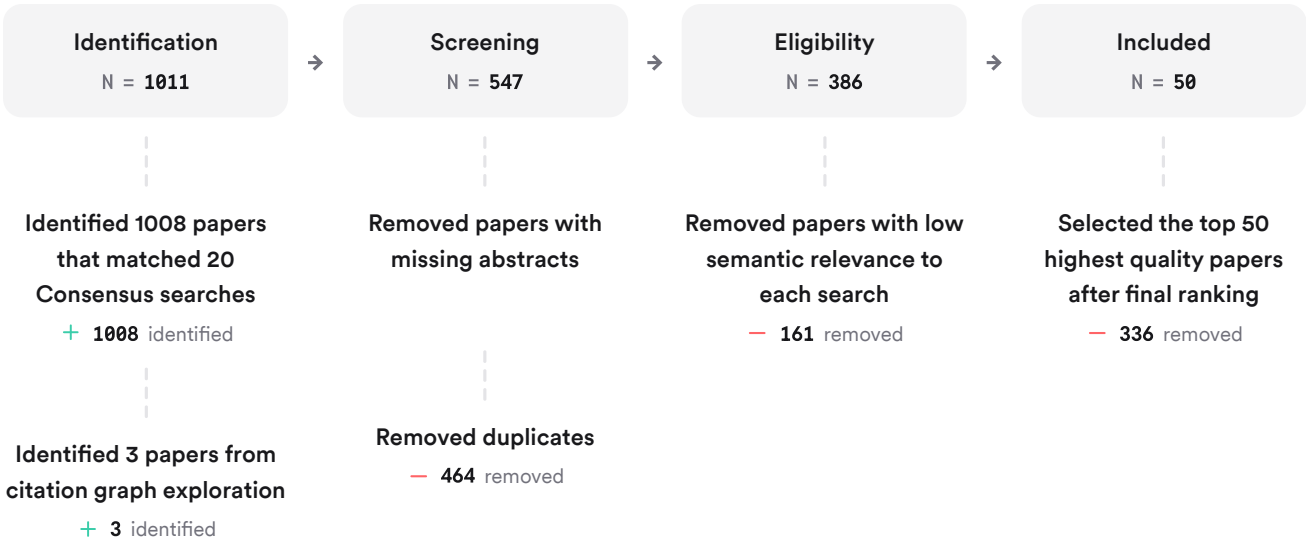

FIGURE 1 Flow of papers through the search and selection process.

Eight unique search groups were used, spanning foundational theory, clinical application, and adjacent constructs to ensure comprehensive coverage.

3. Results

3.1. Polyvagal Theory: Foundations and Mechanisms

Polyvagal theory posits a hierarchical organization of the ANS, with the ventral vagal complex supporting social engagement and safety, and the dorsal vagal and sympathetic systems mediating defensive responses. The theory emphasizes the role of the vagus nerve in regulating physiological states that underlie social behavior, emotional resilience, and adaptive responses (Schroeter, 2016; Hanazawa, 2022; Porges, 2025; Sullivan et al., 2018; Porges, 2003; Porges, 2011; Neuhuber & Berthoud, 2022).

3.2. Neuroception: The Detection of Safety and Threat

Neuroception is the subconscious process by which the nervous system evaluates environmental cues for safety or danger, influencing autonomic state shifts. This process is central to polyvagal theory and is critical for understanding how individuals respond to therapeutic environments and relationships (Geller & Porges, 2014; Hanazawa, 2022; Porges, 2025; Cogan et al., 2025; Morton et al., 2021; Porges, 2003; Poli & Miccoli, 2024; Roche et al., 2025).

3.3. Therapeutic Presence and the Social Engagement System

Therapeutic presence involves the therapist's full engagement and attunement, which can signal safety to the client through nonverbal cues (e.g., facial expression, vocal prosody). This presence is theorized to activate the client's social engagement system via neuroception, facilitating co-regulation, trust, and optimal conditions for therapeutic change (Geller & Porges, 2014; Fox, 2025; Sanders & Hall, 2017; Ryland et al., 2021; Sullivan et al., 2018; Morton et al., 2021; Porges, 2003; Flores & Porges, 2017; Bernards, 2017; & , 2017).

3.4. Clinical Applications and Measurement

Polyvagal-informed interventions are increasingly used in trauma therapy, attachment work, and creative arts therapies, emphasizing the importance of fostering safety and co-regulation. Tools such as the Neuroception of Psychological Safety Scale (NPSS) have been developed to measure the felt sense of safety in clinical and research settings (Cogan et al., 2025; Morton et al., 2021; Poli & Miccoli, 2024; Roche et al., 2025; Lans et al., 2025).

Key Papers

Paper	Core Focus	Methodology	Key Results
(Geller & Porges, 2014)	Therapeutic presence & safety	Theoretical review	Presence triggers neuroception of safety, deepening therapeutic relationship
(Porges, 2025)	Polyvagal theory overview	Review	Hierarchical ANS states, neuroception, and clinical implications
(Cogan et al., 2025)	NPSS validation	Psychometric study	Validated scale for neuroception of psychological safety
(Morton et al., 2021)	NPSS development	Psychometric study	Developed and validated NPSS, linking safety, social engagement, and body sensations
(Porges, 2003)	Social engagement & attachment	Theoretical model	Social engagement requires neuroception of safety; links to attachment

FIGURE 2 Comparison of key studies on polyvagal theory, neuroception, and therapeutic presence.

Top Contributors

Type	Name	Papers
Author	S. Porges	(Geller & Porges, 2014; Porges, 2025; Cogan et al., 2025; Sullivan et al., 2018; Morton et al., 2021; Porges, 2003; Porges, 2011; Flores & Porges, 2017)
Author	L. Morton	(Cogan et al., 2025; Morton et al., 2021; Poli & Miccoli, 2024; Roche et al., 2025)
Author	Shari Geller	(Geller & Porges, 2014)
Journal	*Journal of Psychotherapy Integration*	(Geller & Porges, 2014)
Journal	*Clinical Neuropsychiatry*	(Porges, 2025)
Journal	*European Journal of Psychotraumatology*	(Cogan et al., 2025)

FIGURE 3 Authors & journals that appeared most frequently in the included papers.

4. Discussion

The literature strongly supports a **synergistic relationship** between polyvagal theory, neuroception, and therapeutic presence. Polyvagal theory provides a neurophysiological framework for understanding how safety is established in therapeutic relationships, with neuroception acting as the mechanism by which safety is detected and therapeutic presence serving as the relational context that facilitates this process (Geller & Porges, 2014; Porges, 2025; Cogan et al., 2025; Morton et al., 2021; Porges, 2003; Porges, 2011; Flores & Porges, 2017). The activation of the social engagement system through therapeutic presence can downregulate defensive responses, enabling deeper therapeutic work and co-regulation (Geller & Porges, 2014; Fox, 2025; Sanders & Hall, 2017; Ryland et al., 2021; Sullivan et al., 2018; Porges, 2003; Flores & Porges, 2017; Bernards, 2017; & , 2017). Measurement tools like the NPSS offer empirical support for these concepts, linking subjective experiences of safety to observable outcomes in therapy (Cogan et al., 2025; Morton et al., 2021; Poli & Miccoli, 2024; Roche et al., 2025).

However, some critiques highlight the need for further empirical validation of polyvagal theory's anatomical specificity and its application across diverse populations (Porges, 2025; Neuhuber & Berthoud, 2022; Lans et al., 2025). Despite these debates, the theory's clinical utility in trauma, attachment, and emotion regulation is widely recognized (Porges, 2025; Sanders & Hall, 2017; Sullivan et al., 2018; Brown et al., 2023; Porges, 2003; Flores & Porges, 2017; Roche et al., 2025; Lans et al., 2025).

Claims and Evidence Table

Claim	Evidence Strength	Reasoning	Papers
Therapeutic presence facilitates neuroception of safety, supporting effective therapy	Strong	Strong theoretical and empirical support; presence triggers physiological safety via social engagement system	(Geller & Porges, 2014; Porges, 2025; Cogan et al., 2025; Morton et al., 2021; Porges, 2003; Porges, 2011; Flores & Porges, 2017)
Neuroception operates subconsciously to detect safety/threat, shaping autonomic state	Strong	Well-established in polyvagal theory and validated by psychometric tools	(Hanazawa, 2022; Porges, 2025; Cogan et al., 2025; Morton et al., 2021; Porges, 2003; Poli & Miccoli, 2024; Roche et al., 2025)
Polyvagal theory provides a useful framework for trauma and attachment interventions	Strong	Widely applied in clinical practice, especially for trauma and attachment	(Porges, 2025; Sanders & Hall, 2017; Sullivan et al., 2018; Brown et al., 2023; Porges, 2003; Flores & Porges, 2017; Roche et al., 2025; Lans et al., 2025)
NPSS is a valid tool for measuring neuroception of psychological safety	Strong	Psychometric studies confirm reliability and validity	(Cogan et al., 2025; Morton et al., 2021; Poli & Miccoli, 2024; Roche et al., 2025)
Some anatomical and empirical aspects of polyvagal theory remain debated	Moderate	Critiques exist regarding anatomical specificity and generalizability	(Porges, 2025; Neuhuber & Berthoud, 2022; Lans et al., 2025)
Application of polyvagal theory in creative arts and somatic therapies is promising but under-researched	Weak	Theoretical support, but limited empirical studies	(Sullivan et al., 2018; Haeyen, 2024; Pénzes et al., 2025; Lans et al., 2025)

FIGURE Key claims and support evidence identified in these papers.

5. Conclusion

The relationship between polyvagal theory, neuroception, and therapeutic presence is well-supported by both theoretical and empirical literature. Therapeutic presence, informed by polyvagal theory, can activate neuroception of safety, facilitating co-regulation and optimal conditions for therapeutic change. While the framework is widely applied and supported, further research is needed to address ongoing debates and expand empirical validation, especially in diverse clinical contexts.

Research Gaps

Topic/Outcome	Trauma Populations	General Clinical	Children/Adolescents	Measurement Tools	Creative Arts/Somatic
Neuroception of safety	8	6	4	5	2
Therapeutic presence	7	8	3	2	1
Polyvagal interventions	6	5	2	1	3
Measurement/NPSS	2	3	1	8	GAP
Creative arts/somatic	1	2	1	GAP	4

FIGURE Matrix of research topics and study attributes, highlighting areas with fewer studies.

Open Research Questions

Question	Why
How does therapeutic presence influence neuroception and physiological safety in diverse clinical populations?	Understanding this can inform tailored interventions and improve outcomes for trauma, attachment, and other clinical groups.
What are the neurobiological mechanisms linking therapeutic presence to changes in autonomic state?	Clarifying these mechanisms will strengthen the empirical basis for polyvagal-informed therapies and guide clinical practice.
How can measurement tools like the NPSS be validated and applied across different therapeutic modalities?	Broader validation will enhance the utility of these tools and support evidence-based practice in various settings.

FIGURE Key open research questions for future investigation.

In summary, the integration of polyvagal theory, neuroception, and therapeutic presence offers a robust framework for understanding and enhancing therapeutic relationships, with ongoing research needed to address gaps and refine clinical applications.

These papers were sourced and synthesized using Consensus, an AI-powered search engine for research. Try it at https://consensus.app

References

Geller, S., & Porges, S. (2014). Therapeutic presence: Neurophysiological mechanisms mediating feeling safe in therapeutic relationships.. *Journal of Psychotherapy Integration*, 24, 178-192. https://doi.org/10.1037/A0037511

Schroeter, V. (2016). Polyvagal Theory. *The Clinical Journal of the International Institute for Bioenergetic Analysis*. https://doi.org/10.30820/0743-4804-2016-26-9

Hanazawa, H. (2022). [Polyvagal Theory and Its Clinical Potential: An Overview].. *Brain and nerve = Shinkei kenkyu no shinpo*, 74 8, 1011-1016. https://doi.org/10.11477/mf.1416202169

Porges, S. (2025). Polyvagal Theory: Current Status, Clinical Applications, and Future Directions. *Clinical Neuropsychiatry*, 22, 169 - 184. https://doi.org/10.36131/cnfioritieditore20250301

Fox, E. (2025). Polyvagal Theory in Trauma-Informed Music Therapy Practice. *Music Therapy Perspectives*. https://doi.org/10.1093/mtp/miaf001

Sanders, M., & Hall, S. (2017). Trauma-informed care in the newborn intensive care unit: promoting safety, security and connectedness. *Journal of Perinatology*, 38, 3 - 10. https://doi.org/10.1038/jp.2017.124

Ryland, S., Johnson, L., & Bernards, J. (2021). Honoring Protective Responses: Reframing Resistance in Therapy Using Polyvagal Theory. *Contemporary Family Therapy*, 44, 267 - 275. https://doi.org/10.1007/s10591-021-09584-8

Cogan, N., Morton, L., Campbell, J., Fitzpatrick, L., Lamb, D., De Kock, J., Ali, A., Young, D., & Porges, S. (2025). Neuroception of psychological safety scale (NPSS): validation with a UK based adult community sample. *European Journal of Psychotraumatology*, 16. https://doi.org/10.1080/20008066.2025.2490329

Sullivan, M., Erb, M., Schmalzl, L., Moonaz, S., Taylor, J., & Porges, S. (2018). Yoga Therapy and Polyvagal Theory: The Convergence of Traditional Wisdom and Contemporary Neuroscience for Self-Regulation and Resilience. *Frontiers in Human Neuroscience*, 12. https://doi.org/10.3389/fnhum.2018.00067

Morton, L., Cogan, N., Kolacz, J., Calderwood, C., Nikolič, M., Bacon, T., Pathe, E., Williams, D., & Porges, S. (2021). A new measure of feeling safe: Developing psychometric properties of the Neuroception of Psychological Safety Scale (NPSS).. *Psychological trauma : theory, research, practice and policy*. https://doi.org/10.31219/osf.io/tpe5j

Brown, S., Rodwin, A., & Munson, M. (2023). Multi-systemic trauma and regulation: Re-centering how to BE with clients. *Journal of Human Behavior in the Social Environment*, 35, 245 - 262. https://doi.org/10.1080/10911359.2023.2291442

Porges, S. (2003). Social Engagement and Attachment. *Annals of the New York Academy of Sciences*, 1008. https://doi.org/10.1196/annals.1301.004

Haeyen, S. (2024). A theoretical exploration of polyvagal theory in creative arts and psychomotor therapies for emotion regulation in stress and trauma. *Frontiers in Psychology*, 15. https://doi.org/10.3389/fpsyg.2024.1382007

Pénzes, I., Abbing, A., & De Witte, M. (2025). How to use theories to explain effects of the Creative Arts Therapies: The case of Polyvagal Theory. *The Arts in Psychotherapy*. https://doi.org/10.1016/j.aip.2025.102316

Porges, S. (2011). The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-regulation. **.

Poli, A., & Miccoli, M. (2024). Validation of the Italian version of the Neuroception of Psychological Safety Scale (NPSS). *Heliyon*, 10. https://doi.org/10.1016/j.heliyon.2024.e27625

Neuhuber, W., & Berthoud, H. (2022). Functional anatomy of the vagus system: How does the polyvagal theory comply?. *Biological Psychology*, 174. https://doi.org/10.1016/j.biopsycho.2022.108425

Flores, P., & Porges, S. (2017). Group Psychotherapy as a Neural Exercise: Bridging Polyvagal Theory and Attachment Theory. *International Journal of Group Psychotherapy*, 67, 202 - 222. https://doi.org/10.1080/00207284.2016.1263544

Roche, H., Morton, L., & Cogan, N. (2025). Barriers and Facilitators to Psychological Safety During Medical Procedures Among Individuals Diagnosed with Chronic Illness in Childhood. *Healthcare*, 13. https://doi.org/10.3390/healthcare13080914

Bernards, J. (2017). Physiological Attunement and Influence in Couples Therapy: Examining the Roots of Therapeutic Presence. **.

Lans, L., Huijbregts, K., Westerhof, G., Haeyen, S., Derks, Y., & Noordzij, M. (2025). How to integrate physiological data from wearables in treatment of personality disorders: a narrative review. *Frontiers in Psychiatry*, 16. https://doi.org/10.3389/fpsyt.2025.1591871

, ., & , . (2017). `□□□ □□` - -. **, 21, 21-39.