P-ISSN 2664-0422	Pakistan Social Sciences Review	Jan-March 2025, Vol. 9, No. 1
O-ISSN 2664-0430	https://doi.org/10.35484/pssr.2025(9-I)30	[381-390]

Pakistan Social Sciences Review
www.pssr.org.pk

RESEARCH PAPER

Unraveling the Nexus: Investigating the Relationship between Neuroception of Psychological Safety and Childhood Traumas

Iram Mansoor

Associate Professor, Department of Behavioral Sciences, CMH Lahore Medical College – NUMS, Lahore, Pakistan

***Corresponding Author:** niaziiram@hotmail.com

ABSTRACT

This research aims to explore the intricate relationships among neuroception of psychological safety and childhood traumas. Early life experiences, particularly adverse childhood experiences (ACEs), have been shown to impact neurodevelopment and influence later perceptions of psychological safety. This study seeks to build on existing literature by examining these intricate relationships. Analytical cross-sectional design was used to assess the participants at a single point in time. The data gathered throughout Lahore, Punjab from Jan 2024 to July 2024. The sample size of 222 adult participants was selected by the convenience sampling strategy. A diverse sample of adult's age range of 20 and over recruited to ensure representation of various adult stages, genders, and cultural backgrounds. Assessment of participants was based on established measures and their eligibility for the study was determined accordingly. For assessment purpose three scales were used; Neuroception of Psychological Safety Scale (NPSS) for psychological safety and Adverse Childhood Experiences (ACE) for childhood trauma were used. Adverse childhood experiences measured by ACE to be a significant predictor of neuroception of psychological safety ($p<.000$) and also significant predictor of all its subscales of social engagement ($p<.000$), compassion ($p<.000$) and bodily sensations ($p<.000$). The results are in line with previous literature linking trauma with Polyvagal theory that Adverse childhood Experiences (ACEs) like violence, physical, emotional and sexual abuse, or being developed with such parents and other family members suffering from the mental health issues or substance abuse history can provide the base for physiological and mental health problems in later life.

KEYWORDS Psychological Safety, Adverse Childhood Experiences, Polyvagal Theory, Neuroception

Introduction

In the recent past, there has been an increasing focus on the interaction between neuroception of psychological safety and childhood adversities in the field of psychology. This emerging field is important as it offers insights into the navigation of individuals' social and emotional world, their mental health, and social relations (Anda et al., 2006; Dale et al., 2022; Huges et al., 2017; McLaughlin et al., 2015). Neuroception is a term coined by Stephen Porges to denote the non-conscious process of assessing threats and safety signals in the environment by the autonomic nervous system (Porges, 2007). This neuroceptive system is very much related to the creation and the development of psychological safety, a factor that affects emotional regulation, stress, and mental health (Winhall, 2021). The foundation of an individual's neuroception of psychological safety can therefore be attributed to one's childhood experiences, in particular, various types of childhood traumas. Childhood traumas, which include adverse events like abuse, neglect, or family dysfunction, have been identified as major influences on psychological health. These traumas have effects not only during the happening of the events but also

affect the neurobiological processes of perceiving safety in the environment (Anda et al., 2006; Dale et al., 2009; Young et al., 2022).This study aims to explore the intricate relationship between childhood traumas and the neuroception of psychological safety. Understanding these connections has significant implications for mental health interventions, therapeutic approaches, and interpersonal relationship dynamics. By delving into existing research, this study seeks to contribute to the growing body of knowledge in this domain, offering valuable insights for both theoretical exploration and practical applications in mental health.

Relevant Literature

Co-Regulation and Psychological Safety

Since the beginning of childhood, relationships with other children determine how the nervous system reacts to stress and connection. In this way, 'co-regulation' means that the presence of the caregiver is soothing for the child and helps the child to feel safe and attached. As pointed out by Medina (2014), the concept of "soil nurturing seed" sets the stage for the child's emotional development and management of emotions as well as positive emotional competencies, while "good-enough" parenting heals fractures, demonstrates fortitude, and allows for proper adult interactions (Medina, 2014). This process continues into adulthood, where calm interactions improve overall well-being.

Attachment Theory and Childhood Trauma

A lot of research literature has established a strong connection between childhood traumatic experiences and the shaping of attachment styles. Bowlby's attachment theory provides a context for understanding how early childhood experiences with initial caregivers contour one's relationship patterns in future life. Childhood traumas, such as neglect, abuse, or unreliable caregiving, have been associated with insecure attachment styles, which negatively influence an individual's capability to form trustworthy and secure relationships in adult life. As highlighted by the research work of Flatti et al. (1998), childhood traumatic experiences have deep and lasting effects not only on physical but also on mental health in adulthood. An in-depth literature review from the contemporary research project conducted by Dale and colleagues (2022) exposed the differences in autonomic regulation of those individuals who experienced maltreatment, highlighting the significance of regulating autonomic states as an important intervention goal for trauma management. This could be buoyed by the addition of body-based, bottom-up approaches as an integral part of therapeutic intervention. Similarly, the research work by Young and colleagues (2022) discovered that changes in the brain's threat and reward circuits have been connected to early childhood adverse experiences, as well as to anxiety and depression. Further research investigations by Heller and LaPierre (2012) debated the application of polyvagal theory for understanding emotional and attachment challenges in children and adolescents.

Neurobiological Impact of Childhood Trauma

In the developmental stage of infancy, the nervous system, mainly the amygdala, is intensely affected by the surrounding environmental factors. It shapes the child's fear responses and attachment patterns, which, in turn, affect attachment styles in adulthood. These patterns are highly dependent on the interactions with caregivers. Insecure and threatening environments, marked by child abuse on emotional, physical, and sexual

levels, neglect, or chronic stress, impair a child's ability to manage fear in threatening situations and can lead to long-term effects such as anxiety, depression, and maladaptive coping mechanisms. These early disruptions in attachment and safety can lead to dissociation, complex PTSD, and entrenched survival behaviors, impacting memory, emotional regulation, and social functioning (Holochwost et al., 2020). Social isolation, bullying, or stress due to any discrimination further activates pathological defense mechanisms, leading to addiction or self-harm as passive coping strategies. Similarly, soldiers who are trained for combat in high-alert conditions frequently experience mental health issues, with post-traumatic stress disorder (PTSD) being one of the most prevalent due to unresolved trauma and difficulties adjusting to civilian life. Even if an individual is not diagnosed with PTSD, a history of childhood abuse has been connected with lower vagal regulation of the heart (i.e., respiratory sinus arrhythmia) and an incapability to rapidly re-engage vagal regulation instantly following mild exercise (Dale, 2009).

The Role of the Nervous System in Emotional Regulation

Generally, our nervous system interprets and shapes our experiences, creating a narrative that reflects our survival behaviors and emotional history. This highlights the significance of understanding its crucial role in navigating daily life challenges. As mentioned by Deb Dana,"*We live in a story that originates in our autonomic state, is sent through autonomic pathways from the body to the brain, and is then translated by the brain into beliefs that guide our daily living. The mind narrates what the nervous system knows. Story follows state*" *(Dana, 2018, p. 35).* This perspective underscores the importance of addressing physiological state regulation in trauma therapy. Therapeutic interventions that integrate bottom-up approaches, such as somatic therapy, mindfulness, and polyvagal-informed practices, can play a crucial role in fostering psychological safety and mitigating the impact of childhood trauma.

Implications for Mental Health Interventions

Exploring the relationship between childhood traumas and neuroception of psychological safety holds significant implications for mental health interventions. A deep understanding of these complex dynamics can impact therapeutic techniques aimed at developing psychological safety, mitigating the impact of childhood traumas, and contributing to overall physical and mental well-being. In a nutshell, based on these strands of literature, this study aims to contribute to the growing body of knowledge surrounding the complex connections between adverse childhood traumas and neuroception of psychological safety, offering valuable insights for both theoretical understanding and practical application in the domain of mental health and the enhancement of interpersonal relationships.

Material and Methods

Participants

The study was analytical cross-sectional and grounded on data from Lahore, Punjab. The sample size was constructed on the proclamation made by Kline (2013) which specified that the proportion of the sample must be at least 3:1 for the number of the items of the scale. The sample was selected through the convenience non-probability sampling technique. The sample comprised of 222 participants. Inclusion criteria was for general population with the education level from intermediate and above and age range from 20 and above.

Measurements

Demographic questionnaire

The first part of form was consisted of informed consent, further comprised demographic details in first segment.

Neuroception of Psychological Safety Scale (NPSS)

The (NPSS) is a 29-item tool designed to evaluate an individual's sense of safety. It is comprised of three sub-scales: Social Engagement (14 items) assesses the perception about environment as non-threatening and safe for social engagement; Compassion (7 items) assesses the passion to form social connections, demonstrate care and empathy, and have a sincere desire to help others around., and last subscale is of Bodily Sensations (8 items) evaluates that how much individual has calm internal bodily sensations, described by a sense of relaxation all over body, a stable heartbeat and breath, and a stable stomach. This scale on the whole offers a standardized evaluation of psychological safety, based on the principles of the Polyvagal Theory. Higher scores shows greater levels of psychological safety (Morton et al., 2022).

Adverse Childhood Experiences (ACE)

The Adverse Childhood Experiences (ACEs) Questionnaire is a 10-item assessment instrument designed to measure the childhood trauma. It assesses 10 types of adverse experiences identified in the ACE Study, comprised of five from personal categories: Physical neglect, emotional neglect, physical abuse, verbal abuse and sexual abuse. Other five types of adverse experiences includes loss of a parent, family discord and divorce, and exposure to alcohol or any other drug abuse and mental illness in the family, or any type of violence in the home (Felitti et al., 1998).

Procedure

The sample was collected from the city of Lahore. Informed consent was obtained from participants on the individual level during data collection. The demographic form, NPSS and ACE was administered individually. The approximate time to complete the questionnaire was about 10-15 minutes, and it first started with the debriefing about the research objectives.

Scoring and Statistical Analysis

Data was analyzed using Statistical Package for Social sciences (SPSS, version 25.0). The descriptive statistics and inferential statistics was used. Regression analyses was applied to examine the relationships between childhood traumas, and neuroception of psychological safety.

Results and Discussion

The analysis begins with exploring the relationship between childhood trauma and neuroception of safety with its subscales and how adverse childhood experiences plays imperative role as a determinant neuroception of psychological safety. Table 1 exhibits demographics details with descriptive statistics. In inferential statistics linear regression was conducted on the data. The presentation of regression analysis for entire sample includes summary of regression analysis and alpha coefficients. The research

findings in Table 2 and 3 presents the summary of regression analysis which shows adverse childhood experiences to be significant predictor of NPSS and its subscales.

Table 1
Descriptive Statistics of Demographic Characteristics of Sample (N=222)

Variables	*f*	%
Age (*M*=28.69, *S.D*=9.66)	138	
20-30	38	62.16
30-40	24	17.11
40-50	22	10.81
50-60		9.90
Gender	70	
Male	152	31.53
Female		68.46
Education		
Undergraduate	48	21.62
Graduate	80	36.03
Post-graduate	94	42.34
Marital Status		
Married	82	36.93
Un-married	132	59.45
Divorce/Separation	8	3.60
Family System		
Nuclear	128	57.65
Joint	94	4.05
Job Status		
Employed	84	37.83
Unemployed/Student/Housewives	138	62.16

Table 2
Summary of Regression Analyses with ACE as Predictor of NPSS and its subscales

Variables	*R*	R^2	*Adjusted* R^2	*F*	*p*
Social Engagement	.475	.226	.222	64.15	.000
Compassion	.293	.086	.082	20.62	.000
Bodily Sensations	.386	.149	.145	38.49	.000
NPPS	.468	.219	.216	61.72	.000

Note. p <.001, ACE appears as significant predictor of NPSS and its subscales of social engagement, compassion and bodily sensations stress

Table 3
Coefficients of Linear Regression with NPSS and its subscales as Dependent Variable and ACE as Predictor

Dependent Variable	**Model**	**Unstandarized Coefficients**		**Standarized Coefficients**	***t***	***p***
		B	***SE***	**B**		
Social engagement	Constant	50.962	.960	-.475	59.02	.000
	(ACE)	-2.545	.318		-7.85	.000
Compassion	Constant	29.17	.590	-.293	49.46	.000
	(ACE)	-.886	.195		-4.54	.000
Bodily sensations	Constant	30.34	.699	-.386	43.43	.000
	(ACE)	-1.43	.231		-6.204	.000
NPSS	Constant	110.47	1.872		59.025	.000

(ACE)	-4.86	.619	-.468	-7.857	.000

Results mentioned in the Table 2 and 3 presents the summary of regression analysis which showed Adverse childhood experiences measured by ACE to be a significant predictor of neuroception of psychological safety (p<.000) and also significant predictor of all its subscales of social engagement (p<.000), compassion (p<.000) and bodily sensations (p<.000). ACE accounts for 22.6% of the variance in social engagement. ACE explains 8.6% of the variance in compassion. ACE accounts for 14.9% of the variance in bodily sensations and ACE explains 21.9% of the variance in overall NPSS.

Discussion

The findings of this research project is in line with growing body of literature and high lightened the enduring influence of Adverse Childhood Experiences (ACE) on adult physiological, psychological and emotional functioning (Koss & Gunner, 2018, Oh et al., 2018, Young-Southward et al., 2020). Adverse Childhood Experiences (ACE) significantly predicted the Neuroception of Psychological Safety Scale (NPSS) and its subscales, aligning with existing research that underscores the pervasive influence of early adversity on mental health and social behaviors.

The results showed that ACE accounted for 21.9% of the variance in NPSS, emphasizing the crucial role of early childhood adverse experiences in shaping an individual's perception of psychological safety. This finding supports previous studies, such as those by Felitti et al. (1998), and Guccione et al. (2022) research findings established the long-term association between ACE and increased psychological distress, diminished emotional well-being, and impaired stress regulation. Correspondingly Midolo et al., (2020) and Teicher and Samson (2016) demonstrated that the neurobiological basis for this relationship may stem from the disruption of brain regions involved in emotional processing, such as the amygdala and prefrontal cortex, caused by early.

The significant relationship between Adverse childhood experiences and social engagement (R^2=.226, p<.001 R^2 = .226, p < .001, R^2=.226, p<.001) echoes findings by Tzouvara et al., (2023) and research findings of Perry et al. (2006), which highlighted that early adversity disrupts attachment styles, leading to difficulties in forming secure relationships (Pery, 2006; Tzouvara et al., 2023). Social engagement, as part of psychological safety, is particularly sensitive to childhood experiences because it is based on trust and the ability to perceive others as non-threatening (Porges, 2011). The modest but significant association between ACE and compassion (R2=.086, p<.001R^2 = .086, p < .001R2=.086, p<.001) resonates with research findings of Arslan et al (2024), findings revealed that promoting self-compassion is significant in reducing the effect of adverse childhood experiences on mental health of young adults and interventions designed to increase the self-compassion will be beneficial for minimizing the negative impact of adverse childhood experiences (Arsla Ozdemir & Kocaayan, 2024). Similarly Gilbert's (2009) research on compassion-focused therapy, which theorizes that early childhood trauma constrains the development of self-compassion and empathy in an individual. This may result from high self-criticism and feelings of shame and doubt, common in individuals who scored high in ACE scores (Al-Shawi & Lafta, 2015).

The relationship between ACE and bodily sensations (R^2=.149, p<.001R^2 = .149, p < .001, R^2=.149, p<.001) aligns with findings by Al-Shawi and Lafta (2016) research work in Baghdad revealed that adverse childhood experiences play a main role as the

determinant of adulthood physiological health outcomes. Likewise van der Kolk (2014), who identified somatic dysregulation as a hallmark of childhood trauma. On the similar lines, Kolacz and colleagues (2021) observed the relation of joint hypermobility with dynamic autonomic activity and parasympathetic regulation in adolescents. Childhood adversity often disrupts the autonomic nervous system, leading to the hypersensitivity of the individual towards internal bodily cues and heightened stress responses, which may explain the observed association. Consistent with prior literature, these findings highlight the necessity of integrating trauma-informed practices into therapeutic and medical settings. Approaches such as somatic experiencing, mindfulness-based interventions, and attachment-focused therapies could address the psychological and somatic symptoms rooted in ACE (Dale et al., 2022; Dieterich-Hartwell, 2017; Kolacz et al, 2021; Winhall, 2021). Contemplating the significant influence of Adverse Childhood Experiences (ACEs) on the physiological and psychological wellbeing, policymakers should focus on implementing early intervention programs intended to support at-risk families and focusing on stressors like parental neglect, emotional, physical and sexual abuse, parental drug addiction and poverty. Psychological flexibility, self-compassion and resilience-building interventions, like parent training programs and child-focused community services, could buffer against the negative consequences in further adulthood associated with ACE (Ada et al., 2006).

Limitations

Though ACE emerged as a significant predictor of NPSS and its subscales, the variance indicates that other variables which were not included in the research project, such as genetics, current environmental stressors, and personality traits, also play a role. Additionally, there is limitation linked up with the cross-sectional design that it restricts the ability to draw causal conclusions, and the use of self-reported data may acquaint with potential biases.

Conclusion

The study underlines the persistent influence of ACE on adult psychological safety which comprises of social engagement, compassion and bodily sensations, consistent with the comprehensive literature. Addressing adverse childhood traumas through trauma-informed approaches and preventive programs has beneficial role in physical and mental health and fostering psychological flexibility and resilience across the lifespan.

Recommendations

To effectively counter the lasting effects of Adverse Childhood Experiences (ACE), policies should focus on delivering targeted support early on. This means making evidence-based solutions to help people deal with trauma available everywhere, particularly in places that help the most vulnerable. Mental health professionals need to take a more comprehensive approach that includes various therapies to help people recover from trauma, boost their resilience, and develop a better understanding of their emotions. For the future research projects it is suggested to further explore the moderating and mediating variables such as social support and resilience, this type of intensive research work could provide deeper insights into the fact that why some individuals overcome the adverse effects of ACE easily as compared to their counterparts. Longitudinal studies may be good option for further exploration of causal relationships and identify critical periods for intervention.

References

Al-Shawi, A. F., & Lafta, R. K. (2015). Effect of adverse childhood experiences on physical health in adulthood: Results of a study conducted in Baghdad city. *Journal of Family & Community Medicine, 22*(2), 78–84. https://doi.org/10.4103/2230-8229.155374

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience*, *256*(3), 174–186. https://doi.org/10.1007/s00406-005-0624-4

Arslan, G., Özdemir Bişkin, S., & Kocaayan, F. (2024). Adverse childhood experiences, self-compassion, psychological flexibility, and posttraumatic stress disorder. *Children and Youth Services Review, 155,* 108109.

Dale, L. P., Carroll, L. E., Galen, G., Hayes, J. A., Webb, K. W., & Porges, S. W. (2009). Abuse history is related to autonomic regulation to mild exercise and psychological wellbeing. *Applied Psychophysiology and Biofeedback*, *34*(4), 299–308.

Dale, L. P., Kolacz, J., Mazmanyan, J., Leon, K. G., Johonnot, K., Bossemeyer Biernacki, N., & Porges, S. W. (2022). Childhood maltreatment influences autonomic regulation and mental health in college students. *Frontiers in Psychiatry, 13*, 841749. https://doi.org/10.3389/fpsyt.2022.841749

Dana, D. (2018). *The polyvagal theory in therapy: Engaging the rhythm of regulation*. W. W. Norton & Company.

Dieterich-Hartwell, R. (2017). Dance/movement therapy in the treatment of post-traumatic stress: A reference model. *The Arts in Psychotherapy, 54,* 38–46. https://doi.org/10.1016/j.aip.2017.02.010

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, *14*(4), 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine, 14*(4), 245–258.

Gilbert, P. (2009). *The compassionate mind: A new approach to life's challenges.* New Harbinger Publications.

Guccione, C., Heilman, K., Porges, S. W., Gentile, S., Caretti, V., & Halaris, A. (2022). Autonomic measures in differentiating depressive disorders: A potential aid. *Clinical Neuropsychiatry, 19*(1), 29–38. https://doi.org/10.36131/cnfioritieditore20220105

Heller, L., & LaPierre, A. (2012). *Healing developmental trauma: How early trauma affects self-regulation, self-image, and the capacity for relationship*. North Atlantic Books.

Holochwost, S. J., Wang, G., Kolacz, J., Mills-Koonce, W. R., Klika, J. B., & Jaffee, S. R. (2020). The neurophysiological embedding of child maltreatment. *Development and Psychopathology*, *33*(3), 1107–1137. https://doi.org/10.1017/S0954579420000383

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, *2*(8), e356–e366

Kline, P. (2000). *The handbook of psychological testing* (2nd ed.). Routledge. https://doi.org/10.4324/9781315812274

Kolacz, J., Kovacic, K., Lewis, G. F., Sood, M., Aziz, Q., Roath, O. R., et al. (2021). Cardiac autonomic regulation and joint hypermobility in adolescents with functional abdominal pain disorders. *Neurogastroenterology & Motility, 33,* e14165. https://doi.org/10.1111/nmo.14165

Koss, K. J., & Gunnar, M. R. (2018). Annual research review: Early adversity, the hypothalamic–pituitary–adrenocortical axis, and child psychopathology. *Journal of Child Psychology and Psychiatry, 59*(4), 327–346. https://doi.org/10.1111/jcpp.12784

McLaughlin, K. A., Sheridan, M. A., Tibu, F., Fox, N. A., Zeanah, C. H., & Nelson, C. A. (2015). Causal effects of the early caregiving environment on development of stress response systems in children. *Proceedings of the National Academy of Sciences*, *112*(18), 5637–5642. https://doi.org/10.1073/pnas.1423363112

Medina, J. (2014). *Brain rules for baby: How to raise a smart and happy child from zero to five* (Updated and expanded ed.). Pear Press.

Midolo, L. R., Santoro, G., Ferrante, E., Pellegriti, P., Russo, S., Costanzo, A., & Schimmenti, A. (2020). Childhood trauma, attachment, and psychopathology: A correlation network approach. *Mediterranean Journal of Clinical Psychology, 8*(2). https://doi.org/10.6092/2282-1619/mjcp-2418

Morton, L., Cogan, N., Kolacz, J., Calderwood, C., Nikolić, M., Bacon, T., Pathe, E., Williams, D., & Porges, S. W. (2024). A new measure of feeling safe: Developing psychometric properties of the Neuroception of Psychological Safety Scale (NPSS). *Psychological Trauma: Theory, Research, Practice, and Policy, 16*(4), 701–708.

Oh, D. L., Jerman, P., Marques, S. S., Koita, K., Purewal Boparai, S. K., Harris, N. B., & Bucci, M. (2018). Systematic review of pediatric health outcomes associated with childhood adversity. *BMC Pediatrics, 18*(1), 1037. https://doi.org/10.1186/s12887-018-1037-7

Perry, B. D. (2006). Applying principles of neurodevelopment to clinical work with maltreated and traumatized children. In N. Boyd Webb (Ed.), *Working with traumatized youth in child welfare* (pp. 27–52). Guilford Press.

Porges, S. W. (2007). *The polyvagal perspective. Biological Psychology*, *74*(2), 116–143. https://doi.org/10.1016/j.biopsycho.2006.06.009

Porges, S. W., & Furman, S. A. (2011). The early development of the autonomic nervous system provides a neural platform for social behaviour: A polyvagal perspective. *Infant and Child Development, 20*, 106–118. https://doi.org/10.1002/icd.688

Teicher, M. H., & Samson, J. A. (2016). Annual research review: Enduring neurobiological effects of childhood abuse and neglect. *Journal of Child Psychology and Psychiatry, 57*(3), 241–266. https://doi.org/10.1111/jcpp.12507

Tzouvara, V., Kupdere, P., Wilson, K., Matthews, L., Simpson, A., & Foye, U. (2023). Adverse childhood experiences, mental health, and social functioning: A scoping review of the literature. *Child Abuse & Neglect, 139,* 106092.

Van der Kolk, B. A. (2014). *The body keeps the score: Brain, mind, and body in the healing of trauma.* Viking.

Winhall, J. (2021). *Treating trauma and addiction with the Felt Sense Polyvagal Model: A bottom-up approach*. Routledge. https://doi.org/10.4324/9780367408183

Young, K. S., Ward, C., Vinograd, M., Chen, K., Bookheimer, S. Y., Nusslock, R., Zinbarg, R. E., & Craske, M. G. (2022). Individual differences in threat and reward neural circuitry activation: Testing dimensional models of early adversity, anxiety, and depression. *European Journal of Neuroscience, 55*(9–10), 2739–2753.

Young-Southward, G., Svelnys, C., Gajwani, R., Bosquet Enlow, M., & Minnis, H. (2020). Child maltreatment, autonomic nervous system responsivity, and psychopathology: Current state of the literature and future directions. *Child Maltreatment, 25*(1), 3–19. https://doi.org/10.1177/1077559519848497