

WORKPLACE ENVIRONMENT INFLUENCES ON WORKER ENGAGEMENT AS MEDIATED BY THE AUTONOMIC NERVOUS SYSTEM

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Abstract

This study reiterates the importance of positive psychology and cultures in thriving organizations and the impact on organizational sustainability. Thriving organizations utilize neuroscience to develop strong and viable cultures. Cultivating a viable culture includes intentionally empowering – innovation, inclusion, emotional intelligence, productivity, continual improvement, and project management. Amplifying key competitive advantages, this study highlights theories regarding the relationship between WPEs, WEG, and human ANS mediation. The quantitative, exploratory research design is supported by literature and observational research to form a strong field of study. To remain objective during data collection, this study omitted the distinction among industries or worker type. This quasi-experimental study evaluated 397 responses from an online questionnaire of U.S. workers who lived and worked in the U.S. for at least six months over the past two years. The questionnaire provided more copious responses by eliminating potential distractions of demographic input. Correlations and relationships were analyzed using Hayes Modeling.

INTRODUCTION

This exploratory study aligns decades of information to exhibit how human interactions encompass varying degrees of engagement, happiness, motivation, encouragement, comfort, stress, and support. To further empower intrinsic motivation or make positive impacts among organizations, leaders must understand the basics of interactions incorporating human nature and science (Irwin, 2018; Mauritz, 2018). Workplace environments (WPE) and workers' engagement (WEG) are indicators of an organization's triple-bottom-line, including (a) social/people, (b) culture, environment, planet, and (c) benefits, financials, profit (tangible, intangible, monetary, or influence) impacts or cost (American Psychological Association, 2015; Foster, 2016). Healthy workers and profitable collaborations are important for an organization's success.

The problem addressed in this study was that there are negative impacts of antagonistic WPEs on WEG. From a portion of the extensive literature review, Mental Health America (MHA) researchers reported over 65% of the 2017 MHA survey respondents report workplace distractions (Hellebuyck et al., 2017). With a 95% confidence level, MHA researchers validated strong correlations between hostile/unhelpful work environments and overall workplace health ($r = .70$, $p < .01$), confirming WEG directly impacts productivity. Gallup confirms the essence of *worker engagement* via “70% of the variation between great workplace engagement and lousy workplace engagement can be explained just by the quality of the manager or team leader” (Clifton, 2019, p. 1).

The purpose of this quasi-experimental, correlation study was to increase understanding of the primary relationship between WPE and WEG, hence contributing to the knowledge base and understanding of the constructs. The researchers explored the influence of ANS on the positive correlation between WPE and WEG. Human interaction produces chemicals in the brain, supporting or hindering, a person’s health and motivation (Jerath et al., 2015; Sharma, 2016). *Stress* impacts a person’s health, and the autonomic nervous system (ANS) balances body functions (Jerath & Beveridge, 2018; National Institutes for Health, & Mikulic, 2019; Pittman, 2020). This study reiterates the importance of positive psychology and neuroleadership in thriving organizations, cultures, leadership, and environments. Increasing the understanding of the primary relationship between WPE and WEG as mediated by ANS expands the understanding of negative impacts of antagonistic WPE on WEG, hence dually maintaining the sustainability of workers and organizational well-being.

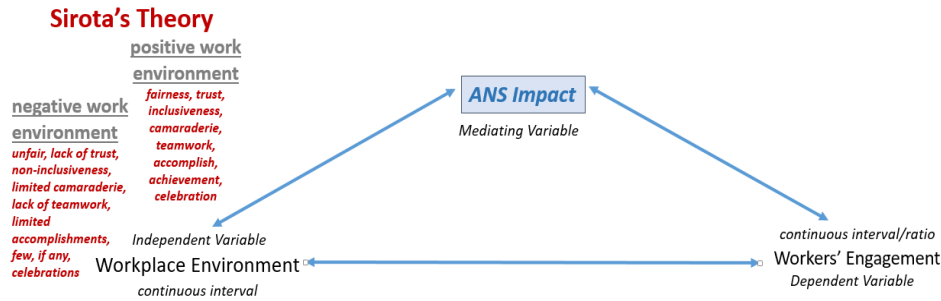
THEORETICAL FRAMEWORK

The significant theme among the extensive literature review abridges – leaders drive motivation and productivity; and WPEs institute positive or negative approaches to successes. Understanding the WPE influence or impact on the cognitive and physical reactions toward a psychological balance for the human brain, body, and health is vital to the fundamental theory associated with this study (Breuning, 2016; Immordino-Yang, Darling-Hammond, & Krone, 2019; Jerath et al., 2015; Sharma, 2016). To document cognitive behaviors, this study incorporates a theoretical framework based on the significance of Sirota’s three factor theory (STFT). Sirota et al. (2005) combined decades of research, establishing a theory outlining the importance of fairness, accomplishment, and camaraderie (Sirota & Klein, 2014; Sirota et al., 2005) among employees.

Through the literature review and actual findings of this study, the researchers demonstrated how the impacts of WPEs allow leaders to influence organizational productivity in alignment with STFT and related quantitative data and findings.

Figure 1.

Sirota's Three Factor Theory



Expanding the understanding of WPE impacts on WEG requires answering important questions regarding ANS influences on WPEs. This methodology and design are appropriate because organizational sustainability is dependent on WEG. Ensuring productivity and innovation for an organization's triple-bottom-line is imperative (Elkington, 1999; Montani & Dagenais-Desmarais, 2018). This study, via its literature review, incorporates many authors and researchers who demonstrated impacts and influences of WPEs aligning with organizational productivity (Pendell, 2020; Pittman, 2020).

METHOD

This was a quasi-experimentation study using primary data collected via a questionnaire. Sampling frame criteria for participation was people who live in the U.S. and have worked in the U.S. for at least 6 months over the past 24 months. Participants were recruited using the Qualtrics platform. The Northcentral University Institutional Review Board approved prior to initiating recruitment efforts. To measure the primary constructs of interest (WEG, WPE, and ANS), a questionnaire was self-developed.

WEG was a self-reported measure of participants' engagement representing productivity, innovation, well-being/health, and comfort in approaching assignment tasks to be accomplished. The WEG, dependent construct, was measured on a sliding scale from 0 to 100% of the time. The WPE was a self-reported measure of participants' perception of their WPE, including characteristics of fairness, camaraderie, and accomplishment. The WPE was the independent construct measured on an interval, 5-point Likert frequency scale asking respondents to indicate occurrence of specific characteristics (fairness, camaraderie, and accomplishment) experienced in the workplace environment ranging from never (1) to always (5). The ANS was self-reported, via a questionnaire, which measured participants' propensity in the work environment reflecting flight, freeze, or fight responses. The ANS was the mediating construct

measured on an interval, 7-point Likert frequency scale ranging from never to always. Hayes model 4 was used to explore the mediating effect that self-reported ANS has on the relationship between WPE and WEG.

RESULTS

This study reflects on human interactions within organizations (or WPEs) rather than the size, type, mission, or purpose of the organization. Implementing suggestions of multiple existing studies to further apply a quantitative look at the relationship between WPEs and WEG is key. In this study, correlations were found using Hayes Modeling, confirming the relationship of the constructs. Takeaway ideas are not directly wrapped around industry, geographical location, or any worker. For this study, of the 467 returned questionnaires, 397 (85%) held complete questionnaire responses. Data assumptions of normality, homogeneity of variances, and independence were tested and found to meet assumptions for statistical testing. Questionnaire reliability was assessed using Cronbach's alpha. Cronbach's alpha values are shown in Table 1.

Table 1.

Cronbach's Alpha Results

Constructs and Items	<u>Cronbach's Alpha</u> <i>(Results per Question)</i>
WPE – Q1 (section1)	
Fairness – Q1, Q6, Q7, Q12	.860
Camaraderie – Q2, Q5, Q9, Q11	.848
Accomplishment – Q3, Q4, Q8, Q10	.840
ANS – Q2 (section2)	
Freeze – Q1, Q8, Q9, Q12	.833
Fight – Q3, Q4, Q7, Q10	.852
Flight – Q2, Q5, Q6, Q11	.805
WEG – Q3 (section3)	
ENG (engagement) – Q1 through Q8	.924
WPE – Q1 (section1)	.945
ANS – Q2 (section2)	.925
WEG – Q3 (section3)	.924
Overall – entire questionnaire	.840

Note. Cronbach's Alpha = $>.8$ = good; and $>.9$ = excellent

Pearson correlation was used to explore association between the construct items and between construct items and WEG. Association between WEG and ANS items were negative, weak correlations ranging between $r(395) = -.155$ and $r(395) = -.316$. Pearson correlations were statistically significant with the exception of the association between camaraderie (WPE) and fight (ANS) of $r(395) = -.028$ and between fairness (WPE) and fight of $r(395)$ of $-.063$.

Descriptive statistics for the three primary constructs of interest were: WPE $M = 3.74$, $SD = .91$; WEG $M = 65.87$, $SD = 20.55$; and ANS $M = 3.41$, $SD = 1.30$. The WEG held a positive, strong correlation with WPE, $r(395) = .63$, $p < .01$; and a negative, weak correlation with ANS, $r(395) = .28$, $p < .01$. WPE and ANS held a negative, weak correlation, $r(395) = .24$, $p < .01$.

The WEG engagement construct consisted of 8 questions ($\alpha = .92$). The construct of WPE consisted of three work environment items. The WPE fairness item consisted of 4 questions ($\alpha = .86$), the WPE camaraderie item consisted of 4 items ($\alpha = .85$), the WPE accomplishment item consisted of 4 questions ($\alpha = .84$). The ANS construct consisted of three psychological response items. The flight item consisted of 4 questions ($\alpha = .86$), the ANS freeze item consisted of 4 questions ($\alpha = .86$), and the ANS fight item consisted of 4 questions ($\alpha = .85$).

The study participant criteria were intentionally broad because WPEs affect every worker, every task, and the related success. Demographics were intentionally excluded from this study to encourage and enhance participants' comfort-level in answering the questions, allowing data collection to focus on the variables. A significant response rate was achieved (i.e., doubling the expected responses), which exceeded the Qualtrics project management process expectations in volume and timing. These results propose that the option of self-reporting without demographics is a fairly unique approach to data collection.

To express the theoretical model hypothesizing whether the positive relationship between WEG on WPE is influenced, in part, by ANS, a model was developed (Figure 2). Hayes Model 4 was used to determine the statistical significance of the indirect effects of ANS. Overall, WPE predicted WEG, moderated by ANS, $R^2 = .419$, $F(2, 394)$, $p < .001$. The analysis supports the theoretical model that the relationship between workplace environment and worker engagement is mediated by the autonomic nervous system. Standardized calculations for the indirect effect, direct effect, and total effect are

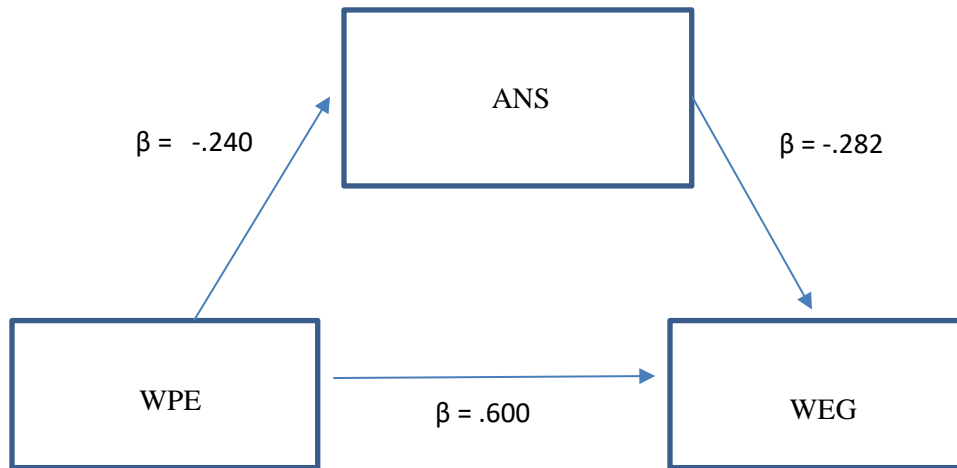
$$\text{Direct effect} = c' = .600$$

$$\text{Indirect effect} = ab = -.240(-.282) = .06768$$

$$\text{Total effect} = c = -.600 + .06768 = .66768$$

Figure 2

Hayes Model 4



Andrew Hayes' work contributes significantly to clarifying and applying various models for research (Hayes, 2017; Hayes, 2021). Strong significance among the constructs' relationships was consistent with existing research and aligns with STFT. An emphasis on the relationship between WEG and WPE appears beneficial with the addition of a self-reporting aspect that allows for participants' responses regarding their ANS reactions to their WPE. The results indicated a significance of WPEs on WEG and establish support for a balance of people, planet/environments, and profits while highlighting the role of an employee's ANS response to this relationship. WPEs can institute and influence positive or negative approaches to success (Austin, 2019; Heathfield, 2020).

DISCUSSION

Refining and rebuilding are essential for the brain and the human body. Everyone can seek their full potential by effectively finding the reward activation key in their team, workgroup, organization, studies, and endeavors. Based on a combination of the literature review and the data analysis for this study; undoubtedly, a person's brain and their WPE have a connection. A person's brain and their WPE have a connection. Human chemistry supports engagement through ANS (Dabke, 2016; Zwaan et al., 2019). The ANS balances and blends paradox-savvy leadership into more productively influencing and positively encouraging WPEs. Engagement is critical to being proactive, adaptive, and innovative workers, and is synthesized as a current and influential topic. Motivation is driven by leadership (Irwin, 2018). Emotions, feelings, thinking,

and self-regulation are developed by experience for every person. Neuro-capital, when embraced, balances a person's portfolio, paying dividends for the health and well-being of each unique person (Buisson-Narsai, 2020).

The sample, in this study, was designed to avoid distinguishing between industries or types of workers to remain objective across human-beings – no matter the industry or their work responsibilities. For example, Olympic teams comprised of individuals who greatly excelled at their craft but did not 'gel' well together as a team, is an example of the missing element of camaraderie among a WPE. Alexander the Great, leading the Macedonians to overcome the significantly larger Persian army, is a superb example of the combination of humanity, camaraderie, and teamwork that achieves organizational sustainability. Understanding effective coaching, emotional intelligence, and leadership plays an imperative role in organizational success.

Gilin-Oore et al. (2015) presented a strong review on workplace conflict and the relationship and power of leaders in the workplace environment. Sankovic (2018) illuminates the importance of structures and processes for reporting, repairing, and healing from workplace environment gaps, conflicts, and issues. Montani et al. (2018) showed how leaders should address, change, and improve WPEs by removing barriers and nurturing human capital among productive atmospheres. In parallel, Epitropaki (2020) determined forgiveness institutes incredible repair. Methot et al. (2017) clarified: positive, negative, ambivalent, and indifferent relationships by blending social-functional emotions perspective with four major streams: "(1) sources, (2) outcomes, (3) temporal dynamics, and (4) measures of ambivalent and indifferent relationships" (Methot et al., 2017, p. 1797), and "link[ed] social interactions, discrete emotions, and workplace relationships with the four research streams" (Methot et al., 2017, p. 1791).

Ghadiri et al. (2012) show that brain-friendly work environment(s) provide productive and beneficial workspaces while aligning neuroscientific specifics with biology, brains, environment, motivation, leadership, and growth, and noted a renewed intent to develop neuro-leaders who understand, respect, and formalize effective approaches to meet the basic brain needs in the business world. Brains think 'safety first' (Buisson-Narsai, 2020). Lee et al. (2020) especially noted the findings of multiple variable and constructs for future research suggestions. The impact of emotional intelligence (EI) on knowledge sharing (KS) behavior and the supporting roles of the mediating variables – organizational justice (OJ) and work environment (WE) prove significant (Tamta & Rao, 2017). Dabke (2016) demonstrates leadership effectiveness in correlation to EI, motivation, intellect, and influences.

Multiple regressions and Hayes modeling demonstrate a strong and viable regression analysis approach (Hayes, 2017; Soper, 2021; Thakkar, 2020; Tomaselli et al., 2020; Vogt, 2007). Building a multiple regression model via

IBM SPSS® add-ons, as needed, to explore the variables' relationships based on log-linear analytical methodologies (Hayes, 2017; Tomaselli et al., 2020) expands on existing research by reflecting on the latent variables. Decomposition of the latent variables was key. Multi-regression analysis, along with appropriate statistical analysis (i.e., mean, standard deviations, t-tests, and distributions) (Vogt, 2007), clearly presents the findings.

The chemistry of leadership was demonstrated in the Clifton (2019) article reflecting on 70% of the responsible for the engagement of workers resides with leaders and managers (Clifton & Harter, 2019). Similarly, Dabke (2016) "studied the relationship between performance-based EI [emotional intelligence] and transformational leadership [TL] as exhibited by participants in the work role with leadership effectiveness as perceived by their superiors and subordinates" (Dabke, 2016, p. 27) to assess leadership chemistry and effectiveness as correlated with EI, TL, behaviors, motivation, intellect, and influences. Dabke (2016) presents strong use of SPSS® with results reflecting Pearson's correlation coefficient and multiple regression analyses resulting in a variety of positive relationships among variables and reflects on behavior, rather than EI, accounting for greater impacts on effectiveness.

Chemical releases and balancing occur naturally based on indications to the brain regarding the anticipated or understood paths of fight-flight, rewards, moods, emotions, feelings, and bonding (Buisson-Narsai, 2020). The significance of understanding the benefits of treating every brain with respect and forgiveness is the combination of STFT and neuroleadership. Achieving the purpose of increasing the understanding of the primary relationship between WPE and WEG as mediated by ANS expands the knowledge base and the understanding of the problems associated with the negative impacts of antagonistic WPE on WEG.

The *take-home message*, ideally, is the big picture of *getting to the hearts and minds of people* to empower and motivate. Doing so requires work environments and cultures of productively harvesting the strengths of fairness, achievement/recognition, and camaraderie/teamwork. Positive environments and positive psychology presented a balance of forgiveness rather than developing antagonistic situations. An organization's triple-bottom-line reflects the health, well-being, chemistry, brainpower, innovation, teamwork, and productivity of its people. Human nature via the innate ANS components of fight, flight, and freeze (i.e., amygdala) intrinsically impacts motivation and well-being among organizations' team members and the success and sustainability of the organization. This study supports Sirota's theory of fairness, camaraderie, and accomplishment as basic requirements for the success and sustainability of people and organizations.

LIMITATION OF THE FINDINGS

Limitations of the findings include population representation; respondents' intent and perspective of the research topic; randomness; plausible sampling bias; mitigating errors; mediating analysis, conditional analysis, and modeling; and clarification or rework if processing or leftover errors occur. Delimitations include volunteer population sample; lack of specific geography, region, or culture supports randomization allowed for extensive modeling analysis; not limited to a specific industry or location; and the researchers focused on attributes of the variables rather than specific or pre-determined organizational attributes. And, the variable ANS, represents parasympathetic and sympathetic states for humans. This research design and the data collection approach support an intentional focus on less complicated survey participation and responses related specifically to the variables for this study. This effort especially supports the initial content validity, the research regarding reliability, and establishes the fundamentals for future research to further validate the data collection instrument and process. Utilizing Qualtrics' project management support and allowing the participants an opportunity to reflect only on the subject matter without demographics, revealed the availability of substantial, timely, and applicable data collection. This approach may prove beneficial for future research by further presenting quantitative evidence and suggesting organizational improvements.

IMPLICATIONS

Strong leaders must be flexible, adaptive, and focused on followers' needs (Immordino-Yang et al., 2019). Social contributors are essential in continued brain development and added value regarding brain-friendly workplaces and humans' related requirements to be motivated, learning, and growing (Immordino-Yang et al., 2019). This study contributes to the knowledge base by presenting a renewed focus on addressing concerns regarding the primary relationship between worker engagement (WEG) and workplace environment (WPE), as mediated by the autonomic nervous system (ANS). Consistent with other studies, the results support, and further outline the significance of meeting human challenges with neuroleadership-related practices to develop healthier and resilient WPEs. Combining business, human nature, and science is important to the success and sustainability of organizations. This study links multiple WPE related theories and reiterates the importance of positive psychology and neuroleadership. Researchers continue to find that safe, healthy, and productive WPEs are about the *we* of an organization – i.e., thriving, encouraging, and strengthening, productively, rather than antagonistically. To do so, is to protect the ANS, like guarding against a broken arm or violence in the workplace. Organizational sustainability requires leaders to manage in a manner that engages the calm (parasympathetic) state of mind. This is the key to harmonizing the triple-bottom-line. Continually improving organizational approaches to people, environment, and benefits/profits will remain a goal for this researcher. Further

developing a theory supporting thriving workplaces can provide tools to refine the approach and results of work environments.

SUGGESTIONS FOR FUTURE RESEARCH

Highlighted as a crucial study topic – the impact of WPEs on health, well-being, engagement, and productivity – remains a vital topic for future research. Sankovic (2018) and Montani et al. (2018) recommended future research regarding protection, presence, and eliminating the triggers in WPEs. Methot et al. (2017) recommend future research, including "develop and empirically test models where ambivalent and indifferent relationships predict proximal emotions, which then predict work attitudes and behaviors" (Methot et al., 2017, p. 1809). Some researchers who embarked on qualitative studies highlighted challenges for related topics. Additional quantitative research on WPE and WEG would further expand the knowledge base.

Future studies should broaden variables in relation to leadership, transgression, and the repair of related relationships. Gilin-Oore et al. (2015) recommended more research on the person and the conflict or situation. Cook (2018) referenced creativity and intrinsic motivation in the workplace and embarked on a qualitative study with findings regarding future research suggestions and highlighting qualitative research challenges. In addition to contributing to the knowledge base and expanding the understanding of WPEs' impacts *on humans* and how leadership methods affect motivation or WEG, this study establishes future research suggestions. Future studies could reflect additional populations or samples to further address culture, specific industries, types of leadership approaches, or geographical aspects as constructs or population sample criteria. Additional criteria and related information may be reflected in future variables regarding well-being, health, leadership, and organizational development. Future studies can further expand the knowledge base of WPEs, WEG, ANS, and related variables' influence growth, leadership, and sustainability of an organization.

Future data collection can be tailored to find the - who, how, and where for small businesses, large entities, governments, countries, and any combination of organizations, no matter their size or focus. Exciting topics can be gleaned for future research ideas. Lee et al. (2020) provides a platform "call(ing) for better measurement and study design tha[t] can reduce endogeneity biases and provide more accurate estimates of the relationship between leadership variables" (Lee et al., 2020, p. 18). Immordino-Yang et al. (2019) supports awareness of vital interactions and the triggers of the cognitive processes based on leaders' influences and dynamics among their workers or followers.

CONCLUSION

In this study, the researchers reviewed key research studies, books, and many articles pertaining to the relationships among WPEs, WEG, and vital approaches to better understand affects, effects, impacts, and implications. The problem of antagonistic/hostile WPEs negatively impacts organizations, across the globe.

The essence of this study illuminates the need for organizations to refocus their WPEs in alignment with neuroleadership approaches to focus on the needs and well-being of their people. Positively enhancing WPEs is documented as a key ingredient to increasing the percentage of people engaged in their work. Not including demographics on the questionnaire played a significant role in data gathering. It offered quicker and more abundant responses by eliminating potential distractions throughout the data collection process. Beyond the superficial needs of people and organizations, this study emphasizes the sustaining and thriving needs of organizations, through the needs of people.

This research highlights the magnitude of the influences and consequences of WPE on WEG. Understanding the importance of how to treat brains properly is supported by many studies. The purpose of this study was to expand the understanding of the association between negative impacts of antagonistic WPE on WEG. Organizations can enrich their triple-bottom-lines by focusing on the ANS influences of their WPEs. Positive environments and positive psychology present a balance of forgiveness rather than developing antagonistic situations (Austin, 2019; Breuning, 2016; Buisson-Narsai, 2020; Hellebuyck et al., 2017; Irwin, 2018; Sharma, 2016; Sirota & Klein, 2014; Sirota et al., 2005). The benefits of understanding the impacts of antagonistic WPE can allow leaders to improve their WPEs and encourage sustainability and productivity. Consistent with the results of this study and the messages from the literature review, organizational leaders who focus on healthy WPEs will increase their organizations well-being and long-term sustainability through their people.

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