



Body Chemistry and Leadership Behaviour

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Abstract

This study applied body chemistry and neuroscience to leadership behaviour. Specifically, it sought to replicate some studies on the relationship between leadership behaviour and happiness. The research method was exploratory because of the paucity of research on leadership behaviour and happiness and involved the use of qualitative and quantitative techniques. The qualitative technique centred on a review and summarisation of existing literature on leadership behaviour, happiness hormones, and happiness on Google Scholars. The quantitative research used a valid and reliable online questionnaire survey on Google Forms to collect information from 80 respondents on different WhatsApp platforms in Canada, the United States of America and Nigeria, selected by judgemental non probability sampling technique. They were asked if there was a relationship between leadership behaviour and happiness. Six descriptive data analysis methods- tabulation, bar graphs, mode, summations, percentages and average score per respondent - were applied to answer the research question from the coded questionnaire responses. It was found out that there was a relationship between leadership behaviour and happiness. The research also identified the main hormones and neurotransmitters, secreted by mostly the brain, that increase the wellbeing and happiness of leaders and other persons. They are dopamine, oxytocin, serotonin and endorphins (DOSE). It is recommended that leaders should initiate happiness generating activities like kindness, appreciation, team work, praising others, outdoor exercises, get-togethers and handshakes to enhance their leadership behaviours. The researcher also recommended that leadership recruitment, selection, training, evaluation and rewards should be centred on the capacity to generate and distribute happiness. Leaders should be 'happifiers' or happiness generators and distributors.

Keywords: Body chemistry, leadership behaviour, happiness, dopamine, oxytocin, serotonin, endorphins and happiness.

1.0.INTRODUCTION

Nigeria had high hopes in 1960 and was economically at par with South Korea and a notch better than Malaysia (Anyaoku, 2019; Can et al, 2018.). Today, the story is depressing. In terms of the economic complexity index which measures productive capabilities, South Korea and Malaysia are globally ranked 4th and 24th respectively while Nigeria occupies the 126th position (The Observatory of Economic Complexity, 2021; Can & Tursunbadalov, 2019). In addition, South Korea is the 13th most advanced economy in the world and Nigeria is still ranked among the developing economies (World Data 2022). In the report of the UNCTAD 2019 World Investment, Nigeria after Egypt and Ethiopia is the third African economic hub for FDI. The state is amid the most favorable crossroads of development in Africa and allures many investors in the areas of oil, energy, construction etc. Some of the major capitalizing states in Nigeria include the USA, China, the United Kingdom, the Netherlands, and France. (Demirbas et al, 2022 ; Can et al, 2022). Many reasons have been adduced for the stunted national growth, including poor leadership. Leadership is the process of influencing people towards achieving shared goals and values (Kuye, 2010), poor leadership is a failure to do that. Ogbeidi (2012) stated that despite Nigeria's rich natural and human resources, the country was yet to find its right place among nations because of poor leadership. This was corroborated by Okurounmi (2010) who opined that Nigeria's leadership failure has dashed the hopes of not only Nigerians but also the entire black race.

The leadership history of Nigeria is a litany of many failures and few successes. Since independence, Nigeria has had five coups and 4 republics. The first republic was aborted by 'The Five Majors' in 1966 while the others were terminated by different military leaders who used civilian leadership failure as an excuse. Nigeria has had uninterrupted civilian rule from 1999 (Hoffmann and Wallace, 2022). But with a massive public debt of #87.38 trillion and an inflation rate of 28.2% (NBS 2024), a parallel market dollar exchange rate of \$1 to #1,940 (as at February 22, 2024) and the incessant power supply and security breaches, many have scored even the various civilian leaderships in Nigeria low. The situation in many other parts of the world is not better- the typical cases of Thailand in Asia with 29 coups and Haiti in Latin America that is presently running on autopilot tend to confirm the suggestion of Simon (2023) that leadership

deficiency is a serious global problem. There is also a leadership drought in the corporate world. According to a report by NASME, in 2022 about 600,000 micro, small and medium scale enterprises were forced out of business. Furthermore, why is it that few Nigerian companies are centuries or more than 100 years old? Surely, the blame for these twin negatives should be shared by government and non-government leaders. If many civilian and military governments, corporate and non-corporate leaders worldwide exhibit leadership deficiency in spite of the available quantum of leadership theories and business schools, there should be a radical solution, a leadership paradigm shift to stimulate a new breed of leadership and leaders. Therefore, it is important to study human body chemistry to extract factors that will help explain and facilitate human leadership. The seat of the human body and the regulator of body chemistry is the hypothalamus of the forebrain. It secretes hormones and neurotransmitters that determine, i) leadership behaviour and ii) how followers perceive and react to the leadership behaviour. The hormones and neurotransmitters that enhance effective leadership behaviour are dopamine, oxytocin, serotonin, endorphins, testosterone (DOSET) and little amounts of cortisol and adrenaline (CA). Leadership behaviour and activities are impaired by excessive quantities of cortisol and adrenaline in the blood stream. According to Stone (2017), we can rewire the brain and change its default setting to generate thoughts and activities that secrete more of positive leadership chemicals and less of negative leadership chemicals. This was affirmed by Elsbury (2021). He asserted that the power to change leadership behaviour is in human beings, who should be able to hack into the brain's wiring system and reprogramme it for more effective leadership.

In summary, leadership behaviour can be improved by tapping into the body chemistry that is regulated by the brain. How can this be done? Use appropriate behaviours and activities to induce the secretion of the relevant chemicals that will make both leaders and followers have a 'happy' sense of wellbeing for better leadership and followership behaviour.

2.0. LITERATURE REVIEW

This describes a summary and synthesis of relevant Google Scholar - sourced literature on 'Body Chemistry and Leadership Behaviour'. It is sectioned into conceptual, theoretical and empirical reviews for more effectiveness.

THE CONCEPTUAL REVIEW

Definitions of Body Chemistry

The concept 'Body chemistry' originated from two terms, the 'human body' and 'chemistry' and has different definitions and approaches. Clark (2018) defined it as all the chemical interactions that occur in the body while Schirber (2009), Davey (2003) and several other authors described body chemistry as the study of the functions and processes that occur in the human body, from cell and body fluid production to the heart beat.

Approaches to Understanding Body Chemistry.

i) The **building block approach**: this studies and describes the composition of the human body to understand body chemistry. It for example identifies and lists all the elements in the body that make up body molecules and cells and are involved in important body functions. The following 20 elements, among many others, have been listed by proponents of this approach (Amendolare and Marion, 2023) carbon, oxygen, hydrogen, nitrogen, calcium, phosphorus, sodium, chlorine, magnesium, sulphur, zinc, silicon, manganese, nickel, cobalt, thorium, selenium, radium, beryllium and uranium. A variation of this approach according to Helmenstine (2019) doesn't list elements as building blocks; it focuses on inorganic components of the body like water and various minerals and organic compounds such as fats, proteins, carbohydrates and nuclei which make up the human body.

ii) **The metabolism or reaction approach**. The body is a series of interactions, reactions and different levels of metabolism or chemical processes. The chemical processes like respiration, digestion, excretion or growth can be fast, moderate or slow.

iii) **The controlling body fluid approach**- Body chemistry is also understood and described in terms of chemical fluids in the body that control body interactions and metabolisms, namely hormones and neurotransmitters. Neurotransmitters and hormones are chemical messengers that carry messages from nerves to cells like muscles, glands or other nerves. Without neurotransmitters like dopamine, serotonin, endorphins, adrenaline(epinephrine) and hormones such as testosterone, cortisol, thyroxin, insulin, adrenaline, estrogen and oxytocin the body will be unable to move, reproduce, grow, breathe, learn, think, feel, respond to stress, sleep or digest food (De Vries, 2017)

In summary, body chemistry describes all the chemical elements, interactions and chemical fluids in the body. Some of the chemical fluids like hormones and neurotransmitters control all the processes and metabolism in the body; without them the body will not function. The body can be easily reduced to chemistry (Clark, 2018).

Hormones and Neurotransmitters

i. Hormones are body messengers that are produced in special body cells called endocrine glands and travel through the blood stream to specific targets and affect our growth, mood, reproduction, metabolism, development among many other body functions. The main body hormones are the pituitary, pineal, thyroid and adrenal glands. The pancreas, testes and ovaries also act as endocrine glands and produce appropriate hormones. The primary male hormone, testosterone, for example, is produced by the testes. It circulates to all parts of the body and is responsible for regulating sex differentiation, producing male sex characteristics and fertility, (Nasser& Leslie, 2023).

ii. Neurotransmitters are chemical messengers that carry messages from one nerve cell in the body to the target cell which can be another nerve cell, a muscle cell or a gland. Over a hundred naturally occurring neurotransmitters or chemical messengers carry messages that affect our moods, emotions and actions, move our limbs, help us feel sensations and breathe. Some hormones are called neurotransmitters. The main difference between them is that hormones travel through the blood stream to different organs and tissues while neurotransmitters occur only in the brain and central nervous system where they communicate via neurons. Special neurotransmitters (like serotonin, histamine, dopamine, adrenaline and endorphins) play a critical role in the brain and nervous system- they regulate consciousness, cognition, attention and emotion. As asserted by Lake (2018), it is clear that “human bodies run on chemical interactions” and that body chemistry can be described on the bases of elements like oxygen and carbon or inorganic and organic compounds like hormones and neurotransmitters, exemplified by cortisol, adrenaline, dopamine, oxytocin, serotonin, endorphins and testosterone, Chakravarty (2018). Neuro-science is simply the study of the nervous system that includes the brain, spinal cord and all the nerves in the body. It is a review of the biology and psychology of the brain and how it interacts with other body systems, Nelson (2016). Social neuro-endocrinology is a subset of neuroscience that focuses on how hormones and neurotransmitters impact social behaviour.

Body Chemistry and Behaviour

Chemistry affects human behaviour. Beach (1951) asserted that there is a relationship between body chemistry with its body fluids and human behaviour. This is in line with an earlier view of Rich (1931) that human behaviour is linked to chemical changes in the body and that personality and body chemistry are correlated. The brain with its 86 billion neurons or cells creates and is the centre of all thoughts, functions and behaviours. According to Sofrone (2018), individuals are born with different types of brain chemistry that affect dispositions and behaviour. He further stated that people are fully in control of their reactions. Jong and De Vrieze (2017) and Carter (1996) explained further that behaviours are in the hands of hormones. These hormones influence world views, thoughts and actions. Specifically, aggression, sexual behaviour, ingestion and adaptive behaviours are regulated by hormones, neurotransmitters or chemical substances produced in the body, (Herbert, 1977). These chemicals are involved in ‘a lot of essential processes like heart rate and digestion, but also of mood and feelings- they help people bond, feel joy and experience pleasure’, (Atlas Biomed Team, 2023). While external factors can affect mood, the four neurochemicals that affect thoughts and actions are serotonin, dopamine, adrenaline and oxytocin. Powell (2017) for example, studied the effects of music on the body chemistry. He stated that human ‘bodies contain an internal pharmacy that dispenses various chemicals to help deal with life’s challenges and music is the key to the pharmacy.’ For example, loud music boosts adrenaline to increase wakefulness and alertness while relaxing music reduces the amount of noradrenaline in the body system for calmness and sleepiness. When a dangerous situation occurs, the pharmacy releases adrenaline to increase energy and when a person does something nice, they get a ‘happy’ shot of serotonin which encourages them to repeat the action..

Furthermore, Huettich (2020) opined that, hormone ‘play a great role in whether leaders create strong unified teams or weak every- man- for -himself, ones. Also, hormones and the emotions triggered can inspire people and improve leadership skills and corporate culture. The brain is in charge of the release of the four main neurotransmitters and hormones (dopamine, oxytocin, serotonin and endorphins), which communicate with its other parts to excite or calm behaviours, actions, activities and emotions. The hormones, neurotransmitters and other neurochemicals that affect behaviours are as follows:

i. Dopamine- this is the feel good or happiness neurotransmitter that controls the mood, memory and motor skills. It acts like a reward and is released when people do things that they like and are happy, satisfied and motivated. Dopamine is also involved in attention, decision making and impulse control, the brain's motivation and reward system- generating pleasure. Activities that make the brain release feel good chemicals like dopamine include; eating foods rich in L- Tyrosine, the protein needed to make dopamine; avoiding processed foods and foods high in fat, sugar and caffeine; exercising daily; being praised on the job; shopping; getting enough sleep; and other cherished activities like a massage, sex, listening to music, dancing, social drinking, social outings and recreation. Ayers (2016) stated that too little of dopamine in the brain is a chemical imbalance and can lead to mental illnesses like depression and anxiety while too much of it may cause negative behaviours like over- competitiveness, aggression and impulsiveness. Some people addictively and negatively indulge in activities like drug use, gambling, comfort feeding, excessive sex or drinking to be on a perpetual dopamine 'high'.

ii. Oxytocin or the love hormone, produced and used by the body during childbirth, breastfeeding and love making, increases trust, generosity, fellow feeling, and bonding in teams. Oxytocin is a neurotransmitter that regulates stress responses, calms the nervous system and is involved in romantic relationships. Social phobia, depression and anger issues are linked to oxytocin deficiency and have been successfully treated with oxytocin shots. Oxytocin secretion is a result of stimuli perceived by the brain in response to touch, eye contact, taste, smell or stress to counterbalance the effects of cortisol. Natural ways of boosting oxytocin include; stroking a pet or another person; hugging, massaging or holding hands; sex and romance; laughing or smiling and social eye contact and conversations.

iii. Serotonin or the natural mood regulator and happiness producer is mainly generated in our gut. It is responsible for mood regulation, sleep regulation, digestion, brain function, happiness and a feeling of wellbeing. The trio of dopamine, oxytocin and serotonin are natural feel - good chemicals. Adequate levels of serotonin help to make people calm, emotionally stable, focused and energetic. Low serotonin levels can cause sleeping problems, low self - esteem, low libido, memory problems, depression and a craving for sugar and sweet foods. They are also thought to contribute to feelings of anxiety, panic- disorder and post – traumatic stress disorder (PTSD). Serotonin is the leadership hormone according to Chakravarty (2018). It boosts willpower, self -

esteem, inner satisfaction, confidence and a sense of purpose. It also reduces the stress hormone or cortisol. All these actions increase leadership traits and behaviours. Some natural ways of boosting serotonin include; Counselling; A good night's sleep; A diet rich in tryptophan (eggs, oats, beef, chicken, milk, cheese, soybeans, salmon, potatoes, etc.) that is a precursor for the production of gut serotonin; Expressions of gratitude; Meditation; Plenty of outdoor exercises and Plenty exposure to sunlight.

iv. **Endorphins** are chemical messengers from the pituitary gland and hypothalamus of the brain. They relieve pain, stress and depression, regulate appetite, improve self – image, pleasure and confidence. For example, when a person feels pain, nerves send pain signals to the brain which releases endorphins to block the nerve cells that received the pain signals and turn off the pain. This makes people feel better and enjoy a more positive mindset because pain has been avoided, they keep on functioning without stress and pain. Endorphins also induce euphoria, especially when combined with dopamine. Endorphins or happiness hormones, are released when people are performing pleasurable or fun activities like; massages; laughter; aromatherapy; exercises like swimming, walking, hiking; listening to music; good social interactions; dancing; sex and eating well. People with low endorphin levels, according to the American Cleveland Clinic researchers (2022) exhibit the following deficiency symptoms- depression, anxiety, body aches, addiction, sleep issues and impulsive activities.

v. Adrenaline is another hormone that affects human behaviour. The release of adrenaline or an adrenaline rush triggers the following symptoms; Sweating; Palpitation or rapid heartbeat; Rapid breathing; Nervousness; Decreased sensation of pain and Increased strength. Stress and worry make the body to release adrenaline with the above 'flight or fight' response symptoms. The body overrides this with a 'rest and digest system' that includes; Deep breathing to get more oxygen supply; Recreation and relaxation; Talking with family and friends about the sources of the stress; Eating well; Adequate exercising; Avoiding the use of electronic devices like telephones, laptops and video games at bedtime; Limited use of alcohol, caffeine and spices around bedtime. Some people are addicted to the adrenaline rush and do all sorts of dangerous activities like motor racing, sky diving, risky adventures to achieve it.

vi. **Testosterone** is a hormone that is produced more in men than in women. It affects aggression, dominance, confidence, competitiveness, concentration, mood and energy. Testosterone arouses

the manifestation of anger, verbal aggressiveness, dominance, physical violence and the development of the muscular system, (Batrinos, 2012). Batrinos (2012) also reported that testosterone is high in individuals with aggressive behaviour and rises in winners of competitions and in people in aggressive phases of competitive sports. Men go through their monthly cycles of testosterone high called the ‘andro- cycles and manifest more aggressiveness and anger during these periods’ (Baron, 2016). Women also go through a testosterone high from a week or two before their monthly menstrual and ovulation periods. The testes and fat cells of men also produce oestrogen. There is a period of ‘oestrogen spike’ at particular monthly periods during which time men become more compassionate, empathetic and nurturing’.

vii. Cortisol or the stress hormone is produced by the adrenal gland in response to stress and low blood sugar. Excessive cortisol makes the work culture more toxic and the employees more emotionally unstable, more hyper alert and more prone to ‘desk rage’, depression, burnouts and immunodeficiency issues (Aboiron, 2022). A combination of all these effects can lead to a reduction in employee efficiency and productivity (Aboiron, 2022). Cortisol acts to ameliorate the effects of testosterone (Batrinos, 2012).

Baron’s (2015) research on hormones and leadership concluded that hormones affect human mood, behaviour and leadership. During the testosterone high period, both men and women become more aggressive and during the oestrogen high period, they become more emotional and more compassionate. Nelson’s 2016 study in *The Journal of Personality and Social Psychology* asserted that executives with the most responsibility at work had the highest levels of testosterone and low levels of cortisol. As the level of cortisol increased, the effectiveness of leadership decreased. Effective leaders, regardless of gender, were those with high testosterone levels who managed their cortisol to a low level. Nelson (2016) also suggested some steps that would enable people control their hormones (not the other way round) and find the right testosterone – cortisol balance. They include;

- Social skills like emotional intelligence and people skills that increase communication and collaboration. Social support and the hormones released when one feels part of a social group help reduce stress and cortisol levels.
- The power or super hero pose- standing tall, feet apart, hands akimbo and chest out - increases testosterone and reduces cortisol.

- Diet. Plant based diet; whole foods; diets with more of garlic and nuts and less of sugar and alcohol increase testosterone and reduce cortisol levels.
- Exercises of about 30minutes a day reduce cortisol and stress.
- Mindfulness or focusing on the present while ignoring stress and stressful events can reduce cortisol and make us more relaxed.
- Changing the manner of thinking and talking. Attitudes matter. The way people think and talk about stressful events can reduce or increase cortisol and stress. For example, seeing a particular situation as a challenge instead of as threat influences the way the brain sees it and how the body responds to it, less stressfully.

Leadership Behaviour

Many definitions of leadership exist. Leadership is influencing people towards achieving shared goals and values (Kuye 2010), and is more about what people do than whom they are. Leadership is also a process whereby an individual inspires a group of individuals to achieve an agreed goal. It is the process where someone is able to motivate and inspire others to follow them. Leadership expresses its skills through observable behaviours which lead to measurable outcomes. It is a set of behaviours used to help people align their collective direction, to execute strategic plans and to continually renew an organization, (McKinsey et al, 2022). According to Kruse (2013), these leadership behaviours are diverse but should maximize the efforts of followers towards the achievement of goals. In order to be an effective leader, a manager must influence his associates in a positive way, through behaviours to achieve corporate goals. Leadership behaviour encompasses the traits and characteristics that make leaders effective. A team of unnamed writers in the University of Minnesota described effective leadership behaviour in their open book, 'Organisational Behaviour' (2017). as 'what effective leaders actually do to be effective as leaders'.

Importance of Leadership Behaviour

Leaders should work to improve their own behaviour in order to perform better. Leadership behaviour helps to guide, direct and inspire the led. Leaders are to use their behaviour to share a vision, motivate others and increase their efficiency and effectiveness. Different researches have

conceptualized leadership behaviour from different angles; some of the various types or styles are listed below.

1. Two categories of leadership behaviours exist: task-oriented behaviours and people-oriented behaviours.
 - i. Task oriented leader behaviours- these include providing subordinates with instructions and directives to increase their performance, getting things done properly and achieving corporate goals. Task leadership is more related to leader effectiveness.
 - ii. People oriented behaviours are those behaviours that show concern for the wellbeing of employees and their work. People oriented leaders respect and care for employees; their decisions, actions and activities reflect these care and respect.

Both task -oriented and people- oriented leadership behaviours are relevant in organisations. According to Judge, Piccolo & Ilies, (2004), where leaders are people oriented, employees are more positive minded and satisfied with their work; but when they are task oriented, employees tend to be more productive. Furthermore, task -oriented leaders are more effective in small companies while people- oriented ones are more effective in large ones (Miles & Petty, 1977). Burnouts are higher in organisations with task - oriented leaders (Seltzer & Numerof, 1988).

2. Another focus of leadership behaviour is the decision making process. Three types of decision -making styles or behaviours were identified as follows:

- i. Authoritarian leaders make decisions alone, without involving employees
- ii. Democratic or participative leaders encourage employees to participate in decision making
- iii. Laissez-faire leaders provide only minimum guidance, and leave the employees to make decisions.

Which of the three behavioural styles is best? Research says it depends on the circumstances. Employees are more satisfied with their work when their leaders allow them to participate in decision making but the excellence of the decisions and productivity may decline (Miller and Monge, 1986). Democratic leadership is viewed most favorably by scientists in research organisations (Baumgartel, 1957), but workers in large workplaces, where opportunities for interaction are limited viewed authoritarian leadership most favorably (Vroom & Mann, 1960)

3. **Narcissism** is a characteristic of an excessive love and admiration of one's self, manifesting in arrogance, self – centeredness, egoism, grandiosity, entitlement and hostility. Narcissistic leaders have big belief systems and leadership styles and are generally motivated by their need for power and admiration rather than empathy. They are self-absorbed with a superiority complex and are great at accumulating power and influence and giving the illusion that they are the best for the job, (Gruda and Hanges, 2023). They are hostile and aggressive when criticized and validate their self-worth by denigrating others (Nevicka et al, 2018). Nevicka et al (2018) also called followers of narcissistic leaders 'victims' and 'audience- members' who may actually be abused.

Gruda & Hanges, (2023) believe "narcissistic leaders can be productive and accomplished over time but their need for continual admiration, acting in their own interest and putting the needs and interests of others at risk can destroy productivity, group morale and organizational culture". Other researchers think they are confident and extraverted (Smith & Foti 1998, Judge 2002), charming, humorous, charismatic and attractive (Gsvin et al, 2010) and leaders who engender a positive first impression (Black et al, 2010). Narcissistic leaders are seen as charismatic and easily rise to power but many of them have a long list of toxic characteristics; for example, they lack empathy and are exploitative, antagonistic, egocentric (Sedikides and Campbell, 2017) and aggressive (Park & Colvin, 2015). All these negative characteristics could make narcissistic leaders abuse power and adversely impact their followers. Narcissistic leaders easily externalize blame while accepting credit for the success of others (Stickle, 2003). They are also very exacting of others and expect them to be perfectionistic (Stoeber et al, 2015) and show unethical behaviour (Soyer et al, 1999.) Some narcissistic leaders are said to be pseudo- transformational because their inspiring transformational activities are self- serving (Bass & Steidlmeier, 1999) and not based on a connection between leader and the led..

4. Transformational Leadership behaviour. According to Burns (1974) transformational leadership occurs when 'one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality'. Transformational leadership according to Needle (2023) is a leadership approach that encourages and inspires employees to innovate and develop new ways of growth and achieving corporate goals. It is a leadership style that causes changes in individuals and systems and enhances the motivation, morale and performance of the followers. Northouse (2001) defines transformational leadership in two

different ways: i) as a process of changing and transforming individuals and ii) the ability to get people to want to change, improve and be guided , Some unnamed researchers at the Michigan State University (2022), summarized the traits of transformational leadership into the 4 'Is':

- intellectual stimulation away from fear and the status quo,
- idealized influence of the leaders as ethical and social models,
- individual consideration of followers to give them a feeling of 'ownership' and autonomy and
- inspirational motivation, passion and mission mindset.

Transformational leadership leads to performance that exceeds expectations. (Farnsworth et, 2023). Many forms of transformational leadership are wins for both leaders and followers. Pseudo transformational leaders are different from the real transformers. They maybe charismatic, visionary and influential but the focus is on the leadership, in a sort of cult personality (Newton, Pepper and Scoane 2023). Pseudo transformers are self- interested, self centred and may exploit employees to achieve their own goals. Visionary leaders like their transformational counterparts look into the future for new possibilities and motivate others to see and own the vision. But transformational leaders have an extra quality; they inspire the development of new ideas and nurture them into reality. Transformational leaders are empathetic and passionate; they motivate others towards corporate vision and mission through skills such as coaching and developing others to grow; encouraging people to think innovatively for effective problem solving; encouraging and inspiring others; acting ethically and with integrity.

5. Transactional leadership. Also known as managerial leadership, transactional leadership is the leadership style that relies on rewards and punishments to achieve optimal job performance from their subordinates, (Lutkevich & Pratt, 2022) Newton, Pepper and Scoane (2023) explained that transactional leaders focus on transactions, the transactions between getting work done and the goals and rewards and would not have exceptional performance. People need more than ordinary or average performance. The transactional leadership model is based on an exchange or a transaction; the leader rewards those who perform above a particular level and punishes those who

achieve below that level. It assumes that employees are not self-motivated and need structure, supervision and reward to perform well; workers will perform well for the pay or any other reward., (Lutkevich & Pratt 2022). Salient characteristics of this style are as follow: subordinates are not self-motivated; they are motivated by rewards and punishments and should be closely monitored and managed. Unlike transformational leaders who focus on individual and organizational growth, these leaders focus on short term achievement and establish criteria for success and then reward or penalize team members according to their performance. Transactional leadership is result-oriented and appropriate in a structured organisation where there are minimal deviations from defined processes and roles; and the goal is to complete specific tasks within a limited timeframe (Lutkevich and Pratt, 2022).

6. Servant leadership. Ehrhart (2004) defined servant leadership as one in which the leader goes beyond the financial success of the organisation but also focuses on the moral responsibilities to subordinates, customers and the corporate environment. This is in line with the what researchers at the American National Library of Medicine (2021) said; they described servant leadership as ‘a form of moral-based leadership where leaders tend to prioritise the fulfillment of the needs of followers, namely employees, customers and other stakeholders, rather than satisfying their personal needs’. In this servant-first approach, persons naturally decide to serve others before they aspire to lead to serve well (Greenleaf 1970). This is different from the leadership-first styles where people aspire to lead to meet power or material needs before trying to incorporate service into their leadership process. According to the American National Library of Medicine (2021) quoted earlier, servant-first leadership positively affects job satisfaction and organisational commitment. It shares power, cares for those being served to grow and be wiser, healthier, freer, more autonomous and to develop and perform as servant leaders themselves. This contrasts with the traditional leadership where leaders accumulate power. Greenleaf (1970) added that institutions, not just individuals, should also be servant leaders for a better society. The Young African Leaders Initiative (YALI, 2023) agreed with Greenleaf (1970) that great things are accomplished by leaders who put people first and went on to state salient characteristics of servant leaders like active listening, prioritizing responsibilities, ‘accepting others as they are and where they are’ without condoning disruptive behaviour or poor performance; empowering others to be wiser and to be servant leaders themselves. They also concluded that effective servant leaders should be good time managers, intuitive and able to use informed guesses to bridge the information gap for good

decision making. Good servant leaders foresee the future from the past and present; are not afraid of failure and will initiate a course of action and a vision for all to follow. while persuading and convincing others to achieve the vision. Servant leadership supports others, puts their needs first, practices honesty and high moral standards while discouraging knowledge hoarding (Zada et al, 2022).

7. Compassionate leadership. The uncertain and insecure nature of work and the world, especially after the repercussions of the Covid 19 pandemic, has refocused attention on compassionate leadership. It is seen as a solution to the ‘suffering, pain and toxicity’ of the workplace (Moss, 2021; Rao and Sutton, 2020). Compassionate leadership is the prioritization of people along with their output and placing importance on relationships. It is listening with understanding and responding mindfully with love, care, and selflessness in a caring and supportive organisation (Oruh et al, 2021). Banker and Bhal (2018) conceptualized compassionate leadership as a process of ‘noticing, feeling; sense making and acting’ by the leader to reduce the suffering of others...A compassionate leader is kind and has a genuine desire for subordinates not just to exist but to thrive. How effective is compassionate leadership? Researchers in Management Consulted (2023) stated that compassion in the workplace may make people take advantage of leaders and not take them more seriously but Ramachandra et al (2023) disagreed. They opined that it makes employees feel legitimized, elevated, more confident, more satisfied and more resilient. They also become compassionate to others, experience more positive emotions, feel more connected, become more cooperative and create an environment of corporate harmony and respect. (Lilius, 2013). Compassionate leaders are more trusted and rely on pillars of compassionate management like active listening and communication.

Limitations of the Behavioural Approach to Leadership

According to Nystrom (1978) research doesn't support that displaying either or both the task orientation and people orientation would make leaders more effective if they neglect the environments of leadership. They further argued that no particular behaviour works or fails all the time but that behaviours that yield effective leadership consider the size and nature of organisations.

2.2 THEORETICAL REVIEW

This section reviewed the theory by Chakravarty (2018) that hormones like Dopamine, Oxytocin, Serotonin, and Endorphins (DOSE), could help leaders to succeed at work. According to theorist, they are labelled 'happy hormones' because they induce a sense of pleasure, happiness and wellbeing in people and 'success hormones' because they stimulate optimism, energy, drive, confidence, better relationships and focus at work. The actions that trigger these happy or success hormones, according to the theorist, include, receiving rewards and appreciation, team work, social interactions, exercises, deep breaths and music. He also said that a change in our foods can change moods, for example, when people consume dark chocolates to increase the secretion of dopamine and serotonin; hot peppers to trigger endorphins, and caffeine and sugar to get dopamine.

The above theory by Chakravarty (2018) is applicable to this research. Some past and present attempts to cultivate effective leadership have had limited success (Anyaku, 2019; Ogbeidi, 2013 and Okurounmi, 2010). There is thus a need for a paradigm shift for better leadership behaviour. It is possible to improve leadership behaviour through the application of certain actions to trigger the happy and success hormones listed by Chakravarty (2018). These actions are also part of the positive leadership actions required by effective leaders. This research attempted to use the Chakravarty (2018) theory to test and recommend activities that would generate the DOSE happy hormones. These activities linked to hormones from our body chemistry are, essentially, effective leadership behaviour.

2.3 EMPIRICAL REVIEW

Aboiron (2022) studied 'Leadership Seen by Neuroscience'. The aim was to explain how neuroscience or a study of the brain and its neurochemicals could create a healthy workplace and be an effective management tool. Numerous works on how body chemistry and brain chemicals that affected leadership behaviour were reviewed. The results showed that leaders should individually and collectively stimulate employees to be creative, more focused and less stressed through activities that trigger the stimulation of oxytocin, dopamine and serotonin in the brain. A mixture of Oxytocin and Serotonin themselves, overcomes a toxic work culture and encourages leaders to delegate and empower employees with minimal stress because the leaders have a higher acceptance of failure. Dopamine can be stimulated where people lack vision and motivation to

make them more vision and goal oriented. Cortisol can be used to ‘push’ a workforce that is unmotivated.

Zak (2017) examined ‘Employee Engagement, the Neuroscience of Trust’, to identify neuroscientific strategies to boost employee engagement, retention and performance. The researcher applied oxytocin (through oxytocin nasal spray) into the brains of living human beings to prove it causes trust, an important element of leadership. Participants who received doses of oxytocin, more than those who received a placebo, doubled the amount of money they sent to strangers, an indication of trust. To prove oxytocin levels increased with trust, the researcher drew blood from people’s arms before and after they made decisions to trust others as senders or to be trustworthy as receivers. It was found that the more money they received (showing more trust on the part of the senders) the more oxytocin their brains produced. In addition, the more oxytocin the recipients produced, predicted how trustworthy they would be in sharing the money with others. It was also discovered that trust varies with individuals and situations- stress reduced trust while empathy increases trust. Zak (2017) recommended that managers should cultivate trust by setting clear directions, providing necessary resources and getting out of the way of the employees for them to perform effectively.

In ‘Happy Hormones at Work: Applying the Learnings from Neuroscience to Improve and Sustain Workplace Happiness’, Ghosh (2018) listed various activities and programmes that trigger the release of happiness hormones in the brain and maximise happiness in the workplace. The happiness – generating activities suggested by Ghosh (2018) include breaking down big goals into happiness generating smaller goals, listening to and making music, aromatherapy, exercise and meditation, adequate exposure to bright sunlight, an attitude of gratitude, laughter and humour, gifting and charity, handshakes and hugs, celebrations at work, social interactions, positive thoughts and affirmations and engaging in new and creativity activities.

Juhro and Aulia, (2018) studied ‘Transformational Leadership through Applied Neuroscience: Transmission Mechanism of the Thinking Process’. They explained a neuroscience based transformational leadership style in a volatile, unstable, complex and ambiguous world in order to achieve a ‘physically, emotionally and mentally safe’ state at work and encourage organisations to transform themselves. The authors then suggested an application of neuroscience in recruitment and selection, performance appraisal, training, decision making, visioning and goal setting,

leadership agility and adaptability. The study suggested more validation studies through medical brain-tests and executive brain assessment.

Yazdanifard and Zhe (2015) examined the ‘Neuroscience of Effective Leadership: Cultivation of a Healthy Corporate Culture through Neurochemicals’. They explained how body neurochemicals can help leaders develop a good corporate culture for increased productivity, higher profitability, a better-quality workforce, etc. The authors reviewed many related research works and concluded that neuroscience drives human behaviour and a healthy corporate culture. Specifically, they found out that a certain amount of dopamine and cortisol help leaders to push employees to be more attentive but excessive amounts lead to a toxic work environment. Where the work culture is toxic, neurochemicals like oxytocin and serotonin can be stimulated within the workforce to improve things; this mixture also motivates leaders to delegate in a way that reduces stress in employees. Oxytocin creates a feeling of trust and helps the organisation have a healthy work culture where visions and goals are understood and pursued. For an organisation that lacks vision and motivation, a little dopamine can be generated in the workforce by inserting manageable vision and goals. The study recommended that leaders should understand what is best for their organisations and see neurochemicals as work tools to balance employee wellbeing and corporate profitability.

Furthermore, Joseph et al (2015) in the work “Is a happy leader a good leader ...?” examined the relationship between the leader trait affectivity and several leadership criteria including transformational leadership and transactional leadership. The leader trait affectivity describes the tendency to feel positive emotions (trait positive affect) or feel negative emotions (trait negative affect). A literature search was carried out using PsycINFO (1887 -2014), ProQuest (1861 -2014), Google Scholar, and reference lists from reviews of emotions and leadership literature (e.g. Gooty et al 2010, Rajah et al 2011). . The results showed that,

- i) Leaders’ tendency to express emotions, particularly positive ones, plays a significant role in predicting leadership criteria’.
- ii) Leaders’ emotions, particularly positive emotions, play a critical role in leadership processes and group outcomes.
- iii) Leaders’ positive emotions are positively related to leadership criteria, whereas their negative emotions are negatively related to leadership criteria.

The researchers recommended that more work should be done on leadership emotions and processes.

3.0 METHODOLOGY.

The methodology adopted in the research was exploratory. This is because the study of the impact of body chemistry on leadership behaviour is evolving and lacks the volume and specific results in many other areas of management. In addition, the exploratory technique may not provide specific actionable findings but will give more insight and ideas about leadership and happiness and concepts for future research. (George, 2023)

Qualitative and quantitative exploratory strategies were used to answer the research question and achieve the research objective.

i. The Qualitative Exploratory Technique.

This secondary data collection involved a review and summary of literature on happiness generating body chemicals and what leadership activities and actions could trigger them in the workplace. An online literature search was done on ‘Google Scholar’ using the keywords, ‘body chemicals’, ‘happiness hormones’ and ‘leadership behaviour’ in order to identify studies on how body chemistry and body chemicals influence leadership behaviour. The main points of the studies were categorized into a) four main ‘happiness’ hormones and neurotransmitters that affect leaders and their functions and b) what leaders should do to trigger these happiness chemicals in themselves and others for effective leadership behaviour.

ii. The Quantitative Exploratory Technique- a Questionnaire.

A short online questionnaire of six items (Table 1) was designed on **Google forms** to answer the research question, “Does happiness influence leadership behaviour?”. The sixth questionnaire item was a repetition of the fifth. It was inserted to identify and screen off inattentive human respondents and automatic responses by online software or robots who normally give different answers to repeated questions. Such automatic answers diminish the accuracy and reliability of research findings.

Table 1: An Online Exploratory Questionnaire.

The following questions were designed to explore the link between happiness triggered by body ‘happiness’ hormones and leadership behaviour in the workplace. Please tick the space that most accurately matches your opinion and experience about each of the questionnaire items. One of the items was repeated to screen off robots.

SA = Strongly agree. A = Agree. N = No opinion. D = Disagree. SD= Strongly disagree.

	LEADERSHIP BEHAVIOURAL QUALITIES	SA	A	N	D	SD
1	Happy leaders are more effective listeners.					
2	Happy leaders are more creative.					
3	Happy leaders are less autocratic.					
4	Happy leaders are more compassionate to their followers.					
5.	Happy leaders have a better coaching mindset.					
6	Happy leaders have a better coaching mindset.					

Validity and reliability

The questionnaire had content and construct validity because it was analysed, proofread and approved by a globally acclaimed professor of managerial leadership. A valid questionnaire is always reliable (Roberts, 2021). Therefore, since the research questionnaire was valid, it was also reliable.

Sampling Technique

The research purpose and objectives were explained to Eighty (80) respondents who were selected, with their permission, from different WhatsApp platforms to complete the online research questionnaire. They were not selected randomly but judgementally and purposively because they had at least one year work experience and could objectively complete the questionnaire.

Questionnaire Administration.

The link of the questionnaire was sent through Google forms to the respondents on their WhatsApp platforms. They were from different towns in Nigeria, Canada and the United States of America.

Data Analysis

A Likert scale, with five response options of strongly agree, agree, neutral, disagree and strongly disagree, was used to determine the extent of respondents' agreement with five specific statements on the link between leadership behaviour and happiness. All the responses were coded as follows, to facilitate summation of the Likert scores, - strongly agree = 5, agree = 4, neutral = 3, disagree = 2 and strongly disagree = 1. The responses of all the respondents were valued and collated and the average rating was calculated by dividing the total numerical value of all the responses by the number of respondents. The average rating of between 1 and 5 was used to conclude on the link between happiness and leadership behaviour. In addition, bar graphs, mode and the percentages of responses on each of all the questionnaire items were calculated and applied to show the relationship or nexus between workplace happiness and leadership behaviour.

4.0. FINDINGS AND DISCUSSION.

Qualitative Analysis Results

The following happiness hormones/ neurotransmitters, their functions and how they can be triggered in the workplace were distilled from the literature consulted through Google Scholars.

	Happiness Hormones/ Neurotransmitters	Functions	Workplace Triggers
1	DOPAMINE (THE HAPPINESS HORMONE)	Controls our moods, attention and memory. It is released when we are rewarded or do things we like and are satisfied and motivated.	Carry out activities that give employees happiness including praises, exercises, natural foods, music, dancing, outings and recreation.
2	OXYTOCIN (THE LOVE HORMONE)	Increases trust, generosity, empathy and bonding. It	Workplace smiling, laughing, hugging,

		reduces stress and calms the nervous system.	holding hands and social eye contacts and conversation.
3	SEROTONIN (THE LEADERSHIP HORMONE)	Regulates our mood, sleep, digestion, brain function and feeling of wellbeing. It also makes emotionally stable, focused, and energetic. It reduces the stress hormone cortisol but boosts confidence, self-esteem and self-satisfaction	Counselling, adequate sleep, expressions of gratitude, outdoor exercises, good natural foods and meditation.
4	ENDORPHINS (NATURAL PAIN KILLERS)	Reduce pain, depression and stress and make us feel good and positive.	Fun activities like massages, aromatherapy, exercises, listening to music, social interactions dancing and natural foods.

Quantitative Analysis Results

Table 2: Questionnaire responses

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE	TOTAL COUNT
QUESTION 1	40	27	8	5	0	80
QUESTION 2	23	39	12	6	0	80
QUESTION 3	34	28	12	5	1	80
QUESTION 4	40	29	8	3	0	80
QUESTION 5	33	33	11	3	0	80

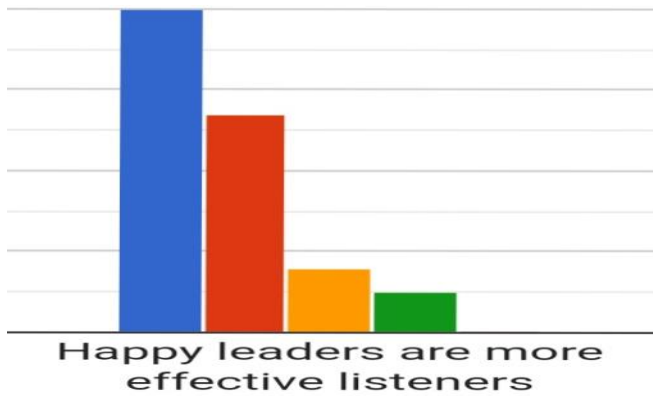
TOTAL PER RESPONSE OPTION	170	156	51	22	1	(400)
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Table 3: Responses to question 6 to check validity.

STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE	TOTAL
30	36	11	3	0	80

The following are graphical presentations of the responses to questions 1 to 5 from Google Forms (2024). The coloured bars denote different responses: blue – strongly agree; red -agree; pink-neutral; green- disagree and purple- strongly disagree

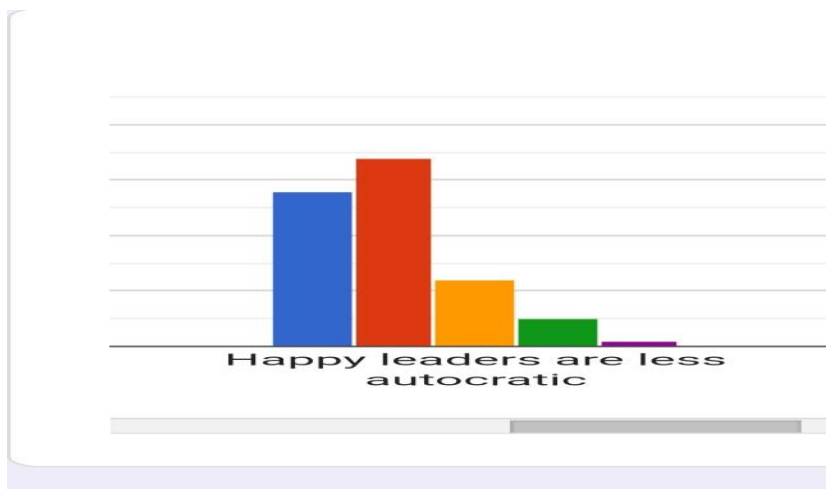
Graph 1 : Responses to ‘Happy leaders are more effective listeners’.



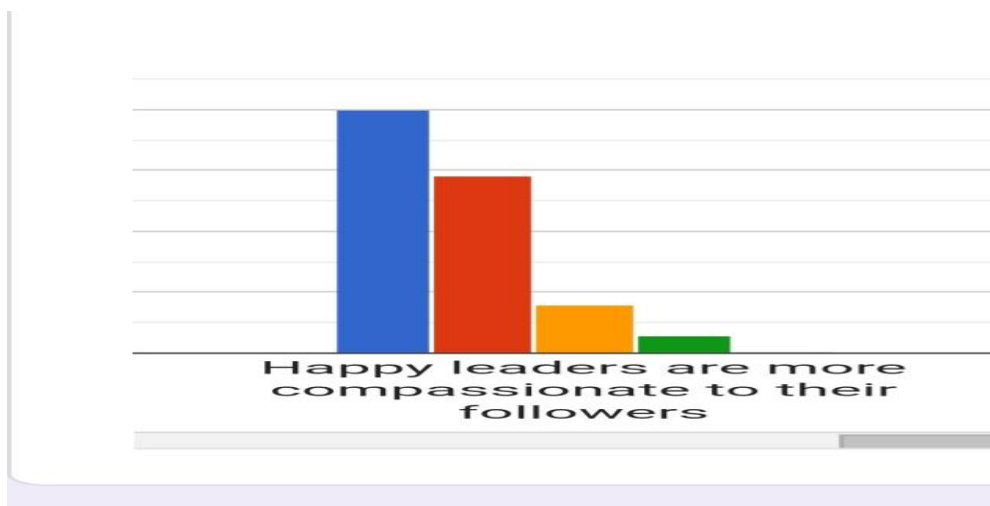
Graph 2: Responses to the item, ‘Happy leaders are more creative’.



Graph 3: responses to item 3, 'Happy leaders are less autocratic'.



Graph 4 – Responses to the item, 'happy leaders are more compassionate'





Graph 5: Responses to the item, ‘Happy leaders have a better coaching mindset’

Mode – a measure of central tendency

From Table 2 and graphs 1 to 5, the modal or most common response is 170 (strongly agree) followed by 156 (agree). The green bars (strongly agree) and the red bars (agree) were most prominent. It follows that, most of the respondents agreed that leadership behaviour and happiness were linked (Appendix 1)

Findings

a) The qualitative analysis through a review and summary of leadership and happiness hormone literatures found out that

- The human body has tissues inside and outside the brain that produce chemicals like dopamine, oxytocin, serotonin and endorphins when stimulated.
- These chemicals generate feelings of happiness and wellbeing.
- When leaders (and others) are made happy by this happiness – chemicals, their behaviors are positively affected. They (and others) become more motivated, positive, team minded, helpful, attentive and less stressful and frustrated.
- These enhanced factors are important leadership behaviours.
- Leaders should deliberately initiate behaviours and activities that will trigger happiness and wellbeing in themselves and others.

b.) The quantitative analysis of the online questionnaires concluded that leadership behaviour and happiness are related.

Discussion

According to this research, happy leaders make better leaders. Leaders who are able to make themselves happy and make others happy are more effective than those who can't. Activities that make people happy also make them more alert, more tolerant and less liable to stress, frustration and depression. Workplace well being and happiness increase factors that increase leadership effectiveness like a positive attitude, motivation, empathy, trust, generosity, focus, calmness and a higher brain function. Leaders should therefore be effective happiness generators and distributors or 'happifiers'. Since it takes two or more persons to be happy, a happy leader should make his followers happy. Happiness may not be a stand- alone condition for leadership effectiveness- it works best when linked with workplace motivators like fair rewards, humane policies and structures. Happiness without such linkages will thus be barren, hollow and ineffective. Does applying happiness activities at work mean that results, policies and procedures will be sacrificed on the altar of employee wellbeing? No. happiness generators are mere aids, contexts or settings for achieving objectives and not the main events. Happiness spices, flavours and seasons the main events. Too much happiness due to the overproduction of happiness hormones can be counterproductive. Any happiness above 7, on a scale of 1 to 10, may be too much and may lead to lackadaisical behaviour and laissez faire behaviours. Finally, happiness is not a cure -all for all corporate deficiencies but just one of the strategies for achieving stated goals. Leaders should therefore combine moderate happiness with other strategies. Happiness is more of a spice than a main ingredient of leadership. It flavours and seasons leadership.

5.0. CONCLUSION AND SUGGESTIONS FOR FURTHER STUDIES.

Conclusion

Chemistry and neuroscience have shown that when special ductless glands and other organs produce happy hormones and neurochemicals like dopamine, oxytocin, serotonin and endorphins, people become happy. These happy hormones are also important in corporate leadership. They make leaders less stressed, more humane, more human and more effective. Leaders are thus advised to apply happiness to lead better by initiating happiness generating activities.

Recommendations

- Leaders should always inject a dose or two of happiness into their leadership behaviours and activities to increase the stimulation of happiness hormones like dopamine, oxytocin, serotonin and endorphins.
- Happiness generating activities like outdoor activities, staff get togethers, team work, praise and appreciation; hugging and handshakes should be incorporated into effective leadership..
- Leadership training should incorporate happiness training to make leaders more happiness proficient.
- Conditions for leadership recruitment, selection, placement, evaluation, promotion and incentives should include how much happiness leaders can generate and distribute.
- Corporate structures, activities and policies should be regularly audited to note how much of happiness or stress they produce. The stress – generators should be minimized.
- The HR units should regularly organize outdoor activities, get- togethers and other activities that will increase the corporate happiness pool and reduce absenteeism, truancy, indiscipline and other symptoms of happiness deficiency.
- Finally, since happiness is destined to be the currency of success, organisations may need to have Happiness Officers at different levels.

Suggestions for further studies

Research on happiness and leadership behaviour is in its infancy and a lot still needs to be done. This research was exploratory and relied greatly on literature reviews and a short survey to suggest that the behaviour of leaders is linked to their happiness levels. More quantitative research is necessary to not only definitely link happiness with good leadership behaviour but to also quantify both leadership behaviour and happiness to enable us determine the quantity of happiness that produces a specific quantum of positive leadership behaviour or vice versa. Some scholars may need to also determine if there are gender and racial differences in the leadership behaviour and happiness linkage. Leadership stands on the two legs of leaders and followers. This research focuses more on the leaders. Does the happiness level of the followers matter in leadership? If the leaders are leading happily, does it matter if the followers are happy or not? These and other followers- based questions should be answered by more research.

Finally, further research should decide how much happiness boosts leadership. Too much may lead to lackadaisical and laissez faire behaviours while too little might lead to nonchalance and frustration.

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APPENDIX 1

Summations

Total number of positive responses (strongly agree + agree) = $170 + 156 = 326$.

Total number of negative responses (strongly disagree + disagree) = $22 + 1 = 23$

Total number of neutral responses = 51

Total number of all responses = $326+23+51 = 400$

There were 326 positive responses and 23 negative responses out of a total of 400.

At least 3 out of every 4 respondents positively answered the research question, 'Is there a relationship between leadership behaviour and happiness?'

Percentages

% of positive responses = $326/400 \times 100 = 81.5\%$

% of negative responses = $23/400 \times 100 = 5.75\%$

% of neutral responses = $51/400 \times 100 = 12.75\%$

% of neutral and positive responses = $51 + 326 / 400 \times 100 = 94.25\%$

Therefore, 81.5% of respondents positively answered the research question while 5.75% answered negatively.

Average score per respondent.

Total detailed responses from Table 4 were as follows: SA = 170, A = 156, N = 51, D = 32 and SD = 2

Given: the codes or points for SA = 5, A = 4, N = 3, D = 2 and SD = 1.

Then the total weighted score for all respondents will be =

$(170 \times 5) + (156 \times 4) + (51 \times 3) + (32 \times 2) + (1 \times 1) = 1692.$

The maximum score per respondent = $80 \times 5 \text{ points} = 400 \text{ points}.$

The average score for a respondent from the research is =

$1692 / 400 = 4.23.$

Using the codes, 4.23 is just above the 'AGREE' mark of 4.00.

This means that the respondents AGREED that there was a relationship between leadership behaviour and happiness.