



The Determinants of Leadership: Genetic, Hormonal, Personality Traits Among Sport Administrators

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ABSTRACT

The purpose of the study was to investigate the determinants of leadership, hormonal, genetic and personality traits among sports administrators.

Therefore, 24 sports administrators were the subjects of the study (4 for the pilot study). They were subjected to hormonal (serotonin), genetic (DuDR genotype) and personality traits IQ, trust, autonomy, initiative, achievement, identity, intimacy and donation. The results indicated the serotonin level was elevated and more concentrated than the average people, indicating higher intelligent and higher mood, as for DuDR genotype 10 contain (L/L) the long gene and 5 contain (L/S) genotype and 5 having the short gene, meaning a higher percentage, good selection of leadership (75%) As for the IQ and then personality traits, they were in the favour of the convenient selection of leadership, as they recorded a high degree in the test.

In conclusion, leadership may be determinant biologically and through personality tests.

Key Words: leadership, hormone, gene and personality traits

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INTRODUCTION

Present, conclusive evidence has obtained testifying to a significant contribution of hereditary factors to human psychological features, including personality traits. According to the results of psychological genetic research, heritability's of personality traits range from 30 to 60 %. Extensive study of genes of personality was associated with the discovery of genes encoding proteins with known function in the biochemical processes of the brain [1].

Leadership is defined as guiding individuals and groups toward their goals [2]. A well-known operationalization of leadership in sport is the multidimensional model of leadership [3]. Leadership behaviors can be assessed by

leadership scale for sports representing five dimensions of leader behavior: training and instruction, democratic behavior, autocratic behavior, social support and positive feedback.[4].

Recently, many researches think that leadership may be genetic as an example, John Raven[5] former CEO of GE, reported choosing leaders as a form of genetic selection, he is often asked whether leadership can be learned or within it comes in genes. He added that IQ, intelligent quotient and energy level are probably innate (genetic), but self-confidence is learned from environments such as the family, school, and others, but he added that it is all innate (genetic). If one is born leader, he will seek out experiences that help him

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to develop. He will fill energized when things go well in their development. He also added that if you are born with raw leadership ability, your early experience will serve to help you understand it, exercise it, come to terms with it and fine tune it.

An important question has been pursued for decades, what are the determinants of leadership in work and organizational setting?

A variety of constructs and predictors have been cited as determinants of leadership including general intelligence, personality, values, genetic factors and hormones specially neurotransmitters hormones.

Manal, S[6] present the results of their meta-analysis, the results showed that personality variables are consistently and reliably correlated with leadership emerge and leadership effectiveness.

Chan, D[7]. reported the importance of cognitive personality and motivational constructs as related to leadership. Ambroio[8]. proposed an expanded model of genetic influences on work related variables including leadership, as mediated by personality and chemical factors as hormones and blood sugar, physiological factors in height, weight, gender, together with psychological factors including perception, attention and values.

Hui, M, Meng, T, LI, Y[10]., reported a study that represents an attempt to relate supervisors big five personalities to the leader performance. Data were collected from supervision of 72 companies in three provinces in China. The results of Exploratory factor analysis (EFA) and reliability analysis show that the construct validation and reliability of the scales are good. The five-factor model is composed of neuroticism, extraversion, openness to experience, agreeableness and conscientiousness.

The results of correlation analysis show that the big-five personality traits are related with extra effort, job satisfaction, organizational commitments and leadership effectiveness assessed by their supervisors.[1].

Radeket al, Ball et al.[38], Ernest Noble et al., [20] and Benjamin et al,[16] They reported that Neurotransmitter genes(D4Dr) are among key candidates for evaluation in complex behavior since dopaminergic system has received a great deal of attention as a large body of knowledge implicates this system in brain reward mechanism.

Arai [13], Ugrumovet al.[43] added that dopamine receptors are implicated in many biological and neurological process, including cognitions, memory, learning and motors control, as well as modulator of neuroendocrine signaling and thus are connected to many normal and abnormal disorders [21]

Fox et al.[23], Swanson et al.[42] reported that D4Dr gene may play some roles in the deregulation and disinhibition to cognitive and behavioral responses to stimulation when dopamine release is abnormal

In normal cases dopamine has been implicated as a major neurotransmitter involved in Euphoria and approach and reward seeking behavior and people

with the long D4DR version are likely to be active and reactive.

Anna Derberet al. [12] stated that D4DR (7R) allele accounts for associated with risk talking and allele is associated with migration and male competition both of which entail an element of risk.

Remus et al.[39] investigated the extent to which differences in the likelihood of emerging as leaders are explained by genetic differences between individuals. They come to conclusion that approximately 17% of the variance in the latest construct of leadership emergence is explained by genetic effects that are mediated by intelligence and the big five personality traits, the heritability estimate obtained in the study represent a bound estimate of the genetic influences on leadership.

Aim of Study

This study investigated the influence of genetic and hormonal and personality traits on leadership among sport administrators.

Research Hypothesis

It is hypothesized that the genetic and hormonal and personality traits might influence leadership among sport administrators.

Research Procedures

Research method: the researcher used the descriptive experimental method due to its suitability to the nature of the study.

Research Sample:

24 sport administrators were chosen from Suez Canal province to participate to the study, (20) administrators for the main study and (4) for the pilot study. The main study was performed in July 2017.

Table (1) Homogeneity and equivalence of sample

Variable	Mean	±SD	Skewness
Age(y.)	54	2.91	0.62
Height(cm.)	172.2	3.3	0.17
Weight (kg.)	75.6	3.5	51

Table (1) reported that skewness was between (+3) indicating homogeneity of the sample.

Data collection tools:

- Height using restameter.
- Weight using Medical scale
- Siringes for blood sample
- Test tubes containing anticoagulant(EDTA)
- Coleman+ice for sample blood separation
- DNA and gene determination using thermal cyler, polymerase chain reaction for D4DR using the method of Lichteret al. (1993) primer for D4DR
- Forward primer 5 - 3 TGCCCTC AACCCATC ATCTACAC
- Reverse AATACTTCCGACCCCAACCCT



The number of repeats was determined using electrophoresis through 3.5% agarosegelandethidium bromide staining.

Genotypes were classified, short s/s with 2-5 repeats, long (L/L) (L/S) with 6-8 repeats.

Determination of personality traits (CPM) colored progressive materials for (IQ) by John Raven (1956) is a cross cultural test of different environment and culture based on spearman theory saturated with general factor.

Test composition

The test was composed of 3 groups

Group A: success depend on the ability of person to complete a continuous type, at the end it is changed from one direction to two at the same time.

Group AB: Success depend on the ability of person to perceive the shape separated in a whole type depending on locus correlation.

Group B: success depend on the knowing of the person to the base that govern the change of shapes related to the place using his thinking.

The plates are colored to attract the attention of the tester.

The tested begins with shape A, and put the figure on the right shape, then to shape A2, A3 till A 5.

The tester must take his time to respond to the test.

IQ calculation

After determination of the grade, there are other steps, that correlate with the suitable age, then IQ determination.

The test is composed of (36) colored matrices and 6 subdivisions in different colors and stripes or dotes.

For personality determinations:

Erikson, Eh life cycle international after Sami Melhem[41]P.416-418

The variable of test

- 1- Trust
- 2- Autonomy
- 3- Initiative
- 4- Achievement
- 5- Identity
- 6- Intimacy
- 7- Donation

Validity and reliability of the tests indicated the validity and reliability of the tests of high level.

Also, serotonin hormone was determined using special commercial kit in clinilab using Elisa technique by DRG Int. USA.

Statistical data analysis

Using (SPSS) including

- Arithmetic Mean.
- Median
- Standard deviation
- Skewness

P< 0.05

RESULTS

D4DR genotype indicated 5 short allele (s/s) 10 long allele L/L, and 5 long allele L/S that the majority of 75% of long L/L, L/S allele and minority of 25% s/s short allele.

Serotonin hormone detected was higher than the average level (80 ng/ml). amongpopulation.

Table (4) indicated that the participants of the study attended a high point in IQ and different personality traits.

Table (2) The number and percentage of D4DR genotype of the sample

Genotype	Number	Sex	Percentage
Short allele s/s	5	Male	25%
Long allele L/L	10	Male	50%
Long allele L/S	5	Male	25%

Table (3) indicated serotonin hormone as detected by Elisa technique among sport administrators.

Variable	Mean	±SD	Skewness
Serotonin ng/ml	194±13	21.7	1.813

Table (4) indicating statistical analysis of IQ of other personality traits of the sample

Variables	Arithmetic mean	±Standard deviation (SD)	Skewness
IQ	31.3	3.7	0.892
Trust	32	3.9	0.961
Autonomy	23.2	3.8	0.227
Initiative	26.4	3.6	0.341
Achievement	30.5	3.3	0.726
Identity	52.1	6.4	1.326
Intimacy	24.7	3.1	0.159
Donation	35.8	4.1	0.988

DISCUSSION

Manal El Shafee[6] estimated the genotype and hormone together with personal traits of the sport leaders of Egypt(39) leaders of different institute and achieved among sports success, Manal El Shafee reached the conclusion that there is a relationship between IGF2R gene and serotonin hormone and personality traits in leader persons .

Yasser Shaaban[44]determined the biological and psychological of leader personality in sport activities and reach the conclusion that the long version of D4DR genes may donate leader person as there are correlation between the gene and psychological traits studied.

Matt Ridely[36] reported that in D4DR in its middle repetition between 2-11 repetition in the majority of cases 4-7 repetition, some of us have the short repetition(2-4 R) and others (6-8 R), the more the repetition the less the catch of dopamine in the receptors, and less response to dopamine in some areas in the brain which let these people seeking novelty to reach the high level of mood, in this case they search for competitor sports and adventures which those having the short gene(2-4R) respond highly to dopamine.

In the data reported in table (2) there are 15 administrators processing the long gene D4DR (L/S) , (L/L) meaning they seek competition in sport or in life



and the other 5 administrators possess the short gene (s/s) D4DR meaning they refrain competitive sport and don't seek competition in their special life.

The data presented for D4DR gene genotypes for short(s)gene with 2-5R repeat ion and long (L)gene with 6-8R repeats indicated that 15 subjects participating to this research genotype D4DR genes (S/L) and (L/L) this means composed of 6 to 8 R repeats and possess the long gene which indicates that the selections of the subject as leader in the sport administration was the right choice. AS for (5) subject's short genotypes was not the perfect choice.

D4DR gene release the neurotransmitter Dopamine which relay in movement, also its role affects human action of pleasure and motivation and controls the flow of information from other areas of the brain like the cerebral cortex and limbic system.

Matt Ridley [36]reported in his book the genome autobiography of a species that there are different genes affecting the personality of the persons, that the idea that the gene and indeed life itself consists of digital information. Also, the story of Robert Plomin search for genes that influence intelligence, told by Rosalind Arden [40]. The report of Haier [29] about intelligence and changes in regional cerebral glucose metabolic rate following learning. Also,Chorney and Plomin [19] are stating about a quantitative trait locus associated with cognitive ability of children. All these researchers recorded the role played by genes such as IGF2R and D4DR in the heredity of intelligence and leadership through the functions of neurotransmitters hormones.

Serotonin and dopamine forming the personality of different individuals they work as chemical stimulators of the brain. Matt Ridley [36]added that the chemical brain of a person is determined through the social signals which affect that person and biology affect the character and biology itself is determined by the population meaning that all the above mentioned from genes,hormones,behavior and population are working together forming the personality of the human being Martin,1997[35].

Table (3) revealed a higher concentration of the participants of the research compared to the mean concentration (194+13) ng/ml, the mean concentration (30-200) ng/ml is 80 ng/ml.

The higher level of serotonin concentration (194+13) ng/ml compared to mean concentration of 80 ng/ml may be due to the practicing physical activity in the past as the participant was champion in different athletic activities, as physical practicing increased serotonin concentration Manal El Shafe [6]

Matt Reidly[36] reported that serotonin physiological limit decrease depression and render ordinary people to optimistic one, that serotonin is able to improve the mood of the person and the subjects obtaining higher level of serotonin might be smarter and more intelligent.

Heshmat and Abdel kafi[30], concluded that the sport leader must possess many characteristics included to be patient,respensible,intelligent,and to be the brain

thinker. They also added that the leader persons possess a higher concentration of serotonin in brain than the normal person. Also, serotonin report the case of the person and his relationship to his surrounding and reflex his self-image. ChatlerJea and Shinda[18]showed that the influence of serotonin affects the brain locally as serotonin can't escape the brain barrier of the blood and the more the secretion of serotonin in the blood the more the person possess intelligence.

Guyton and Hall [28] reported the mechanism of action of serotonin as serotonin is secreted in the brain, it induce a state of excitation to the synapses, and some receptors in the brain which stimulates leading information of (CAMP) which stimulates protein ,leading to stimulation of the protein which open and close the gates of potassium in nervous centers, leading to passage as increased potassium passage increase action potential of the nerve cells , increase the knowledge through nerve cells leading to refreshing the memory and increasing intelligence in the brain of the person [25]

The serotonin which is a neurotransmitter is a hormone that affect and regulate behavior in human, also serotonin is important factor in including the general intelligence and there are individual variation in the concentration of serotonin in different subject Chatter Jea and Sinde[18] reported that the tryptophan an amino acid is the basic nucleus of serotonin and the use of tryptophan which is related to the sweet substances and the increase of insulin level due to the high glucose level, insulin in turn help the reaching of tryptophan to the brain and help in formation of serotonin which help the mood and activity of the subjects.

Guyton and Hall [28] stated that serotonin is a neurotransmitter that act as inhibitor of pain pathways in the spinal cord and control the mood of the person, and also may cause sleep.

Guyton and Hall [28] added that diminished activity of serotonin might cause depression as it is presumed that the serotonin system normally provide drive to the limbic area of the brain to increase a person sense of well-beingto create happiness,contentment,good appetite and psychomotor balance,also pleasure and reward centers receive large numbers of nerve endings from serotonin systems [35]

The meaning the serotonin affects personality in different ways and is of importance for the health and mind of the persons.

Franco Viviani [24] reported that serotonin affect psychomotor balance, together with the central motor system, the motor cortex modulates the activity oof the lower levels, organizes complex acts and the execution of precise movements(Ghez and Krakeur[26]) other structures, such as cerebellum and the basal ganglia donate procedure directly motor activity, but modulate the activity of the cortex and brain stem motor system and therefore they are needed for posture and agility, so serotonin play an intense role in the behavior and psychomotor system

of the athletes and important to study its effect from psychological and behavioral direction of sport participants and administrators.

Table 4 indicating statistical analysis of some personality traits of the sample they are I Q, and others all these personality traits are biologically related to the leader specially in case of high moved state which is involved due to the high serotonin concentration also serotonin has a positive impact on the other personality traits as: trust, Autonomy, initiative, achievement, Intimacy, Identity, and donation all of which are interrelated and are good characters and help to highlight on the leader and in turn affect positively on follower to have a great respect to their leader. (Andrew [11], Ambroio, [8])

Data presented in Table (4) indicated that the participants in this study, were tested by (CPM) Colored Progressive Matrices, for general intelligence (IQ) prepared by John Raven which appeared in year (1947) for the first time and reorganized in year (1956), the test was prepared and developed in (30 years), which is a cross cultural test fit for different environments and cultures, to have a complete picture of the brain activity and spearman found this test well saturated. The results of the sport managers were a good one, indicating a high level of general intelligence (IQ), as the majority of points were over 75-80 %.

Different studies used intelligence test in relation to leadership with other personality tests including (Fiedler [22], Remus et al.[39], Johnson et al.[33]).

As the researcher found a relationship between leadership and personality trait and intelligence in proportional degree, as the leader can't fulfill his requirements and continue his way in leadership without many good personality traits including intelligence as the intelligence trait is one of the most important trait to guide the leaders and followers.

Table (4) revealed a high points gathered by the sports administrators in the tested personality traits IQ, trust, Autonomy, initiative, achievement, identity, intimacy and donation. That mean that the leader who is gifted by the right gene and hormone may benefit of this by acquiring the right personality trait fitted with his role in the society and organization that he leads, to be trustful, autonomy self dependant, initiative and have a lot of achievements that give the reason to lead and let others to follow him. Also, he must have his own identity and is not stimulated by others and finally to donate to be a good partner to his follower with these agreeable trait, he will continue his message. This is in accordance with Benjamin et al.[16], Golimbet et al.[27], Manal El Shafee[6] she reported that the common trait between leaders is to stimulate others to reach their target, and the leader that can stimulate can also reach a lot of success and achievements as to change is the accurate aim of the leader, as most of the change to the better need development of the actual situation, so the leader can develop new point of views to the followers and direct them to achieve the target[15]

Research reported that those having a high IQ are more able to utilize glucose in their brain.

Haier [29] agree that intelligence is related to glucose metabolic rate

Chorley et al.[19] reported a quantitative trait associated with cognitive ability in children.

Matt Ridley [37] added also that the French scientist Alfred Binet, stated that the propose of the IQ tests, wasn't as a benefit for the gifted children, but to give attention to the children which are less gifted.

Heshmat, Bahi and Amin [1] stated that intelligence is what is tested by intelligent tests, they added that intelligence is the power that permit us to think in picture or figure and to redistribute the thinking.

From the previous discussion " The hypothesis that the genetic and hormonal and personality traits might influence leadership among sport administrators has been realized.

CONCLUSION

It may be concluded that leadership among sport administrators may be determined by genes as example D4DR gene and others, also through hormone as serotonin and personality traits such IQ, trust, Autonomy, initiative, achievement, identity, intimacy, and donation.

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