

THE INFLUENCE OF PERSONALITY TRAITS ON EFFECTIVE LEADERSHIP: THE ROLE OF DOPAMINE

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ABSTRACT

Personality is one of the key factors for an effective leadership. Personality is determined by the relationship between genetic and environmental factors. Moreover, one of the key determinants of leadership behavior is personality. For the leadership behavior the key genetic factors are midbrain dopamine (DA) neurons, whilst the key environmental factors are family, education, experience etc. Dopamine a secretion of the midbrain dopamine neurons affects wide spectrum of individual behaviour ranging from attention to motivation and motor control. This review focuses on how both midbrain dopamine neurons and environmental factors shape leadership behavior.

Keywords: *Personality, Leadership, Dopamine, Genetics, Behaviour*


KİŞİLİK ÖZELLİKLERİNİN ETKİLİ LİDERLİK ÜZERİNDEKİ ETKİSİ: DOPAMİN'İN ROLÜ

ÖZ


Kişilik efektif liderliği etkileyen anahtar faktörlerden biridir. Kişilik çevre ve genetik faktörleri arasındaki ilişkiden meydana gelir. Dahası lider davranışlarının üzerindeki en önemli etkilerden biri kişiliktir. Kişilik davranışları için önemli olan genetik faktörler, orta beyin dopamin nöronları iken, anahtar çevre faktörleri ise aile, eğitim ve tecrübe vs.dir. Dopamin, orta beyin nöronları tarafından salgılanır, bireylerin dikkatten, motivasyona ve motor kontrolde kadar olan davranışlarına etki eder. Bu literatür taraması orta beyin nöronlarının liderlik davranışlarına nasıl etki ettiğini inceler.

Anahtar Sözcükler: *Kişilik, Liderlik, Dopamin, Genetik, Davranış*


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INTRODUCTION

Personality is one of the main factors impacting leadership effectiveness (Judge, Bono, Ilies and Gerhardt, 2002; Mandell and Perwani, 2003; Cavazotte, Moreno and Hickmann, 2012; Colbert, Judge, Choi and Wang, 2012). Two main factors create and shape individuals' personality: genes (biological factors and heredity) and environment. Environment consists of family, education, experience etc. The other fundamental factor is heredity such as midbrain dopamine (DA) neurons. Heredity studies discuss the various effects of genetics and biologic factors on personality traits. The role of genes on behaviors is fundamental for leadership. In that the dopamine's effect on personality has recently received more attention from scholars. Recent studies on dopamine found that it has a very strong genetic background and consequently is expected to be influential on personality traits (Dragan and Oniszczenko, 2007). Midbrain dopamine (DA) neurons have a crucial effect on variety of behaviors, such as support, control of motor functions, motivation and attention. DA secretion is regulated by several factors and its deregulation is known to results in numerous psychiatric effects, such as attention deficiency, impulsivity and addiction (Faure, Tolu, Valverde and Naude, 2014).

Recently scholars' attention shifts to the role of genes play on personality traits and how this role impact and manifest itself on peoples' behavior. Consequently, this is expected to be influential on the leaders' behavior. Leadership effectiveness depends on many different criteria including, cross-cultural competences (Caliguri and Tariq, 2012), personality (Goff, Goldring and Bickman, 2014; Caliguri and Tariq, 2012), political skills (Brouer, Douglas, Treadway and Ferris, 2012), leadership style (Clarke, 2014) and organizational culture (Toor and Ofori, 2009). In various studies it has been found that the personality characteristics are related to effective leadership (Kirkpatrick and Locke, 1991; Bono and Judge, 2004). Above all, in general leadership trait theories associate leadership effectiveness with leader's personality (Judge et al., 2002). This chapter will have a look at how dopamine affects leaders' personality traits and how these effects would have an impact on leaders' effectiveness and the relationship between leaders and followers.

What is Personality?

Personality can be described as sum of individuals' reaction and interaction with other people. It is a dynamic growth of a person's whole psychological system through experiences and a life cycle (Robins, Stephenson and Judge, 2012). The term offers an explanation for the concept of human being psychology. Personality itself is a construct that compromise different factors including; habit hierarchies, anxiety, ego, needs and motivations and complexes. Personality and behaviors are two different constructs (Mitschel, 2013).

It is an intriguing questions in the personality research that whether genes or environment has more power on personality. Scholars recently come to a consensus that both could be equally important. It should be noted that the individuals' personality changes and develop through time, as experiences and environment play a significant role during the life cycle of human being. However, human beings inherit certain personality characteristics. For example, it has been found that genes play significant role on the substance use disorders or personality traits such as, neuroticism, agreeableness and adaptive personality (Belcher, Volkow, Moeller and Ferré, 2014; De Brabander and Declerck, 2004; Kotyuk, Duchek, Head, Szekely, Goate and Balota, 2015).

Personality research historically focused on manifestation of personality traits within behavior. It was a wide belief among scholars that the personality does not change with circumstances. This was the main assumption of psychodynamic theory that personality is inherited and environment does not interfere with it. According to the theory individuals have a stable core personality that disguises itself but enforces individuals to behave in certain ways (Mischel, 2013). However, trait theories discuss that traits are influenced both by environment and genes. Therefore, they are not static but evolve and substantially change individuals' personality through a human being's life.

Personality Traits

Personality traits could be defined as "enduring patterns of thoughts, feelings and behaviors that distinguish individuals from one another" (Roberts and Mroczek, 2008). The term explains the differences between characteristic and observable behavior of two or more individuals within described limitations (Belcher et al., 2014). The most important aim of the trait approach is to identify personality of individuals and compare their traits to other people and group members. The most

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common model of trait is called the big five personality traits-encompassing extraversion, agreeableness, openness, conscientious and neuroticism. The aforementioned big five personality traits also known as OCEAN model are the dominant model of personality traits (McCabe and Fleeson, 2012).

Trait theories of leadership offer an explanation to the questions that why people act the way do when they become leaders (Yukl and Van Fleet, 1992). Two main sources of the personality traits are determined as genes and environment (Krueger and Johnson, 2008). After a long discussion over whether a personality or environment enforce more power on the behavior recent studies tend to come to a consensus that behavior vary through ages and different circumstances. If a person's behavior is different from year to year that could be because of him/her changing life experiences (Judge, Simon, Hurst and Kelley, 2014).

The aforementioned traits are influenced by parental behavior and investment in education (Almlund, Duckworth, Heckman and Kautz, 2011). However, there is an argument that sometimes it is difficult to observe personality traits' influence on behaviors (McCabe and Fleeson, 2012). It is possible individuals can change traits well into adulthood (Almlund et al., 2011) and this could be through experiences or biological ages of individuals and this process can be quite substantial and consequential (Roberts and Mroczek, 2008).

Recently, the scholars are also defined the dark side of personality and one of the main form that called as the dark triad of personality - machiavalenism, sub-clinical psychopathy and narcissism. This is perhaps one prominent development for personality traits as traditionally big five personality traits tap rather the bright side of the personality (Paulhus and Williams, 2002; O'boyle, Forsyth, Banks and Mcdaniel, 2012). Therefore, the dark side of personality enhances the understanding of the destructive or perhaps toxic behavior of leaders.

The impact of big five on job performance is not entirely clear. Some scholars suggested that the concept is not a good model for predicting work related performance –as it is broad (Hough and Oswald, 2005) some others discussed that it has a direct influence as a model (Stewart, 2008) and one group claimed it is a broad concept and individual traits have different effects (Tett, Steele and Beuregard, 2003; (Tett and Christiansen, 2007). In that adaptive performance is related to emotional stability and openness. Davis-Sacks (1990) found that the

teams were careless and misses deadlines when they exhibit lack of conscientiousness. There is also a relationship between effortful control and agreeableness and conscientiousness (Jensenn-Campbell et al., 2002). Grijalva, Harms, Newman, Gaddis and Fraley, (2015) found that narcissism may have positive effect on leadership emergence if the leaders have high extroversion.

There is no consensus in the related literature that whether the big five trait model should be discussed as a unify model or each trait should be discussed individually. Perhaps, in order to clarify the concept there should be a deeper examination of each trait individually. Therefore, the following section will provide explanation for each individual trait.

Neuroticism

It could be described as being emotionally stable. People who are high on this trait could show emotional instability, moodiness and sadness. People who are low in this trait could be described as emotionally stable and resilient. The trait neuroticism may cause some personality disorders such as being moody and anxious (Barlow, D. H., Sauer-Zavala, Carl, Bullis and Ellard, 2014). For both neuroticism and extraversion moderate heritability factors are reported. Heritability is one of the strongest predictor of neuroticism. In that it is estimated from somewhere between 13 to 58% (Vinkhuyzen, Pedersen, Yang, Lee, Magnusson, Iacono and Payton, 2012).

Extraversion

Extraversion is acting and being extroverted. Extroverted people are assertive, social and talkative. Individuals with high extraversion tend to be lively, warmth and positive. A person who shows low extraversion is less sociable and has difficulties to socialize with others. One of the most related facets of extraversion to leadership is assertiveness. It is found that this trait would be related to positive job performance if a person high in extraversion and employed in certain departments (e.g. sales). Furthermore, this trait is a very strong and consistent predictor of leadership (Blickle, Meurs, Wihler, Ewen, Merkl and Missfeld, 2015).

Openness to Experience

This trait represents peoples' characteristic in terms of being creative, adventurous and open to new experiences. People who are low on this trait tend to be more traditional. Individuals with a high openness

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to experience are ready for new exploration and experimentation and they are actively seeking new experiences. The term is positively correlated with creativity and innovation (Baer and Oldham, 2006) and most closely related to creative achievement. There is a correlation between heritability and openness to experience. It is found that there is a significant genotype influence of the NEO PI-R on "Openness to Experience" (Peciña, Love, Wang, Langenecker, Hodgkinson and Stohler, 2013).

Agreeableness

The trait describes personality dimensions including trust, kindness and affection. Some scholars discuss that the term is linked to social conformity and social desirability concerns processes (Paulhus and John, 1998). The term means to be warm, cooperative and pro-social. The individuals with high agreeableness desire to maintain harmonious social relationship. Agreeableness represent individuals struggle to maintain good relations with others. The low score of agreeableness found to cause increase on rejection sensitivity. People with low agreeableness also have more antisocial behavior (Laursen, Pulkkinen and Adams, 2002) and experience difficulties to adjusting into social environment (Laursen, Hafen, Rubin, Booth-Laforce and Rose-Krasnor, 2010). Perhaps, more important than the rest the low agreeableness causes negative implications for interpersonal adjustments (Wang, Hartl, Laursen and Rubin, 2017).

Conscientiousness

The trait represents individuals' attention to detail and how individuals are organized in their work activities. People who are high on this trait are good at goal-oriented focus. Individuals high with conscientious tend to be more goal-oriented, easily follow the rules and norms and they are also persistent and thorough (Bogg and Roberts, 2013). It is discussed that the term is the best predictor of work related performance among the big five personality traits (Blickle, Meurs, Wihler, Ewen, Plies and Günther, 2013). People high on conscientious become rather more competitive –as they are goal-oriented- and therefore they perform far better than the people who are low on this trait (Marinova, Moon and Kamdar, 2013). It is reported that the low conscientiousness is also associated with drinking problem and depression (Settles, Fischer, Cyders, Combs, Gunn and Smith, 2012).

Personality traits would have different effect on individuals' behavior. The aforementioned model provides an opportunity to see how individual traits manifest themselves within behavior. It is quite substantial and difficult to understand the traits' manifestations within behavior. However, if it could be achieved that would be helpful to identify effective leaders' personality characteristic. It should be noted that the part of leadership personality qualities stems from heredity. Therefore, such traits cannot be changed or evolved.

Dopamine's Effects on Personality and Big Five Traits

Dopamine's effect on behaviors range from awareness of surrounding to help to regulate of motor functions. Therefore, dopamine receptor genes are majorly involved in cortical processing and dopamine-related changes in brain activity. One of the dopamine-related personality effect is novelty seeking (Ebstein, Novick, Umansky, Priel, Osher, Blaine and Belmaker, 1996). Moreover, recent genetic polymorphism studies drawn attention in the effect of dopamine on regulation of extraversion in African American population (Bookman, Taylor, Adams-Campbell and Kittles, 2002). Hence, scholars now focus on regulation of some human behavioral traits specifically big five such as extraversion, sensation seeking by dopamine.

How Does Dopamine System Works and Effects Personality (DA)?

Various studies have shown that dopamine system has different effects on personality and personality traits such as awareness and reward dependence. DA secretion is regulated by several factors and its deregulation is known to results in numerous psychiatric effects, such as attention deficiency, impulsivity and addiction (Faure et al., 2014).

DA systems emerge from ventral tegmental area (VTA) and from the substantia nigra pars compacta (SNc) and extend to the ventral and dorsal striatum (mesostriatal pathway) and to the prefrontal cortex (PFC, mesocortical pathway). Studies showed that DA systems exert a motivational aspect in behavioral control (Berridge, 2012; Montague, Hyman and Cohen, 2004; Schultz, 2006). Specifically, dopamine in SNc has a crucial role in positive reinforcement related to learned behavior besides settled stimulus response habits (Meyer, Yoshikami and McIntosh, 2008). A patterned spontaneous firing activity is employed by Midbrain DA neurons that continuously oscillate between two distinct rhythms: a tonic mode with a reluctant periodic single-spike firing and a

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phasic mode with a bursting action (Grace and Bunney, 1984a; 1984b). Whilst DA tonic neuron firing is resulted by a decreased DA release, phasic firing is stimulated by increased DA release.

Activity and Functions of DA

DA release is associated with previously mentioned tonic versus phasic dynamicity of DA cell activity, which forms the baseline of the suggested functional and cognitive activities in DA signaling. Dysregulation of this system results in severe pathological conditions and addiction (Berridge and Robinson, 1998; Grace, 1995; Schultz, 2007). Burst firing mode which leads to DA secretion of significantly higher volume than regular spiking into (Ventral striatum) the nucleus accumbens (NAc) encourages appetitive and goal-directed behaviors (Gonon, 1988; Montague et al., 2004; Schultz, 2006; Tsai, Zhang, Adamantidis, Stuber, Bonci, De Lecea and Deisseroth, 2009), unpredicted rewards and prediction of a reward (Dayan and Niv, 2008; Schultz, 2007). Researchers also revealed the association between bursting activity and flaws in reward prediction, which are the inconsistency between the reward actually obtained and its prediction by the subject. These flaws in reward prediction are assessed by the distinction between activation initiated by the actual reward and restriction triggered by the reward prediction (Schultz, 2007; Dayan and Niv, 2008).

Aside from appetitive events, recent studies showed that DA neurons are as well responsible from non-rewarding, aversive and alerting situations (Brischoux, Chakraborty, Brierley and Ungless, Magill and Bolam, 2009; Bromberg-Martin, Matsumoto and Hikosaka 2010; Lammel, Ion, Roeper and Malenka, 2011; Matsumoto and Hikosaka, 2009). Coexistence of DA neurons activation and inhibition by aversive events was shown by recent research (Brischoux et al., 2009). Simultaneous activation and inhibition of different VTA DA subpopulations by stimuli- and network-dependent processes maintain a crucial functional role in the equilibrium of DA release in projection areas. Since DA neurons are heterogeneous in their encoding functions, their inferences and their projections, they play diverse roles in motivational control (Faure et al., 2014).

The basal activity of DA neurons is regulated by the interactions between intrinsic excitability, excitatory and inhibitory inputs and neuromodulation. The "events" going on during the lifetime of an individual stimulates activity-dependent alteration of these traits that in

long term disrupts basal activity (Hyman, Malenka and Nestler, 2006; Marinelli, Rudick, Hu and White, 2006). One good example of this phenomenon is the increase of DA cell activity by stress (Barik, Marti, Morel, Fernandez, Lanteri, Godeheu and Tronche, 2013) and addictive drugs (Caille, Guillem, Cador, Manzoni and Georges, 2009; Marinelli, Cooper, Baker and White, 2003). Another example is that animals with a higher-frequency and bursting DA action exert increased reactivity to a novel habitat (Marinelli and White, 2000). Therefore, interpretation and quantification of the long-term effects of DA cell dynamics by external events are crucial since it might radically alter the normal reaction of DA cells (e.g. to aversion, reward...) and conceivably causes pathological behaviors related to DA (Faure et al., 2014).

Association between behavioral facilitation and the functional attributes of the VTA DA projection system was demonstrated by animal studies. Regardless of brain area, DA has shown to simplify neural processes resulting in goal-directed behavior (Bozarth, 1987; Deutch, 1993; Fibiger and Phillips, 1987; Le Moal and Simon, 1991; Louilote Le Moal and Oades, 1985; Oades and Halliday, 1987).

Since extraversion and facilitation appear to be higher-order traits which integrate a modulatory system functioning across lower-order characteristics and reinforcement actions, the VTA DA projection system might also be thought as a higher-order regulator of a neurobiological organization that participates in behavioral roles related with extraversion (Depue and Collins, 1999).

Cholinergic Modulation of DA Systems

One of the major modulators of DAergic neurons is Acetylcholine (ACh) which binds to two main types of receptors; ionotropic nicotinic (nAChRs) and metabotropic muscarinic (mAChRs) acetylcholine receptors. Regulation of DA network via latter receptor requires involvement of multiple ion channels and leads to mostly an inhibition but sometimes an DA neurons' excitation (Picciotto, Higley and Mineur 2012; Wess, 2003). These nicotinic receptors regulates state of the whole dopaminergic systems, through orchestration of diverse DA cells' firing, or through decorrelation of DA subpopulations (Faure et al., 2014b). For instance, simultaneous activation and inhibition of segregated DA subpopulations is caused by noxious stimulation (Brischoux et al., 2009; Ungless et al., 2004; Wang and Tsien, 2011). Moreover, studies suggested that DA cells triggered by physical, yet neutral (i.e. neither rewarding nor punishing) actions are likely different than DA neurons

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that are triggered by rewarding events (Bromberg-Martin et al., 2010). Researches indeed showed by pairwise cross correlations that there is a spontaneous occurrence between DA neurons (Hyland, Reynolds, Hay, Perk and Miller 2002; Morris, Arkadir, Nevet, Vaadia and Bergman, 2004) and these synchronization action increases as a result of a rewarding event (Joshua, Adler, Prut, Vaadia, Wickens and Bergman, 2009). For example, in appetitive conditioning, DA and GABA neurons that are phase-locked to a predicting stimulant rises; but, in aversive learning, this proportion declines (Joshua et al., 2009; Kim, Wood and Moghaddam, 2012). Therefore, modification of GABA/DA ratio or equilibrium may strongly affect the DA dynamics.

Studies of DA Systems

NAC is an especially powerful region for intracranial self-administration of DA and DA agonists. Hence, dose-dependent activation of dopamine D1, D2 and D3 receptors in the VTA–NAC pathway promote the acute rewarding outcomes of stimulus (Hoebel, Monaco, Hernandez, Aulisi, Stanley and Lenard, 1983; Le Moal and Simon, 1991; Pich, Pagliusi, Tessari, Talabot-Ayer, Hooft Van Huijsduijnen and Chiamulera, 1997). Several studies also showed the facilitation of the locomotion induction, pace and potency (Clark and White, 1987; Fishman, Feigenbaum, Yanai and Klawans, 1983; Le Moal and Simon, 1991; Oades, 1985) and the elevated prevalence and extent of impulsive exploratory actions (Fink and Smith, 1980) upon injection of dopamine D1 and D2 agonists in the NAC.

Genotype-driven processes affect the basic structure and function of neurons (Greenough and Black, 1992). The data that associates DA to behavioral expression mainly came from the experiment done on inbred strains that offer a precise and stable genotype to examine (Plomin, McClearn, Gora-Maslak and Neiderhiser, 1991). Studies showed that inbred mouse strains that vary in the number of neurons in the VTA DA cell group exerts obvious behavioral alterations determined by DA communication in the VTA-NAC pathway, along with alterations in the impulsive exploratory activity levels and locomotor action triggered by DA agonist (Fink and Reis, 1981; Oades, 1985; Ross, Judd, Pickel, John and Reis, 1976; Segal and Kuczenski, 1987; Shuster, Yu and Bates, 1977; Sved, Baker and Reis, 1985; Sved, Baker and Reis, 1984). The association of behavior and DA transmission is also demonstrated by using C57 and DBA inbred mouse strains (Cabib and Puglisi-Allegra,

1996; Phillips, 1997). C57 mice that possess increased amount of DA neurons in the VTA site exert higher novelty-induced locomotor action than DBA mouse strain (Cabib and Puglisi-Allegra, 1996; Phillips, 1997). C57 mice that possess increased amount of DA neurons in the VTA site exert higher novelty-induced locomotor action than DBA mouse strain (Anisman and Cygan, 1975; Anisman, Wahlsten and Kokkinidis, 1975; Fink and Reis, 1981; Wenger, 1979). Therefore, genetic differences in VTA–NAS DA projections results in major individual variances in elucidation of incentive motivation (Depue and Collins, 1999).

Recent genetic studies were also suggesting the involvement of DA systems in the human behavior. Studies demonstrated that dopamine D4receptor gene is associated with the salience of information (Berridge and Robinson, 1998; Volkow, 2004). Evidence also supported a strong relation between leadership traits and abilities of task knowledge and problem solving (Judge, Colbert and Ilies, 2004). Therefore, it has been found that the people, who inherited the genotype that is found to be related to with increased sensitivity to information, may be more successful for leadership emergence (De Neve, Mikhaylov, Dawes, Christakis and Fowler, 2013).

There are several genetic studies that link dopamine to neurological and behavioral conditions. For instance, variations in the DA receptor subtypes encoded by D4 receptor (DRD4) and dopamine D2 receptor TaqIA (DRD2) genes are found to be related with neurological illness such as schizophrenia, attention deficit disorder, in addition to some behavioral characteristics which are extraversion (Eichhammer, Sand, Stoertebecker, Langguth, Zowe and Hajak, 2005), novelty-seeking (Benjamin, Li, Patterson, Greenberg, Murphy and Hamer, 1996; Ebstein et al., 1996) and risk-taking (Dreber, Apicella, Eisenberg, Garcia, Zamore, Lum and Campbell, 2009). Another study has targeted DA transporter gene (SLC63) that is responsible for the production of a protein in the neural cell membranes that contributes to the re-uptake of remaining DA in the synaptic cleft between neurons and found that the promotor polymorphisms of this gene has an effect on several neuropsychiatric and cognitive disorders through alterations in the amount of produced protein (Fuke, Suo, Takahashi, Koike, Sasagawa and Ishiura, 2001). Moreover, genetic variations in the Monoamine oxidase A (MAOA) encoding an enzyme responsible from degradation of neurotransmitters (serotonin, dopamine and epinephrine) in brain regions contributing cognitive ability and behavior, has been shown to be associated with impulsive (McDermott, Tingley, Cowden, Frazetto and Johnson, 2009) and

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borrowing behavior (De Neve and Fowler, 2010). Furthermore, several studies focus on the effect of nicotine acetylcholine (nACh) receptors on impulsive behavior since they regulate dopamine release in the midbrain. These receptors are produced by CHRNA6 and CHRN3 that are found all over the central nervous system (Azam, Serhan, Chen and Leslie, 2002; Wonnacott, 1997). The effect of DA in the substantia nigra compacta (SNc) is crucial for both positive support relevant to learned behavior and habits of established stimulus response (Meyer et al., 2008). The SNc releases DA to the striatum through two crucial subunits that are $\alpha 6$ encoded by CHRNA6 gene and $\beta 3$ encoded by CHRN3 gene (Cui, Booker, Allen, Grady, Whiteaker, Marks and Heinemann, 2003; Meyer et al., 2008). Hence, there is a close association between CHRNA6 and CHRN3 genes and impulsive behaviors such as nicotine initiation and addiction Feng, Niu, Xing, Xu, Chen, Peng, Xu (2004; Hoft, Corley, Mcqueen, Huizinga, Menard and Ehringer 2009; Li, Beuten, Ma, Payne, Lou, Garcia and Elston, 2005; Schlaepfer, Hoft and Ehringer, 2008) or alcoholism (Hoft et al., 2009). Since these mentioned habits prioritize tiny rewards over long-term health advantages, they are regarded as impulsive behaviors. Measurements by delay discount task also correlate these behaviors with impulsivity and patience (Bickel, Odum and Madden, 1999; Madden, Petry, Badger and Bickel, 1997). Therefore, CHRNA6 and CHRN3 genes might have a crucial function in the behavioral organization through modulation of dopamine system (De Neve et al., 2013).

What is Effective Leadership?

Leadership could be described as an interaction between a leader and followers. Main aim of the effective leadership within the organisations is to influencing and facilitating individuals and groups for reaching and achieving a common shared goal (Yuki, 2012). Effective leaders can influence the process determining the performance outcome. The most of the discussion on leadership effectiveness indicates the importance of the relationship between leaders and followers. The aforementioned relation involves a social interaction process (Bryman, 2013). There is a strong emphasis to group and the relationship between groups and leaders in effective leadership. This is also important because such relationship is different than one between individuals and leaders (Hogg, Knippenberg and Rast, 2012). It should be also recognized that there might be no best way to lead an organization but optimal course of

action according to circumstances should be taken as it is discussed in contingency theory. Therefore, effective leadership is that taking the most effective decisions under the surrounding circumstances.

Effective leadership performance is difficult to measure. Leadership effectiveness should be measured by according to the team, group and organizational effectiveness. However, in most cases it is completed by peers, supervisors or subordinates' ratings although this could be unfair (Hogan, Curphy, Gand and Hogan, 1994). Most of the leadership effectiveness results come from followers' perspective. However, contingency theory of leadership discuss that leaders should be carefully balance internal needs and surrounding environment. The followers may have either positively or negatively biased opinion on leaders. Therefore, relying only on followers' perspectives might be misleading. Effective leadership is correlated with leadership behavior. Behavior of individuals has a degree of influence on leadership effectiveness (Yuki, 2012).

Personality Traits and Effective Leadership

Personality traits are related to good leadership practises and this is shown with various theoretical and empirical studies (Judge, Bono, Ilies and Gerhardt, 2002; Hoffman and Jones, 2005; Lim and Ployhart, 2004; O'reilly, Caldwell, Chatman and Doerr, 2014). Trait approach is one of the oldest and arguably, the most effective method of understanding of the relationship between leadership effectiveness and personality. In fact, trait theory of leadership discusses that effectiveness and good leadership practises are depends on the personality of the leader (Judge, Bono, Ilies and Gerhardt, 2002). It is a discussion in the related literature that some personalit traits determine the succes of leadership (Van Eeden, Cilliers and Van Deventer, 2008).

However, some other studies found that leadership effectiveness would depend on the circumstances (Hughes, Ginnett and Curphy, 2002). In that, Hogan and Judge (2013) discuss that the effective leadership depends on both circumstances and personality of the leader. They also add that it is difficult to measure how context impact on effective leadership. One of the main outputs of effective leadership is the ability to lead, maintain and create teams that would consequently outperform competitors (Hogan, Curphy and Hogan 1994).

Neuroscientists discussed that a well-functioning brain is well integrated into environment it functions (Heifetz, Linsky and Grashow, 2009). In that, big five personality traits are strongly correlated with leadership effectiveness (Hofmann and Jones, 2005). there is a

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relationship between neuroticism, extraversion and conscientiousness with effective leadership practises (Ng, Ang and Chan, 2008). In their Meta-analysis on personality traits of leaders and effectiveness Judge, Bono, Ilies and Gerhardt, (2002) found that neuroticism is negatively and openness, extraversion, conscientiousness positively influence the process.

Above all, the effectiveness and efficiency of the traditional leadership development programs is questioned by some scholars (Haines, 2009). They have begun to question of traditional methods of leadership assessment methods and realized there is a need for replacing the sort of survey that assesses leadership behavior. Neuroscience of leadership offers a new insight to understand how leaders' behavior is actually influenced by cognitive process within the brain (Adolphs, 2009). In that dopamine play a critical role to shape the aforementioned leaders' behavior –through genes- and subsequently, effectiveness of the leaders. This is consistent with Hogan and Hogan's (2001) finding that most of the leadership failures are based on "personality defects".

DISCUSSION

There is a long and controversial history about leadership effectiveness and individuals' personality. It has been consistently found that some personality traits more closely associated with effective leadership process. Those Meta analyses contributed the leadership and personality trait studies immensely. There is a consensus in the related literature that personality traits have certain and important roles on the leadership effectiveness.

Certain impacts of dopamine on personality traits are shown. Positive motivation and reinforcement may positively impact on leaders' follower relation. It is a well-known fact that people with high conscientious tend to be better organized and have better goal-oriented focus than the one with the low conscientious. It is clear that dopamine has strong responsibility for this trait. In fact, various roles that dopamine play on goal-oriented motivation is found. It regulates motivation and reward control that may positively influence on leadership qualities and consequently, leaders become more effective on path-goal oriented tasks. In addition, dopamine controls reward and responses. This would mean leader with this specific trait could better enforce followers through goals. For example, as they are rather better enforcer this trait would have positive impact on path-goal oriented motivation. The case could be

more important in North American context as in this specific culture people response much more positively to goal-oriented motivation compares to some others, as it is an individualistic country (Hofstede, 1980).

It is also found in the related literature that individuals may perform better in relation to leadership process if they have high conscientiousness trait. This is also a natural advantage for effective leadership as people who has high conscientious trait more strictly follow the rules and norms. Dopamine has an impact on novelty seeking behavior that is associated with openness to experience. A person who has high level of openness to experience tends to be more creative and more successful on the creative achievement. Therefore, people who have this trait through heredity have natural advantage for creative activities that may be an advantage at problem solving as they may find new novel solutions when they face problems in leadership positions.

Arguably, dopamine's impact on personality traits and leadership effectiveness can be best observed on extraversion trait. Dopamine influences this specific trait quite substantially. Furthermore, it has been found that extraversion is consistently the most important trait in leadership effectiveness. This is due to a fact that effective leadership necessitates the successful management of leaders and followers' relationship. For the aforementioned relation the leaders should have good social skills and people with high extraversion tend to be more sociable and successful in their relations. The detail table shows the different leadership styles, personality facets and neurons is presented at the Table 1.

Furthermore, neuroscience of leadership offers new ways to understand employees' habits and attitudes. Therefore, it would enhance the understanding of the follower leader relations. For example, basal ganglia play an extensive role without conscious thought in routine activities. It is part where human beings repetitive activity becomes a habit (Rock, 2010). However, after learning a few months a certain activity would be done without thinking. If in a production line a certain production order is established and after a while if it were decided to change than worker would have difficulties to adjust to a new order. Such things could be seen and observe in any part of organizations and cannot be resolved with behavioral approach.

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Table 1: The Relationship between Personality Traits/Facets, Leadership Style and Neurons

Personality Traits Related with Neural Systems	Facets	Relation to Leadership
Openness to Experience (Pecina et al., 2013)	Intellect, Openness	It is related to transformational leadership (Judge and Bono, 2000)
Conscientiousness (Kotlyuk et al., 2015)	Industriousness, Orderliness	People high on this trait become more competitive thus perform better in leadership positions- It is associated with almost all major leadership theories.
Extraversion (Depue and Collins, 1999)	Enthusiasm, Assertiveness	One of the most important traits that impact on leadership effectiveness. People high on this trait inhibit inspirational leadership (Watson and Clark, 1997).
Agreeableness (Kotlyuk et al., 2015)	Compassion, Politeness	One of the main determinant of the follower and leadership relation. It is closely associated with charismatic leadership (Bono and Judge, 2004).
Neuroticism (Kotlyuk et al., 2015)	Volatility, Withdrawal	People high on this trait would avoid leading roles and they would be less likely transformational leaders (Bono and Judge, 2004)

CONCLUSION

When a CEO or a leader needs to be replaced a question arises: who shall lead? However, psychologist looks this dilemma from a different perspective and modifies the question: who should rule-according to necessary leadership skills? Perhaps, the main problem in here is how to evaluate leaders in their potential in relation to the followers. Leadership studies are one of the oldest and arguably, the most popular among organizational scientist. Leadership effectiveness can depend on different circumstances. However, trait theories of leadership discuss that the quality of personality is the one of the strongest determinant of the effective leadership.

Leaders' certain behaviors translate in to the different performance characteristics. However, the manifestation of trait within behavior is not always clear. Nonetheless, there is a consensus in the related literature that big five of personality is one of the most accurate personality model that could be implemented to the identify character of individuals.

However, a part of literature also discusses that an individual inherit core personality traits. Those cannot be changed and it will carry through a life. In that, genes play a crucial factor and they are the one of the most prominent determinants of a person's character. It is found that dopamine receptor genes have a strong role on the cognitive tasks related with leadership emergence and individuals who carry this specific gene has inherited advantage in leadership roles than to those who do not have (De Neve et al., 2013).

Arguably, one of the most prominent development for leadership studies emerged from neuroscience of leadership field. However, many questions in regard to that remain unanswered. The role of genes on certain behavior need to be further clarified. Nevertheless, the main problem for neuroscience of leadership studies would be how to structure leaders-followers relation where certain leadership traits stem from genes. This is one of the promising area as not only require us to understand how brain function in certain circumstances but also how to modify certain behaviors where brain works in certain ways and influences behavior. This challenge is also important because leadership-followers relation is even more complicated as both parties traits shape by cognitive processes.

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