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Ethics into the (brain) company: from moral people to moral organization?

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1. A MATTER OF DUALITY

In recent years, moral decision-making has been a topic of great interest in different disciplinary fields. Specifically, moral decisions can be defined like a complex process that involves any decision, judgment or evaluation on actions' acceptability within the moral domain (Garrigan, Adlam, & Langdon, 2018). More specifically, ethical behavior can be defined as the taking of normatively appropriate behaviors, concerning personal conduct or actions directed towards others, that are promoted through communication, strengthening and decision-making (Mayer, Aquino, Greenbaum, & Kuenzi, 2012).

In the light of this multidimensionality, the initial psychological interest for moral decision-making has been gradually extended to all everyday decision-making contexts, as demonstrated by an increased interest in companies' moral behavior. Specifically, the interest in leaders' ethical behavior, which has positive effects on the organization climate and culture, has grown. In particular, the investigation of processes underlying company moral decision-making is crucial because it can produce positive or negative social consequences, in terms of consumers, employees, and community health, safety, and welfare, and it definitely has a significant effect on the organizational culture quality (Minas, Potter, Dennis, Bartelt, & Bae, 2014).

Also, neuroeconomics, business implications, and market impact of moral decisions were recently explored by psychological and neuroscientific perspective. Neuroscience research therefore provides useful insights into the neurobiological foundations of emotions in ethical decision-making processes. Indeed, the recent interest in company

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moral decision-making has led to investigated all individual and situational variables underlying moral behavior, considering the processes and brain structures involved in moral decision-making not previously investigated by some studies that have focused the attention only on the application of different theoretical guides in daily management decisions (Minas et al., 2014).

At this regard a set of questions has been largely addressed through the development of theoretical models which attempt to identify a variety of individual and organizational factors that might influence decision-making about ethical problems in organizations.

A first main question is whether moral reasoning is the dependent variable of organizational behavior or, as formulated in most studies of decision-making, moral reasoning is an antecedent, on which the behavior is based and derived. Some studies have found that decision makers do not engage in a priori ethical reasoning but rather make sense of their decisions after the fact, including business decision makers. These studies propose intuitionist decision models, according to which decision makers do not engage in moral reasoning but process decisions "intuitively" outside of conscious awareness, and only construct rationalizations for their moral judgments afterward for the purposes of appearance or social approval (Haidt & Bjorklund, 2008). Alternatively, decision makers engage in post hoc collective sense-making to justify decisions (Sonenshein, 2007).

A second main question, related to the previous one, is focused on the role of ethical decision-making as a rational process. Indeed, traditional theories of moral psychology emphasize the function of "higher cognition" in moral judgment (Kohlberg, 1969), and the relevance of emotions in ethical decisions has been recognized only recently. Cognition is still considered essential when it comes to ethical decision-making, but new research streams suggests a need for synthesis of the two perspectives. Indeed, considering its complexity, moral decision-making appears to be mediated by both emotional and rational processes (Greene, Nystrom, Engell, Darley, & Cohen, 2004; Loewenstein, Weber, Hsee, & Welch, 2001). The former is related to the evaluation of socially relevant stimuli as right or wrong; the latter consists of rational and deductive reasoning processes on the possible costs and benefits associated with moral decisions (Brand, Labudda, & Markowitsch, 2006; Greene et al., 2004). During moral decision-making, therefore, individuals are not only "rational agents" who formulate evaluations to maximize decisions' costs and benefits, to obtain material and social rewards, but also "emotional agents".

Based on this evidence and following the developments in cognitive neuroscience and neuroethics, most researchers have since come to hold a so-called dual processing model of ethical decision-making. According to this model, decision makers in various fields could rely on two modes of processing. One is automatic and intuitive, labeled as X-System. The other mode is higher order conscious reasoning, termed the C-System. The automatic, and intuitive processing has received attention from researchers as a means to expedite decision-making in complex situations under time pressure, which is often the context of ethical dilemmas as well. This type of decision-making is viewed as being a

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rather effortless type of judgment that relies on moral intuition. The second, more complex type of moral reasoning is elicited by moral dilemmas, both hypothetical and in real life, for which no readymade solution exists (Oliveira-Souza, Zahn, & Moll, 2015).

The individual and situation conditions underlying moral decision-making were explored by social decision tasks consisting of monetary paradigms developed in the game theory field (Sanfey, 2007). In this regard, the growing interest in neurosciences and the use of neuroscientific tools for the investigation of processes underlying moral decision-making have allowed researchers to deeply observe the neurophysiological correlates of moral behavior. These paradigms were found to be very useful in optimizing player choice behavior, but they often didn't investigate the emotions underlying decision-making, which provide information on individuals' interpersonal sphere and emotional processing and responses (Wagner, Schlamminger, Gundlach, & Adelberger, 2012).

The emotional and cognitive components underlying moral decision-making in the organizational context can be investigated in depth through neuroscience that reveal the neurophysiological activity underlying moral decision-making processes, through the use of classical paradigms consisting of monetary choices or mathematical exercises and through the use of social decision tests, such as the Ultimatum Game or some variants (Balconi & Fronda, 2019; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003).

Specifically, the Ultimatum Game, which is mainly used to evaluate altruistic behavior and fairness perception, request two players (the proposer and the respondent) to share a sum of money.

In particular, the proposer proposes how to divide the money sum, and the respondent decides whether to accept or reject the offer proposed.

The advantages of using neuroscience to investigate moral decision-making have been demonstrated by previous studies that, through the use of psychophysiological, electrophysiological, and neuroimaging techniques, have observed the body and brain mechanisms associated with moral behavior. For example, some studies have shown an autonomic activity variation, indicated by an increase in skin conductance response (SCR) and heart rate (HR), in choices' conditions perceived as unfair (Balconi & Fronda, 2019; Sarlo, Lotto, Palomba, Scozzari, & Rumiati, 2013). Furthermore, other studies have shown a different involvement of specific brain regions in moral decision-making processes such as the ventromedial prefrontal cortex (VMPFC), which is implicated in the codification of social and cultural norms, in mental representation and the attribution of moral value to decision-making options. Moreover, other studies have demonstrated the involvement of the dorsolateral prefrontal cortex (DLPFC) in problem-solving, cognitive control processes, and in the utilitarian cost/benefits analysis (Greene et al., 2004).

In order to investigate moral behavior within company context, a study by Balconi and Fronda (2019) has investigated the neurophysiological mechanisms underlying 14 managers moral decision-making by the recording of electroencephalographic (EEG), hemodynamic (fNIRS, functional Near-Infrared Spectroscopy) and autonomic activity using a modified version of the Ultimatum Game proposing three different choices'

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contexts (professional, company and prosocial). Specifically, professional choice context required subjects to decide to accept or refuse a money division for a job equally done with a colleague; the company choice context required subjects to decide for a money division for the introduction of some company benefits and, finally, the prosocial choice context proposed a money division to help the care of a sick colleague's relative financially.

For each choice context, three different offers were proposed for the money division (unfair for the respondent, fair for the respondent, and neutral) (Figure 1). The research results allowed us to identify the brain and autonomic patterns underlying managers' moral decision-making. In particular, at the electroencephalographic level a general increase in cortical activity of the frontal region, which is the one most involved in social processes and affective regulation, emerged.

Moreover, considering the influence of offers type within the different choice condition, a different cortical modulation was observed in the left and right frontal region about individuals' emotional evaluation and personal interests. At the hemodynamic level, instead, the involvement of different brain regions emerged during moral decision-making, such as the VMPFC, the DLPFC and the superior temporal sulcus. Also, at the autonomic level, an increase in autonomic activity, skin conductance, and cardiovascular activity emerged concerning individuals' emotional engagement and cognitive evaluation.

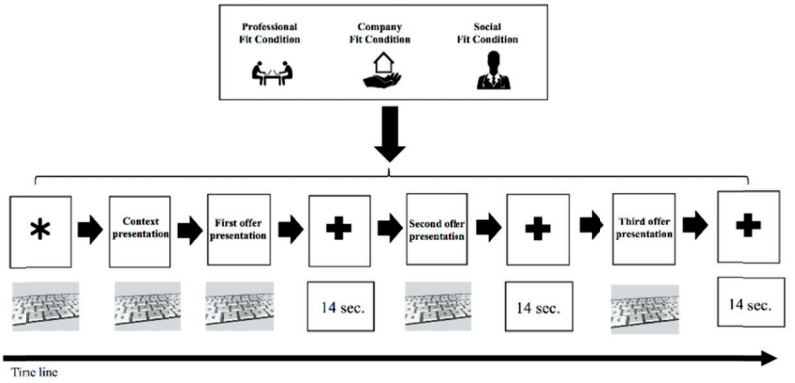

Figure 1. Experimental procedure used for the investigation of moral decision-making in the company context

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2. Cognition and emotion in moral brain: the mediation of empathy

Moreover, neuroscientific efforts in recent years have led to a better understanding of neuropsychological constructs underpinning morality in decision-making, underlying the importance of empathy in fair or unfair decisions for organizations (Balconi, Finocchiaro, & Campanella, 2014).

At this regard, fairness perception can be considered as an adaptive mechanism that individuals use within a framework of cooperation and justice. On the contrary, unfairness perception appears to be associated with negative emotions that lead individuals to reject unfair offers. Recently, the interest in unfairness perception has increased, mainly within social contexts and organizational questions. Specifically, unfairness perception leads to an "inequality aversion" which occurs when individuals perceive inequalities, preferring equity (Strobel et al., 2011; White, Brislin, Sinclair, & Blair, 2014). Unfairness aversion has been particularly investigated by some studies that have shown how unfair offers rejection provide a greater activation of brain regions (the striatal area) that appear to be involved in reward mechanisms and individuals' gratification.

Two subsequent studies have provided further insight into this issue. The first demonstrated that being treated fairly activated brain areas associated with the processing of reward and confirmed that being treated unfairly produced negative emotional response (Tabibnia, Sapute, & Lieberman, 2008). This study employed a similar paradigm to Sanfey and colleagues (2003) and found increased activation in the amygdala, ventral striatum, and ventromedial prefrontal cortex when fair offers were received. Furthermore, these fair offers were almost always accepted. In contrast, unfair offers produced increased insular activation and frequent rejections as before. Participants who accepted unfair offers showed increased ventrolateral prefrontal cortex activation but failed to activate neural reward networks. This suggests that some participants were able to override their strong negative affective reactions to unfair treatment and pursue economic gain but that doing so was unsatisfying. Tabibnia and colleagues (2008) concluded that fairness processing was relatively automatic and intuitive. In addition, they suggested that although being treated unfairly was objectionable, fair treatment was intrinsically rewarding over and above monetary considerations.

A subsequent study explored the association between equity and efficiency of distributive outcomes (Hsu, Anen, & Quartz, 2008). In this study, participants had to distribute limited resources among third parties. They found that equity and efficiency were encoded in separate regions of the brain. Efficiency was associated with activity in the putamen, and equity (or rather inequity) was once again associated with activation in the insula. Moreover, inequitable options produced increased insula activation and were not selected even when those options produced more efficient outcomes overall than more equitable alternatives. The authors concluded that fairness perceptions emerge from moral intuition and emotional response rather than from cognitive consideration of economic efficiency or deontological principles.

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Furthermore, the perception of fairness and unfairness is mediated by empathy, which plays an important role in the morality field (Van Vugt et al., 2011). Especially in contexts that require to make decisions that can have social consequences, such as in a company context, it is therefore very important to observe how empathic behavior influences moral decision-making. Specifically, empathy concept is defined as the implementation of a behavioral response lead by an individual to another, in order to induce a well-being condition (Balconi & Bortolotti, 2012; Batson, 2010).

In particular, empathy is mediated by two interconnected processes: a cognitive one, which consists of adopting the other person's perspective in a given situation, and an emotional one, which consists of feeling sympathy, compassion and tenderness towards others, that characterizes interpersonal and prosocial relationships, strengthening social interactions and cooperation (Pavlovich & Krahnke, 2012). Moreover, within moral context, empathy favours a better contemplation of the possible decisions implications, consequences and responsibilities regarding other individuals' well-being, through the evaluation of choices social benefits. On the contrary, the lack of empathy is generally associated with less guilt and consideration for choices moral implications, resulting in more correlated to utilitarian decision-making.

Some authors discuss the disruptive effect of negative emotions like guilt and anger (Hofmann & Baumert, 2010) for ethical decision-making in organizations; others focus on the role of positive emotions, such as empathy and compassion. In contrast positive emotions such as empathy and compassion are seen as being of particular relevance with regard to ethical decision-making (Eisenbeiss, Maak, & Pless, 2014). Mencl and May (2009) understand empathy as a "moral emotion" and suggest that higher levels of empathy potentially lead to greater awareness of negative decision-making consequences for stakeholders. More specifically, Eisenbeiss and colleagues (2014) argue that empathy and compassion are important emotions required for ethical decision-making, in particular for developing compassionate solutions to moral dilemmas.

To study moral cognition Greene, Sommerville, Nystrom, Darley, and Cohen (2001) scanned the brains of subjects faced with different dilemmas, varying from non-moral dilemmas to multiple variations of the "trolley dilemma". In the trolley-dilemma subjects have to decide if they are willing to sacrifice the life of one person to save five people from being run over by a trolley. The scenario variations differed in the degree of personal involvement. In the option with the highest personal involvement subjects had to decide if, to save the five persons, they would push a person in front of the trolley. The experiment revealed that moral decisions with high personal involvement are processed in areas of the brain pertaining to emotions, like the medial frontal gyrus, posterior cingulate gyrus, and angular gyrus. Areas associated to cognition were significantly less active during the personal condition. This study demonstrates that both cognition and emotions are involved in moral decision-making and different regions of the brain need to be integrated.

Hence, the regulation of thoughts and emotions is seen as being important for effective ethical decision-making (Waldman, Wang, Hannah, & Balthazard, 2017).

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3. Implicit morality

According to neuroscientific findings, individuals' decision-making is greatly influenced by implicit, unconscious processes in the brain (Burns & Bechara, 2007). Human behavior results from the interplay of different systems rather than from any one singular motivation. As a result, our actions can be pushed in one direction or another, depending on the balance of a variety of neurophysiological processes (Johnson, 2004). This is an important insight because it demonstrates how our rationale for our behaviors can diverge substantially from their actual causes. Within this perspective, humans are capable of decisive action in dynamic and uncertain conditions. These subjective realities, however, can differ substantially from the objective reality. In the organizational context, sometimes these differences will have important consequences.

Hence, our self-reported accounts of individual intentions and actions will often be logical and consistent and even predictive of future outcomes and yet be wholly inaccurate with regard to describing the true mechanisms behind the behavior. This helps explain the observed inability of subjects to pass on their knowledge by communicating their decision processes because they are largely inaccessible to our conscious thinking and, therefore, to ourselves. It may also help explain why individuals often find it difficult to recognize and change their own subtle discriminatory behaviors. In general, we tend to overestimate the role of conscious deliberation and intention and underestimate the role of implicit influences.

Neuroscience suggests that much of what we perceive as a unified experience actually masks the activity of different non-conscious and conscious neural systems and processes that are not necessarily always working in concert (Balconi & Pozzoli, 2005; Blackmore, 2005). In other words, even though we can almost always provide rational explanations for our thoughts and actions, we may often only think that we know the true reasons behind them. This phenomenon has termed the "binding problem" which refers to the conscious sense that our perceptions, thoughts, decisions, and actions result from a unitary and contemplative process, even though the underlying neural mechanisms may often be anything but unified and are frequently non-conscious. This sense of unity is usually adaptive, as it simplifies our experience and allows us to navigate through a complex and uncertain world with confidence. However, like many practical adaptations, it also has other consequences. In this instance, the inner workings of our thought processes are largely inaccessible to direct introspection or external report, and consequently, it cannot be evaluated by using ordinary self-observational procedure (Sanfey et al., 2003).

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4. The anatomical bounds of morality

By the neuroscientific perspective, fairness and unfairness in moral perception were found to be mediated by specific brain regions (Tabibnia et al., 2008). In particular, the former is associated with the bilateral insula, left hippocampus and the left lingual gyrus activations (Rilling, King-Casas, & Sanfey, 2008); while, the latter results to activate more the DLPFC and the anterior cingulate cortex, implicated in objectives control and cognitive conflicts detection. More generally, some studies have also observed the role of the VMPFC and the DLPFC in moral decision-making and, whereas the former appears to be implicated in moral judgment and in emotional processing underlying choices with possible gains and social benefits (Hare, Camerer, Knoepfle, O' Doherty, & Rangel, 2010), the latter appears to play a fundamental role more in the evaluation of choices short- and long-term benefits (Levy & Glimcher, 2011).

Thus, moral reasoning and moral decision-making can be considered as complex constructs that require the involvement of different brain networks. For example, as demonstrated by a previous study that used functional magnetic resonance imaging (fMRI) to explore how individuals' brains react to the judgment of positive, negative or neutral actions of other individuals, the evaluation of moral decision implications activates specific cerebral circuits. Some of these cerebral regions, such as DLPFC, the parietal lobe and the superior medial prefrontal cortex (SMPFC) are most involved in objective and moral reasoning (Amodio & Frith, 2006; Jack, Greenwood, & Schapper, 2012).

Moreover, some studies have shown that moral decision-making processes are driven by specific brain structures and regions such as the prefrontal cortex, the premotor and sensorimotor cortex and the striatum, that appear to be activated during decision-making processes regarding actions aimed at an objective to be pursued (Balleine, Delgado, & Hikosaka 2007; Poldrack et al., 2001).

To sum up, most of the anatomical structures involved in ethical decision-making are located in the prefrontal cortex (PFC). The PFC is located in the very front of the brain just behind the forehead and is responsible for the majority of our higher cognitive functions. The prefrontal cortex can be subdivided into dorsolateral, ventrolateral and orbitofrontal. The orbitofrontal cortex (OFC) lies just on top of the eyes and is decisive when decisions require the ability to retrieve consequences when they are only partially observable. The ventrolateral prefrontal cortex (VPFC) lies on the side of the forehead and is connected with brain areas related to emotion. Finally, DLPFC is located more on the top of the prefrontal cortex and connects with brain areas related to attention and cognition.

When evaluating a decision, cognition plays a crucial role. A decisive area for the cognitive part of decision-making is DLPFC. This area of the prefrontal cortex is active when we consider multiple sources of information to make a decision. When decisions have to be made under uncertain conditions especially the right side of the DLPFC is

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important. Contemporary the insula, anterior cingulated cortex (ACC), and amygdala are three key brain regions active in emotional aspects of empathy (Decety & Lamm, 2006). While the insula is part of the cerebral cortex, the ACC and the amygdala belong to the limbic system. The ACC lies in a unique position in the brain deep inside the forehead and behind the brain's frontal lobe. It has connections to limbic system and the cognitive center (prefrontal cortex). Beside its involvement in emotion, it is important in reward anticipation, impulse control and decision-making. The amygdala is an almond-shaped set of neurons located deep in the brain. It is traditionally associated with processing emotionally arousing stimuli and with sharing others' emotions (Adolphs, Tranel, Damasio, & Damasio, 1994) (Figure 2).

In addition, decision-making requires explicit deliberation and integration of diverse sources of information. It can be understood as a complex behavioral phenomenon that involves different brain regions. Research has started to bring different facets of this complex process to our attention, especially the involved brain regions and their functions.

Thus, for a more complete the picture of decision-making we will now look on how this different information is integrated in the brain. The OFC is critical in integrating affective information received from limbic areas. The OFC than integrates this information and uses it to determine how valuable the outcome will be. This evaluation is then passed to other areas of the prefrontal cortex. When we integrate cognition and emotion, other frontal brain areas involved are the VMPFC and the ACC (Decety & Svetlova, 2012).

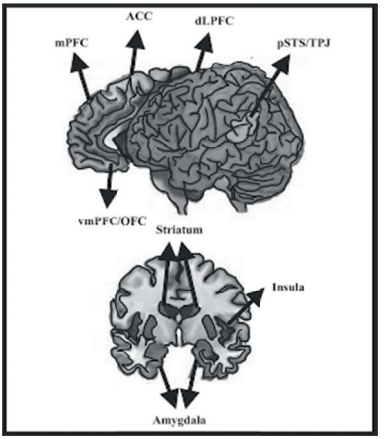

Figure 2. Representation of cortical and subcortical areas involved in the moral decision-making process

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5. Self-interest or other-interests?

It has also been found that justice considerations are associated with self-referential thinking and "theory of mind" processing (Robertson et al., 2007). Theory of mind (ToM) is a relatively automatic process that allows an individual to infer and simulate the mental states of others and place himself or herself in the shoes of the other people. ToM is related to empathy but goes beyond basic emotional response and incorporates simulating the beliefs, goals, and intentions of the other party (Gallagher & Frith, 2003).

For example, it was also found that individuals were more likely to sacrifice personal gain to punish injustice only when the victims of injustice were perceived to be fair players (Singer et al., 2006). Recent findings suggest that moral sensitivity to justice may rely on one's own emotional response and one's inference of the emotional response of other parties. In the present case, moral dilemmas concerning fairness activate different regions of the brain than do those concerning economic gain. This provides support for a more modular model of the brain. From one hand, a number of neuroscience studies have found that there is a tendency for individuals to be more strongly affected by injustice toward themselves and less strongly affected by injustice toward others (Tabibnia et al., 2008). There is evidence that we are sometimes capable of disregarding the unjust treatment of outgroup members, while being more concerned that similar others be treated with fairness (Clayton & Opotow, 2003). Our justice perceptions take cues from other nonconscious brain processes that can moderate or even turn off justice processing.

It follows therefore that implicit attitudes once again are likely to be an important factor in justice considerations. Self-interest is universal since it is the principal human motive. However, if all human concerns are ultimately concerns with the self, then processing related to fairness and processing related to self-interest should take place in the same brain centers. The disagreement about universal self-interest takes on even greater importance when one considers its practical conditions, as in organizations.

Ferraro, Pfeffer, and Sutton (2005) observed that organizations were administered in accordance with managers' preconceptions about human nature. If the leadership of a firm assumed that employees were motivated by egocentric self-interest, then they designed managerial systems with this in mind. Individuals process fairness for themselves and others in similar regions of the brain, especially for automatic implicit reactions to inequity (Frith & Frith, 2008). From the other hand, there is also evidence confirming that negative implicit attitudes can affect the neural processing of justice perceptions in social settings. Diversity in teams and organizations can act as a barrier to shared justice perceptions in their network model of justice. Most importantly for justice considerations, implicit attitudes may alter the way justice is processed in the brain.

Specifically, the activation of out-group status could essentially turn off empathy and justice processing for those individuals. This could help explain the incongruous behavior of individuals who act justly in most aspects of their life but prove capable of gross injustice and even discrimination toward individuals of a particular group. Therefore, in many cases

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by helping to resolve theoretical debates, a neuroscientific debate may often also suggest new research directions.

As we have previously underlined, many theories of workplace behavior imply a high level of conscious control over our thoughts and actions. For example, research on work motivation has historically been concerned with explicit behavioral standards and decisions, despite the availability of evidence suggesting that individuals are also influenced by implicit and unconscious goals (Latham, Stajkovic, & Locke, 2010). The collective impression that emerges from organizational theory often portrays the individual as an active agent who weighs evidence to make deliberate decisions. We argue rather that human consciousness has important limitations. Neuroscience takes a somewhat different view of human thinking and feeling. Brain research indicates that a good deal of processing takes place outside the limits of our conscious awareness. For this reason, organizational neuroscience would retain deliberative processes but also suggest that greater emphasis be placed on non-conscious processing.

6. Internal or external to the leader: a continuum between firm climate, moral self and self-monitoring skill?

Self-monitoring refers to the extent to which an individual looks internally or externally for cues to appropriate behaviors in a given situation or as the degree to which a person exercises deliberate control over his or her expressive behavior, self-presentation, and non-verbal displays of affect (Snyder, 1974). Thus, the manager may look within him/herself for values that can guide his/her decision-making, or the decision maker may look to the situation for behavioral cues. From the other hand, the ethical climate of an organization can be represented as the norms regarding how ethical issues are resolved and characterize it as a function of the combination of ethical decision criteria (decision rules) and the locus of analysis (referent group) used by members of the firm. However, as a third relevant element, the definition of "ethical leadership" may start also from the concept of "moral self", evaluated as a multicomponent phenomenon composed by a set of more properly stable cognitive and affective components that influence moral thoughts and actions, which results to be supported by a complex brain system called the "default mode network". The moral self-system appears to be guided by a number of components that regulate moral behavior, such as the "disposition of moral judgment", which is the result of the neural activity that influences leaders' ethical ideology (Lee, Senior, & Butler, 2012; Senior, Lee, & Butler, 2011).

As highlighted by several neuroscientific studies, the brain's Default Mode Network (DMN) appears to be involved in the moral reasoning processes that are configured as relevant to ethical leadership (Boyatzis, Rochford, & Jack, 2014; Koenigs et al., 2007).

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According to these studies, the brain functioning of DMN could cognitively and affectively affect the ability to regulate morals preceding ethical leadership. In particular, according to the relativist orientation, ethical ideology is considered as the set of moral behaviors and ethical principles dependent on the individual situation, while according to the idealist orientation, ethical ideology is defined as the set of ethical rules and moral principles that are universal and are respected in all contexts. According to this interpretations, individuals with a more relativist orientation can therefore decide whether or not to follow certain principles, depending on the importance attributed to the pursuit of their personal purposes, while individuals with a more idealistic orientation are concerned in all situations to respect ethical and moral principles, avoiding harm to others, even at the expense of achieving their personal goals. In this perspective, relativist leaders are supposed to be more inconsistent in taking ethical behaviors and decisions and less able to establish norms and ethical principles to be followed within groups. In this model, the interaction between neural activity and individual cognitive/ideological aspects is therefore considered in the prediction of future ethical leadership skills. This approach fits in the wake of previous studies that have considered how certain leaders' attributes, such as personal traits, dispositions, and orientations, can be useful in defining future leadership skills and modalities. For example, previous studies have investigated future ethical leadership skills by measuring individuals' personality traits (Brown & Treviño, 2006), moral reasoning skills (Jordan, Brown, Treviño, & Finklestein, 2013) and moral identity (Mayer et al., 2012).

Similarly, the Waldman and colleagues' model, considering neural activity as a predictor of future ethical leadership skills, investigates social cognition and organizational behavior by adopting a neuroscientific perspective.

The advantage of adopting a neuroscientific perspective allows for a better understanding of the neurophysiological bases underlying leadership skills (Healey & Hodgkinson, 2014; Powell, 2011). Recent studies have used the intrinsic or resting brain activity, which reflects the individual's stable ability in terms of mental and behavioral functioning (Balconi, Finocchiaro, & Canavesio, 2014; Balconi, Grippa, & Vanutelli, 2015; Balconi, Vanutelli, & Grippa, 2017; Raichle & Snyder, 2007). Indeed, intrinsic brain activity can be useful for measuring any individual differences relating to cognitive, emotional and behavioral aspects, such as ideology and ethical leadership, which are better measured as stable traits than as responses to temporary stimuli. Specifically, the understanding of ethical leadership capacity can take place through the analysis of the brain activity's underlying processes such as self-reflection, self-regulation and self-awareness (Buckner & Carroll, 2006). In particular, to identify a relevant profile of ethical leadership, it is necessary to consider three core aspects of brain functioning: relevant brain regions' activity, neural connectivity and hemispherical asymmetry. Regarding the first aspect (relevant brain regions), it is necessary to identify which brain areas are associated with some characteristic components of leadership. For example, as demonstrated by

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Waldman, Balthazard, and Peterson (2011), the frontal regions are involved in articulating the leader's socialized vision.

Other studies, however, have shown that the activity of other complex brain networks, composed of interconnections of multiple brain regions, supports some fundamental components of leadership, such as moral judgment or decision-making (Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012). For example, the DMN is constituted as a network of different brain regions, comprising parts of the medial temporal lobe, the medial prefrontal cortex, the posterior cingulate and the medial, lateral and inferior parietal cortices (Raichle, 2010), which appears to be involved in different processes such as self-projection and social cognition (Buckner & Carroll, 2006). Regarding the second aspect (neural connectivity), brain connectivity can provide useful information on cognition and leadership behavior (Balconi, Cassioli, Fronda, & Vanutelli, 2019; Balconi, Venturella, Fronda, & Vanutelli, 2020; Buckner et al., 2008). Specifically, the term connectivity refers to the synchronous activity of different brain regions (Hannah, Balthazard, Waldman, Jennings, & Thatcher, 2013) able of providing a mathematical measure on the degree of similarity of simultaneous neurophysiological signals in two different brain regions (Thatcher, North, & Biver, 2008).

For example, several studies have shown how measuring brain connectivity can provide information on individuals' awareness and moral attention and on the monitoring processes of external environment (Buckner et al., 2008). Moreover, brain connectivity gives information about elaboration and social competence processes (Schreiner et al., 2014).

Regarding the third aspect (brain asymmetry), hemispheric asymmetry can provide information on how the left and right cerebral hemispheres are involved in different forms of thinking and behavior. For example, previous studies (Hellige, 1990) have shown the greater involvement of the left hemisphere in a more rational or analytical assessment underlying the reasoning or moral decision processes. Furthermore, other studies have shown the involvement of both hemispheres in emotional experience (Balconi et al., 2015; Bennet & Bennet, 2008; Cacioppo, Berntson, & Nusbaum, 2008), with a predominant role of the right hemisphere in the processes of emotional regulation and moral judgement. Finally, a correct emotional regulation supports ethical leadership, which can be ruined by an inadequate capacity for emotional management, leading leaders to freeze in front of situations with high moral intensity implementing hostile and inappropriate behaviors.

In other words, it is a question of calibration between firm ethical culture, individual component and brain "attitude".

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