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Voegtlin, Christian ; Walthert, Ina Maria ; Robertson, Diana C

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Neuroscience Research and Ethical Leadership: Insights from a Neurological Micro Foundation

Christian Voegtlin

Department of Business & Society

Audencia Business School

cvogtlin@audencia.com

Ina Maria Walthert

Sustainserv GmbH, Switzerland

ina.walthert@sustainserv.com

Diana C. Robertson

Department of Legal Studies and Business Ethics

The Wharton School, University of Pennsylvania

robertsd@wharton.upenn.edu

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NEUROSCIENCE RESEARCH AND ETHICAL LEADERSHIP: INSIGHTS FROM A NEUROLOGICAL MICRO FOUNDATION

Abstract

The chapter examines to what extent research from social cognitive neuroscience can inform ethical leadership. We evaluate the contribution of brain research to the understanding of ethical leaders as moral persons, as well the understanding of their role as moral managers. The areas of social cognitive neuroscience that mirror these two aspects of ethical leadership comprise research relating to understanding oneself, understanding others, and the relationship between the self and others. Within these, we deem it relevant for ethical leadership to incorporate research findings about self-reflection, self-regulation, theory of mind, empathy, trust and fairness. The chapter highlights social cognitive neuroscience research in these areas and discusses its actual and potential contributions to ethical leadership. The chapter thereby engages also with the broader discussion on the neuroscience of leadership. We suggest new avenues for future research in the field of leadership ethics and responsibility.

Keywords

Ethical leadership, responsible leadership, social cognitive neuroscience, moral person, moral manager

In recent years, research on ethical leadership has proliferated (e.g., Brown & Mitchell, 2010; Brown & Treviño, 2006; Brown, Treviño, & Harrison, 2005; Babalola, Stouten, Euwema, & Ovadje, 2018; Schaubroeck et al., 2012). Not the least because business organizations and their representatives are increasingly confronted with rising societal expectations and a growing call for ethical and responsible leadership (see, e.g., Brown & Treviño, 2006; De Hoogh & Den Hartog, 2008; Voegtlin, Patzer, & Scherer, 2012; Waldman, Siegel, & Javidan, 2006). Leadership ethics is the overarching label for questions related to ethics, justice and fairness in the context of leadership (see, e.g., Ciulla, 1995, 2005; Rost, 1995). Scholars have addressed ethical questions in leadership from a normative point of view and, more recently, also from an empirical perspective. A growing literature stream in leadership research deals with, among other ideas, authentic leadership (Avolio & Gardner, 2005; Walumbwa et al., 2008), servant leadership (Barbuto & Wheeler, 2006; Liden et al., 2008), or ethical characteristics of transformational leadership (Bass & Steidlmeier, 1999; Waldman et al., 2006). All of these concepts address aspects of ethics in leadership as part of the concept itself and in terms of empirical relations to ethical outcomes. More recently, scholars have devoted attention to leadership and responsibility, broadening the scope from the leader-follower relationship to the responsible engagement with all of the company's stakeholders and the citizenship responsibilities of leaders (Maak, Pless, & Voegtlin, 2016; Stahl & Sully de Luque, 2014; Waldman & Galvin, 2008).

Still, the research on the intersection between leadership and ethics presents itself as a complex and heterogeneous field. The empirical research is based on social or philosophical theories as well as psychological assumptions of cognition and reason. Leadership is understood as an influence process between leaders and employees aimed at facilitating collective efforts to accomplish shared objectives (Yukl, 2006, p. 8), and its main research focus is placed on issues around individual characteristics and personal interactions. What we still do not understand sufficiently in relation to the self and the interaction between the self

and others is what is literally going on in leaders' brains. Investigating these processes may help shed light on how the transformation of external stimuli in their brains relates to ethical leader behavior.

Consequently, the impact of scientific and technological developments in neuroscience has inspired a new trend of doing "business with the brain" under the term *social cognitive neuroscience* (Beugré, 2010; Camerer, Loewenstein, & Prelec, 2004; Elger, 2009). In addition to neuroeconomics (Camerer et al., 2004; Kenning & Plassmann, 2005; Stanton, Day, & Welpe, 2010) and neuromarketing (Fugate, 2007; Lee, Broderick, & Chamberlain, 2007), relatively new fields like organizational cognitive neuroscience (Senior, Lee, & Butler, 2011) have emerged. More recently, scholars have started to investigate ethical decision-making and other aspects of business ethics with neuroscience methods (for an overview, see e.g., Robertson, Voegtlin & Maak, 2017). Results of neurological studies reveal for example a two-fold process for ethical decision making in which intuition and emotion play an important role in addition to cognitive reasoning processes (Cohen, 2005; Reynolds, 2006; Salvador & Folger, 2009).

In relation to ethical leadership, on the one hand, an evolving stream of neuroleadership emerges (see, e.g., Elger, 2009; Rock & Ringleb, 2009), trying to uncover, for example, the brain functions associated with transformational leadership (Balthazard, Waldman, Thatcher, & Hannah, 2012; Waldman, Balthazard, & Peterson, 2011a); on the other hand, researchers have investigated the ethical decision-making process from a social cognitive neuroscientific point of view (Cohen, 2005; Reynolds, 2006; Reynolds, Leavitt, & DeCelles, 2010; Salvador & Folger, 2009). However, there is no comprehensive overview of how neuroscience research can inform ethical leadership theories and practices. This chapter aims to demonstrate that integrating a brain-based perspective could add to a more detailed understanding of the field and could advance our knowledge of ethical leadership. We identify the areas of cognitive neuroscience research that we consider most promising for this

understanding. Furthermore, a brain-based perspective could present a successful way for building a common ground for the heterogeneous field of ethical leadership rooted in an advanced micro view of human behavior as "leveraging this knowledge will reduce our level of analysis to the most basic building blocks of behaviour" (Becker, Cropanzano & Sanfey, 2011: 934). Collectively this perspective and neuroscience research findings may offer an important starting point for managerial implications and future research directions.

Nevertheless, despite the potentially beneficial contributions of social cognitive neuroscience, it is important to recognize potential shortcomings with which such an interdisciplinary dialogue has to deal. The enthusiasm with which the social sciences have adopted a neuroscience approach calls for a growing need to critically assess the extent to which these methods and their implications can inform other fields of research, and especially leadership (Lindebaum, 2013; Lindebaum & Zundel, 2013). The aim of this chapter is to provide an overview of neuroscience research in relation to ethical leadership in order to broaden the dialogue between social cognitive neuroscience and leadership scholars and to encourage future research in this direction.

In the following, the chapter introduces ethical leadership. We draw upon the distinction between the ethical leader as a *moral person* and a *moral manager* proposed by Treviño and colleagues (Treviño, Hartman, & Brown, 2000). The dimension of the *moral person* refers to the characteristics and the internalized values of the leader. The *moral manager* stands for the influence process and the employees' perception of leaders as role models for ethical behavior (Treviño et al., 2000). The chapter continues with an introduction to social cognitive neuroscience. We focus on core concepts currently discussed in neuroscience research that can provide insights for the ethical leader as a moral person and moral manager: *self-reflection*, *self-regulation*, *theory of mind* and *empathy*, *trust* and *fairness*. We go on to discuss contributions of findings from social cognitive neuroscience for ethical leadership along three dimensions: descriptive accuracy, managerial implications, and

future research directions for the field of ethical leadership. The neuroscience perspective adds a new descriptive—namely, the neural level—of explanation by advancing the micro foundation of ethical behavior.

LEADERSHIP ETHICS AND RESPONSBILITY

Ethical leadership is an important topic for organizations. Leaders influence their followers and this influence process is open to misuse on behalf of the leader. Ethical leadership is thus concerned with the responsible handling of power and influence. "Leaders and [the] led have a relationship not only of power but of mutual needs, aspirations, and values […]. Moral leadership emerges from and always returns to the fundamental wants and needs, aspirations, and values of the followers" (Burns, 1978, p. 4). The implications of this relationship were initially recognized in the early works of Barnard (1960) as well as with the adaption of Burns' theory of transformational leadership (Burns, 1978) for management research (see, e.g., Bass, 1985; Bass & Avolio, 1994; Bass & Steidlmeier, 1999). Although ethical issues were an essential part of the early works on leadership, the focus in the scholarly leadership discussion has shifted to an instrumental view on leadership as a driver for performance. Only recently have leadership scholars shown a renewed interest in the phenomenon of good leadership in the sense of ethical or responsible leadership (Ciulla, 1995, 1998; Maak & Pless, 2006; Miska & Mendenhall, 2018), often motivated by the demand for action in the light of recent business scandals or the new challenges of globalization and the central role leaders play therein (Voegtlin et al., 2012).

The concept of leadership ethics has been advanced by reflecting either on the normative validity or on the basis of descriptive accuracy. These aspects, although interrelated, refer to different assumptions and entail different implications. Normative approaches draw on philosophical theories to determine what leaders should do or what ethical leadership should be. The descriptive approach examines what is perceived as ethical

leadership in practice and how such leaders influence others, drawing on social scientific methods and assumptions. In their summary of business ethics and the brain, Salvador and Folger (2009) assume that the study of the brain could help bridge the normative–descriptive divide. They propose that neuroscience research can point to underlying neural mechanisms of normative approaches (e.g., research has shown that certain brain regions are related to utilitarian decision making). Biological insights may further highlight what we as humans are capable of doing, which could ultimately guide normative theories by making them more realistic (e.g., by discussing the role of emotions in purely rational theories). However, these findings also spur the discussion about the role of human agency in ethical decision-making (Robertson et al., 2017). Studies on patients with brain lesions indicate that some people might not be held liable for their behavior, because the damage done to their brains makes them unable to perceive moral rules and norms adequately (Greene, 2009). Moreover, the more neuroscience research provides support for intuitive and unconscious processes driving ethical decision-making, the more questions of moral responsibility, autonomy, intent, and free will permeate the normative discussion (Robertson et al., 2017). While these discussions are important, we believe that the main contribution of social cognitive neuroscience will occur at the descriptive and predictive levels and therefore we will focus on these aspects.in the following sections.

As discussed, Treviño and colleagues (Treviño et al., 2000) provide an important distinction with regard to ethical leadership: the leader as a moral person and a moral manager. They derived their understanding of ethical leadership from qualitative interviews with senior managers and ethics officers in organizations, asking them to “think about an ethical leader with whom they were familiar, and to answer broad questions about the characteristics, behaviors, and motives of that leader” (Brown & Treviño, 2006, p. 596). From these interviews, two aspects of an ethical leader emerged. The first aspect revealed personal traits, values, and principles connected to ethical leadership—namely, the *moral person*

dimension. The second aspect, the *moral manager*, is the aspect of ethical leadership concerned with the influence process between leaders and their followers. Both aspects are interrelated; only when combined do they form a reputation for ethical leadership (Treviño et al., 2000). Leaders not perceived as moral managers will not be regarded as clearly unethical, but they will also not be perceived as strong ethical leaders; they may be seen as ethically neutral leaders. Meanwhile, leaders who only act as moral managers and do not show the characteristics of a moral person may build a reputation for window-dressing—namely, people will look for actions that match the words of a moral manager (Treviño et al., 2000).

The two aspects of ethical leadership contain important implications for leaders in organizations. The moral person is characterized by traits and behaviors perceived as ethical and by making decisions based on ethical principles. The traits include, among others, integrity, honesty, and trustworthiness. Ethical behavior relates to doing the right thing, having a concern for people, being open, and having a strong personal morality. When making decisions, moral persons hold to their values, are objective and fair, and follow ethical decision rules (Treviño et al., 2000). The moral manager is an ethical role model for others, rewards ethical and disciplines unethical behavior, and communicates about ethics and values (Treviño et al., 2000). Recent research on the responsibility of leaders emphasizes that the leader as a moral manager has not only to take care of her or his immediate followers, but is accountable to the range of organizational stakeholders (Maak & Pless, 2006; Voegtlin et al., 2012). This requires engaging with stakeholders, listening to their concerns and making decisions that consider the implications for society and the environment besides economic profit.

We have identified three areas of social cognitive neuroscience most useful for research on the ethical leader as moral person and moral manager: understanding oneself, understanding others, and the relationship between the self and others (Robertson et al., 2017). The neurological investigations of understanding oneself can help us inform the moral

person while understanding others may generate insights for the moral manager. In addition, an improved knowledge of how to build and maintain social interactions combines both aspects of the ethical leader. We will turn to these in the following section, after briefly introducing the field of social cognitive neuroscience.

SOCIAL COGNITIVE NEUROSCIENCE AND ETHICAL LEADERSHIP

Social cognitive neuroscience is defined as a field of research combining knowledge of social science disciplines (specifically psychology) and neuroscience (Blakemore, Winston, & Frith, 2004). Such an interdisciplinary approach enables us to look at different levels of analysis from an integrative view, bringing together questions related to the social (motivational and social factors relevant for behavior and experience), cognitive (information-processing mechanisms), and neural level (brain mechanisms) (Ochsner & Lieberman, 2001). Social cognitive neuroscience focuses on social phenomena, such as the representation of the minds of others, empathy, agency, reflection of one's own experiences, emotions, the self as part of the social world, and social decision-making (fairness, trust, and cooperation), using traditional neuroscience methods and tools like neuroimaging and neuropsychology (Lieberman, 2007).

The most prominently used technology is that of functional magnetic resonance imaging (fMRI) to observe brain function; other functional brain imaging methods used for social cognitive neuroscience include electroencephalography (EEG), positron emission tomography (PET), and transcranial magnetic stimulation (TMS) (see, e.g., Harrison & Ross, 2010; Senior et al., 2011). The extraction of brain images differs according to which method is used. For fMRI, the most common method to measure brain activity is the blood-oxygen-level-dependency effect (BOLD-fMRI), a method based on an increase in neural activation that goes along with an increase of oxygen. This method is advantageous in terms of its high spatial resolution and the possibility of viewing neuroanatomic structures in great detail;

moreover, it is non-invasive (Huesing, Jaenicke, & Tag, 2006). A more detailed introduction to functional brain imaging and its application within the social sciences can also be found in the neuroeconomic literature (see, e.g., Glimcher, Camerer, Fehr, & Poldrack, 2009; Kenning & Plassmann, 2005). In addition to brain imaging technologies, scholars often count as neuroscience methods measures of hormones and other bodily reactions, like skin conductance, heart rate, pupil dilation and eye tracking (Robertson et al., 2017). Specifically, the research on hormones like oxytocin, dopamine or testosterone can provide relevant insights into how we approach and bond with others, and might thus be an important field of inquiry for ethical leadership research.

Neuroscience technologies have generated several original research directions in relation to the investigation of social phenomena. Table 1 summarizes the brain functions associated with the emerging research areas in social cognitive neuroscience that seem especially relevant for ethical leadership (for similar structuration, see Robertson et al., 2017) and highlights the possible contribution of social cognitive neuroscience with regard to descriptive aspects, i.e., the explanation of psychological processes and behaviors related to ethical leadership, and managerial implications. Both aspects will be discussed in more detail in the following.

Insert Table 1 about here

Understanding Oneself: Self-Reflection and Self-Regulation

The concept of the "self" is a combination of several cognitive competences unique to humans as individuals. With regard to ethical leadership, understanding oneself refers especially to capabilities of understanding oneself as a moral person. Thus, we focus on competences such as reflecting about oneself and regulating oneself. Both concepts investigate the development of a sense of self, which is not only important with regard to how

one estimates one's own abilities, traits, and attitudes, but also for personal conduct, choices, and behavior in social interactions (Johnson et al., 2002).

Self-reflection is about actively engaging with one's own experiences (past or current), self-concept, and feelings in order to reflect on situations that lead to a good or bad feeling and learn how to seek or avoid similar situations in the future (Lieberman, 2007, p. 267). Neuroscience research has identified brain areas that are related to the evaluation of current experiences and autobiographical reflections of the past (Lieberman, 2007; Saxe, Moran, Scholz, & Gabrieli, 2006). In addition to autobiographical reflections, episodic memory retrieval is important for self-reflection (Johnson et al., 2002). We summarize and provide specific information about the brain regions usually involved in these processes in Table 1. Both forms of memory retrieval are formative for behavioral patterns and for reflecting on one's self-concept, where self-concept refers to trait terms such as kind or smart. Traits are the subject of several studies examining neural activity (D'Argembeau et al., 2007; DeYoung et al., 2010; Kim & Whalen, 2009). Studies for instance found that thinking about personal character traits leads to activation of different brain areas than thinking about someone else's personality characteristics (D'Argembeau et al., 2007).

In contrast to self-reflection, self-regulation is involved in the decision-making process and the achievement of personal and social goals as it enables us to control and reappraise emotional events (Lieberman, 2007, p. 269). Studies have shown that the brain is able to intentionally override impulses and enables us to regulate our behavior in certain situations (Lieberman, 2007; for an overview of brain areas usually associated with self-regulation, see Table 1). We are also able to orchestrate beliefs in order to reason correctly. In addition to the relevance of introspection into oneself, studies about self-regulation and self-reflection convey important insights about the concept of understanding others (Johnson et al., 2002).

These insights have implications for ethical leadership. Leaders as moral persons should know about their strengths and weaknesses, embrace moral values, and act

consistently with these internalized values and beliefs (Treviño et al., 2000). They have an ingrained moral identity that creates a need to act true to their own selves and subsequently motivates action consistent with a set of moral traits that constitute the moral self (Aquino & Reed, 2002; Reynolds & Ceranic, 2007). Results from social cognitive neuroscience studies of the self—especially self-reflection—offer the possibility to improve knowledge and understanding of these aspects of ethical leadership. Experimental studies support the theoretical assumptions of a self-reflected moral identity or an internalized set of moral values (Lieberman, 2007; Reynolds, 2006).

Self-reflection involves brain regions relevant not only for cognitive behavior, but also for moderating social behavior, aspects of memory processing, and evaluation of risks and fears (Lieberman, 2007; Mitchell, Banaji, & Macrae, 2005). Thus, reflecting about oneself as a moral person involves more processes than just conscious reasoning. Theoretical approaches to ethical leadership need to consider the complexity of individuals' current and prior experiences, external triggers of risks and fears, memory processing, and intuitive reactions in addition to assumptions of a purely rational moral judgment (Greene et al., 2001; Reynolds, 2006).

Social cognitive neuroscience also provides behavioral insights for the ethical leader in dealing with the challenge of being a moral person and being perceived as such. Self-reflection depends on past and current experiences. Such experiences leave a footprint the brain starts to remember as soon as it is confronted with similar situations (Lieberman, 2007; Reynolds, 2006). It is further engaged in evaluating and processing these experiences for negative or positive feelings. The process influences both current and future decisions and might implicate the change or modification of current or future behavior as well as personal values and moral identity (Kelley et al., 2002; Mitchell et al., 2005). Conscious self-reflection can lead to the adaptation and modification of moral identity based on experiences and positive or negative emotional stimulation.

In contrast to self-reflection, self-regulation includes the human ability to aim for the achievement of personal goals and regulate emotional impulses in situations that are counterproductive to one's overarching goal. As it refers to cognitive as well as emotional control, it is especially important for ethical leaders with regard to the challenge of moral decision making (see, e.g., Brown & Mitchell, 2010; Cohen, 2005; Salvador & Folger, 2009). Experiments on self-regulation confirm that observable neural processes indicate an intentional and unintentional regulatory effect on behavior. Examined brain regions are understood to be responsible for impulse control or reappraising emotional events (see Table 1). This research is linked to the discussion of insights from social cognitive neuroscience for moral decision making (Reynolds, 2006; Reynolds et al., 2010; Salvador & Folger, 2009). Early studies on brain lesions underscore the role of emotion in moral decision making. These studies for instance showed that individuals with damages to the ventromedial prefrontal cortex, a brain area associated with encoding the emotional value of sensory stimuli, were still able to reason correctly, bud did engage in unethical decisions because they were unable to generate the necessary feelings for others (Greene, 2009). Consequently, one of the main contributions in this area is to show the relevance emotions and intuition play in the process of moral decision making in addition to cognitive reasoning (e.g., Haidt, 2001; Reynolds, 2006). Moreover, research has started to identify brain areas related specifically to moral cognition (Moll et al., 2005).

Studies by Greene et al. (2001, 2004) demonstrated that utilitarian judgments involve brain areas that are associated with cognitive decision making, whereas emotional areas are correlated with deontological moral judgments. Greene and colleagues (Greene, 2007; Greene et al., 2001) tested what they call the dual-process theory with a series of experiments where participants are confronted with the "trolley-dilemma" in its multiple variations. While participants have to decide if they would rather sacrifice one person to save five persons from being overrun by a trolley, their brain activity is monitored using fMRI (Greene et al., 2001).

The results indicate that the more the dilemma is emotionally engaging (e.g., pushing someone in front of the trolley instead of just switching a lever), the more likely participants make deontological decisions (i.e., "do not kill") instead of utilitarian decisions (i.e., sacrificing one person to save five persons). FMRI results showed that in the former case, brain areas associated with emotions are more active, while the latter relates to brain activity in areas associated with cognitive processing. Moreover, Greene and colleagues (2001) also show that if participants in the emotionally engaging conditions do make utilitarian judgments, these decisions tend to take more time. This indicates that deontological judgments are formed more intuitively, as opposed to utilitarian judgments.

It is especially for this interplay between emotion and reasoning where abilities for self-reflection and self-regulation can be relevant for finding a healthy balance. Research on self-regulation can identify ways in which to control these unconscious reactions and to improve our cognitive moral reasoning capacity, while capabilities for self-reflection can make ethical leaders become aware of the importance of their feelings in making ethical decisions.

Social cognitive neuroscience studies on self-reflection and self-regulation offer also important practical implication, i.e., they show that our brain develops (Lieberman, 2007; Waldman et al., 2011b) and that a moral identity can change. Self-reflection involves drawing upon past and current experiences that leave prototypes in the brain (i.e., neural structures) that either trigger intuitive reactions when encountering similar situations or can be adapted or newly created by conscious reflection when confronted with new situations (Reynolds, 2006). Neurobiological results indicate that these prototypes can be altered and moral identity can be modified or adapted by conscious self-reflection. These findings suggest training possibilities to enhance self-reflection and affect the moral identity in ways guided by normative theories. Furthermore, organizations can try to encourage persons to behave morally by letting them experience a strong ethical culture (Rochford, Jack, Boyatzis, & French, 2017).

Similarly to training for self-reflection, neuroscientific insights can guide researchers and practitioners in developing learning techniques to foster self-regulation and raise awareness among managers. Reporting and communication of emotions has been shown to have positive effects for regulating negative emotional responses (Lieberman, 2007). Thus, ethical leaders should talk about upsetting emotional events connected with the workplace and encourage employees to do so as well. They can develop sensitivity for their unconscious brain activity as well as an awareness of how emotions can influence their decision making. Awareness of the role intuition plays in ethical decision making could be raised among business leaders by demonstrating to them what their brains really do when making decisions (e.g., in terms of brain activity and reaction time). Conscious reasoning is often only an ex-post rationalization of intuitive reactions (see, e.g., research on unconscious reactions to physical characteristics of other persons, like beauty and race; Senior et al., 2011, p. 808).

Understanding Others: Theory of Mind and Empathy

Understanding others relates to the way in which one individual perceives the mental state or mind of another person. The leading theoretical concepts in neuroscience considered to be of decisive importance for explaining human interaction in social context are theory of mind (ToM) and empathy. In both concepts, the interplay of the "self" and "other" plays an important role (Frith & Singer, 2008). Whereas theory of mind is investigating how individuals perceive the mental states of others (ability to mentalize), empathy describes the capacity to understand what others feel, such as emotions or a sensory state (Singer et al., 2004, p. 1157). Brain regions usually associated with both capacities are listed in Table 1.

Theory of mind is decisive for understanding psychological traits of the other person in order to more adequately make judgments about dispositions for certain behavior. Based on the cognitive capacity to perceive oneself as a subject expressed by personal pronouns ("I", "me"), perceptions, and experiences, theory of mind is the ability to assign such capacities of

the self to others, which is crucial for any kind of social interaction and communication (Frith & Singer, 2008, p. 3878). As such, individuals draw upon their personal theory of how minds operate in order to infer what others think (Lieberman, 2007). Explanations of theory of mind often point to the concept of "simulation theory" (taking someone else's perspective as well as the projection of one's own attitudes on others based on the activation of the same brain regions relevant for self-perception) or to the opposite and thus controversial view of "theory theory". The latter proclaims that theory of mind involves different brain regions for perceiving oneself and perceiving others, suggesting that mentalizing about others (theory of mind) would lead to different neurological patterns than mentalizing about oneself (Gopnik, 1993; Perner & House, 1992; Vogeley et al., 2001).

In their study, Vogeley and colleagues (2001) demonstrated that aspects investigated by theory of mind usually involve neural activation in brain areas attributed to functions like error detection, anticipation of tasks, motivation, modulation of emotional responses; some of these areas are also crucial for the ability to make moral decisions. Gallagher (2000) added a further neuropsychological perspective in showing differences between activation patterns for theory of mind and perception of self. The findings show that theory of mind indeed involves mental states of the self to predict and explain mental processes of others (Gallese & Goldman, 1998; Vogeley et al., 2001).

The second important ability that enables individuals to understand others is empathy—namely, the capacity to understand what it feels like when someone else experiences something like happiness, pain, a touch, or sadness. Recent studies from neuroscience suggest that an empathic stimulation in terms of the activation of regions associated with feeling an emotion is caused by seeing another person's facial expression of this form of emotion (Gallese, 2001; Lieberman, 2007). Singer and colleagues (2004) examined empathic pain, questioning whether this leads to an activation of the complete pain matrix, which is defined as a network of brain regions engaged in transmitting pain. Their

results indicated that empathy with the pain of others does not include activation of the whole pain matrix, but rather those areas representing the affective dimension of pain. The authors concluded that these regions have a dual function in that they are important for the formation of subjective feelings with respect to the self and for understanding others' emotional states.

Leadership research has emphasized the role of empathy in leader–follower relationships (Kellett, Humphrey, & Sleeth, 2002, 2006; Mahsud, Yukl, & Prussia, 2010). Empathy is part of the emotional intelligence of a person and conceptual work suggests that it affects whether someone is perceived as a leader (Kellett et al., 2002). If ethical leaders recognize, understand, and subsequently share the emotions and feelings of others, it will enhance their ascribed integrity and credibility as well as stimulate cooperation and trust (Kellett et al., 2006, p. 150). Ethical leaders who are empathetic toward their employees should be perceived as more credible role models. They are more sensitive towards the needs of their followers and the differences between their emotional states.

In addition to empathy, theory of mind should enable ethical leaders to improve their ethical decision making. Theory of mind can be regarded as a presupposition of an ideal role taking. Ideal role taking means that the person making a moral judgment tries to assume the perspective of those persons who are possibly affected by the decision and then decides by him- or herself, from such an external moral point of view, what is right or wrong (Habermas, 1996, p. 65; Kohlberg evaluates his stages of moral development according to the approximation of moral judgment toward an ideal role taking, Kohlberg, 1981, 1984). Ideal role taking is also an essential part of many normative ethical theories (e.g., Kant's categorical imperative, Rawls' veil of ignorance, which can be regarded as thought experiments representing ideal role taking; Kant, 1993; Rawls, 1971). Managers who engage in ideal role taking consider the consequences of their decisions for all potentially affected stakeholders and reflect on the negative consequences for these stakeholders from an external moral point of view (i.e., they judge the situation based on ethical criteria, as opposed to self-interest or

the interest of the firm). Ideally, they approach stakeholders in a next step to find mutually beneficial solutions, or at least try to consider the ethical implications in their decision-making.

Taken together, both aspects of social cognitive neuroscience research relate to ethical leaders' ability to be effective moral mangers. Neuroscience research has shown that theory of mind and empathy both involve brain regions attributed with functions of error detection, anticipation, modulation of emotional responses and anticipation of tasks. Empathy further involves brain regions relevant for perception, self-awareness or interpersonal experiences, whereas theory of mind is connected to brain areas crucial for moral decision-making (Lieberman, 2007; see also Table 1).

Neurological findings on empathy reinforce the previously discussed role it plays for bonding and relationships (Shapiro, 2002). The brain regions activated when being empathic are especially relevant for the sensitivity toward and recognition of other people's feelings or emotional states (Lieberman, 2007). Thus, empathy allows ethical leaders to be more careful in their treatment of others. The neural underpinnings of theory of mind are important for the moral decision-making process as they allow for insights of brain-based processes related to deliberately assuming the position of other persons, which may help moral managers evaluate ethical dilemma situations and guide their decision making.

In order to be credible role models, ethical leaders have to be perceived as empathic and fair ethical decision makers. Neurological findings point to possible implications of how moral managers can act as such positive role models. First, they can do so by triggering the right stimulus-response setting; indeed, knowledge about how the brain reacts to certain stimuli can help leaders engage in behavior that fosters ethical behavior among employees. Second, they can try to create an environment that minimizes threats and maximizes rewards for employees (Rock, 2008). Rochford et al. (2017) rely on neurological insights to emphasize the relevance of socioemotional reasoning for ethical leaders. In relation to empathy, this

implies that leaders should look for their employees' emotional signs, including changes in body posture and facial expressions as well as ways of communicating or acting. Leaders can trigger emphatic stimuli, for instance by providing individualized support or appraising employees' emotions.

Due to the importance of both concepts, approaches to learning and teaching theory of mind and empathy are of great interest (Baron-Cohen et al., 1997; Chin & Bernard-Opitz, 2000; Ozonoff & Miller, 1995; Shapiro, 2002). Studies confirm that the improvement of empathic behavior is teachable, including a range of verbal and nonverbal skills (e.g., giving feedback, showing concern for the other person, eye-contact, body posture) as well as behavioral gestures like follow-up calls or purposeful asking (Shapiro, 2002). Teaching theory of mind is often aligned to the training of social skills, like interactional and communication skills. The capability of "socially relating to other people" is especially problematic for people with autism and with Asperger's syndrome (Baron-Cohen et al., 1997; Chin & Bernard-Opitz, 2000), making teaching approaches particularly relevant. However, this knowledge is also of interest for social skill development in organizational settings and ethical leadership.

The concepts presented thus far stem from the individual's viewpoint describing an inward-looking perspective of the individual to one judging other individuals. The following section shifts the focus to social interactions among individuals.

Leading Others: Trust, Fairness and Cooperation

Leading others ethically and responsibly requires trust, fairness and cooperation. Within organization theory, these concepts are prominently discussed and anchored in a well-developed body of literature (Brenkert, 1998; Gambetta, 1988; Hosmer, 1995; Wicks, Berman, & Jones, 1999). More recently, the view of trust, cooperation, and fairness has been enriched by a new (brain-based) perspective and explanations thereof, especially through

research in neuroeconomics (Fehr, 2008; Kosfeld et al., 2005; Sanfey et al., 2003; for an overview, see also Kaufmann, 2011).

Similar to explanations of theory of mind, empathy or the self, the neuroscience view of trust, fairness and cooperation is primarily a descriptive specification of underlying neural correlates (see Table 1). Many studies are framed as a monetary exchange situation in which two individuals perform an economic game (e.g., King-Casas et al., 2005). For trust and related behavior, such as cooperation or fairness, neural activation occurs in brain regions important for memory and emotional reactions, error and conflict detection, body movement, learning and memory as well as those important for feelings of reward (Adolphs, 2003; King-Casas et al., 2005; Rilling et al., 2004). These concepts are all important for a successful and harmonious interaction between two or more individuals and for influencing individual behavior both positively and negatively.

Trust has received significant attention in leadership research (see, e.g., Burke et al., 2007; Dirks & Ferrin, 2002) and has been specifically related to ethical leadership (Brown et al., 2005). Evoking trust in interpersonal relationships can be regarded as an essential quality of a moral manager and a moral person (Brown, 2007; Treviño et al., 2000). Results of social neurosciences studies confirm the importance that trust plays for social interactions (Fehr, 2008). Brain regions involved in trusting behavior are linked to memory, emotional reactions, the detection of errors and conflict situations, and feelings of reward as well as learning (Adolphs, 2003; King-Casas et al., 2005; Rilling et al., 2004). This broad spectrum captures the fragility and importance of trust as a phenomenon that is hard to capture, but indispensable for all kinds of interaction. Knowledge of how trust is neurally constructed can help develop the right stimulus-response setting to improve or rebuild trust in organizations or within teams.

In accordance with results from neuroleadership research, appropriate stimulation (e.g., those brain regions involved in feelings of reward and relevant for an approach

response) require actions on the behavioral level, like empowerment, positive feedback, and a feeling of security (Rock, 2008). Trust is not only a facilitator for economic transactions; when enabled in the context of an environment perceived as fair, cooperative, transparent, authentic, etc., it triggers a feeling of reward, which in turn is a motivational driver (Rock, 2008; Rock & Ringleb, 2009). In addition to these direct implications for the moral person, social neuroscience has found that one of the main drivers of social behavior is the principle of minimizing threat and maximizing reward (Rock, 2008). If leaders want to encourage employees to engage in social behavior and motivate them to perform tasks, they should create an environment that minimizes followers' perceived threats and maximizes their (brain-based) rewards. Building trust is fundamental to such an environment.

Similar to trust, neuroscience has started to identify brain areas related to perceptions of justice and fairness. Cropanzano, Massaro and Becker (2017) provide an overview of these brain regions. Neuroscience findings show that fairness judgments are moderated by affective and cognitive processes. Cropanzano et al. (2017) argue, based on these findings, that individuals are more likely to make the effort to evaluate whether someone was treated fairly or unfairly when they experience both cognitive empathy and affective empathy toward another person.

Trust and fairness are also dependent on hormonal reactions in our body. Hormones are "messenger molecules that are released by specialized neurons in the brain and by glands into the bloodstream, and that carry a signal at the speed of blood to other parts of the body" (Schultheiss & Stanton, 2009, p. 17). Hormones like oxytocine, dopamine, but also testosterone, estrogen and cortisol, influence our behavior and how we cooperate and interact with others. The release of different hormones in the human body has been related to social outcomes such as trust (oxytocin) (e.g., Kosfeld et al. 2005), aggressive behavior and power (testosterone) (e.g., Stanton & Schultheiss, 2009) or empathy (cortisol) (e.g., Engert et al., 2014), but also to individuals' ability to cope with stress in social interactions or work-related

situations (Bellingrath, Weigl, & Kudielka, 2008; Engert et al., 2014; Walther, Voegtlin & Ehlert, 2016). These findings imply for instance that the release of oxytocin enhances an individual's propensity to trust others.

THE CONTRIBUTION OF SOCIAL COGNITIVE NEUROSCIENCE TO ETHICAL LEADERSHIP: TOWARD AN AGENDA FOR FUTURE RESEARCH

Table 1 summarizes our discussion of neuroscience and ethical leadership. Whereas capabilities for self-reflection and self-regulation enhance the leader's capacity to be a moral person, theory of mind and empathy can be seen as presuppositions of being a good moral manager. Trust and fairness can help leaders build strong social relations and influence others in a responsible manner. Neuroscience research advances the micro level of explaining individual leader behavior by integrating processes at the neural level, thereby opening the black box of individual biological reactions related to external stimuli. Relating concrete brain regions and their functions in human action to ethical leadership helps underpin and improve existing theoretical (psychological) models of leadership by literally showing what is happening in the brain (and thereby highlighting potential biological limitations or enablers related to leading ethically and responsibly). Enhanced knowledge of stimulus-organism-response cycles and behavioral responses, as gained through such a micro-foundation, not only leads to theoretical progress (at the descriptive level), but further includes the chance to derive new managerial implications at the instrumental level (some of which we have mentioned in our previous discussion). In particular, neuroscience research can lead to implications for training in organizations in areas such as empathy and self-reflection. We want to conclude our discussion by highlighting emerging research on neuroscience and leadership, followed by some of the caveats mentioned with regard to neuroscience research and an outline of a future research agenda.

Neuroscience Research and Leadership

Apart from the specific areas relevant for ethical leadership we discussed above, research has started to use neuroscientific methods to directly investigate leadership (see also Waldman, Balthazard & Peterson, 2011b). Balthazard et al. (2012) for instance used EEG technology to classify the neural correlates of transformational leaders versus non-transformational leaders. There is also emerging research on neursocience and inspirational leadership: Waldman and colleagues (2011a) focused on the socialized visionary communication of inspirational leaders and showed how such communication mediated the relationship between coherence in right frontal regions of the brain and follower perceptions of leader charisma. In a recent study by Molenberghs et al. (2017), fMRI was used to investigate the different brain reactions of participants when confronted with inspirational and non-inspirational statements by either in-group leaders or leaders from an out-group. Findings indicate that inspirational statements by in-group leaders activated brain areas that are typically associated with controlling semantic information processing. Interestingly, the same areas were also activated by non-inspirational statements from out-group leaders. Non-inspirational statements by in-group leaders lead to brain activity in areas related to reasoning.

There has also been research on brain regions associated with leader complexity (Hannah et al. 2013) and hormonal studies have shown that testosterone is positively related to leader corruption (Bendahan et al., 2015). Bagozzi et al. (2013) studied theory of mind and empathic underpinnings of Machiavellianism using fMRI and found that Machiavellians are better in reacting to the emotions of others and less prone to use reasoning associated with theory of mind than non-Machiavellians.

Finally, Rochford and colleagues (2017) summarize research on two brain networks, the task positive network associated with analytic reasoning and the default mode network, associated with socioemotional reasoning and suggest that ethical leadership requires achieving a balance between both. They point out that organizational culture often relies

heavily on analytic reasoning and encourage ethical leaders to infuse organizations with socioemotional reasoning in order to avoid dehumanizing organizational stakeholders.

Limitations of the Dialogue between Neuroscience and Leadership

Neuroscience methods are not without critique. For example, technological limits are discussed along the process chain of experimental conduct: in the pre-phase of conceptualizing the experimental design, by implementing the experiment, and finally during the interpretation of the data. For example, the experimental design has to deal with problems of localization or reverse inference. Problems of localizing "concepts" like empathy or trust in the brain occur insofar as a clear neurobiological definition of the phenomenon under investigation is often missing. Reverse inference questions the conclusion which is drawn from the measured activation pattern for the involved psychological processes (Logothetis, 2008).

Ethical risks and limitations in turn are often summarized under the term *neuroethics,* a field of applied ethics that points out ethical issues of neuroscience research, such as safety requirements, privacy issues, and the danger of manipulation (Illes & Bird, 2006; Illes & Racine, 2005; Wolpe, Foster, & Langleben, 2010). These limitations and risks are also critically discussed with regard to the contribution of neuroscience for leadership research (Lindebaum, 2013; Lindebaum & Zundel, 2013).

Future Research Agenda

Despite these criticisms, we are confident that neuroscience research can provide important insights for our understanding of social phenomena. We therefore propose in the following a more general agenda for future research at the intersection of ethical leadership and neuroscience. Social cognitive neuroscience studies can be designed to foster knowledge on ethical leadership in two primary ways. First, basic research can further investigate which

brain areas relate to social processes associated with being a moral person or manager, which helps us understand what is literally going on in the brain when we, for example, think about our moral identity, make ethical decisions, or try to influence others to behave ethically. In addition, it can raise awareness of important stimulus-response settings related to ethical leadership. Exemplary questions would be: What are the neural correlates of ethical leadership? Is there a biological link between being a moral person and a moral manager? What are brain areas related to responsibility or to being a good citizen? Studies could investigate contingency factors that foster or hinder ethical leadership. Future research could for instance present subjects in an fMRI with various organizational leadership scenarios designed to evoke empathy or trust and see which characteristics of the situation do produce those empathic or trusting reactions in study subjects' brains.

Second, hypotheses can be tested to confirm assumptions in the field of ethical leadership. Experiments could investigate phenomena across levels of analysis, combining neural mechanisms with psychological processes of cognition as well as reports on social processes from others. Participants' brain activation can also be evaluated in terms of reaction time or coherence of neural activity (Senior et al., 2011). Treatments can include game theory approaches, vignettes, and visual representations (e.g., showing facial expressions). The neurobiological results obtained from leaders could be cross-checked via self- or other-report questionnaires.

A further interesting future research direction would be to test learning effects related to being a moral person or a moral manager. Longitudinal studies could investigate leaders' brain activity before and after a learning experience. For example, fMRI could be used to monitor brain activity before and after training programs that try to improve participants' empathy. Social cognitive neuroscience studies could also foster our knowledge on cultural differences relating to ethical leadership. Indeed, Ochsner and Lieberman (2001) call for an analysis of cultural influences on the self-concept. It could be hypothesized that individuals

who grow up in different cultural settings show different patterns of brain activation when confronted with questions about empathy or mentalizing about others.

Finally, social cognitive neuroscience offers methods that are able to capture implicit reactions of individuals to external stimuli. FMRI is one example of an implicit methodological approach that has already expanded the established and rather explicit view on how to investigate ethical leadership. However, the potential of implicit methods is even broader (see, e.g., Uhlmann et al., 2012). Methods are available that can be used to detect sensory stimuli, body temperature, or sweat production as a reaction of individuals faced with ethical situations. Research could use these methods to investigate some of the most challenging aspects of ethical leadership. Subjects could be shown scenarios depicting, for example, tough decisions in fairness in hiring and promotion practices.

CONCLUSION

This chapter highlighted missing links between leadership ethics and neurological research. We analyzed the importance of self-reflection, self-regulation, theory of mind, empathy, and trust. Social cognitive neuroscience adds an additional micro-level of analysis to our investigation of individual characteristics and interpersonal relations. We are confident that research in social cognitive neuroscience can ultimately advance the descriptive accuracy and explanatory power of concepts in leadership ethics by explaining brain processes and improving the micro-foundation of behavior. Moreover, as we pointed out, neuroscience findings offer starting points for managerial implications and the new methods open up areas for future research. With this chapter, we hope to foster the discussion on neuroscience and ethical leadership and to inspire future research in this direction.

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TABLE 1

Object of Analysis	Neuro-science Concept	Brain Functions		Relation to Ethical Leadership
		Regions	*Function*	*Moral person/Moral manager*
Oneself	Self-reflection	Medial prefrontal cortex Ventromedial prefrontal cortex Dorsolateral prefrontal cortex	Cognitive behaviors, personality expression, moderating social behavior Processing of risk and fear, decision making Motor planning, organization and regulation, regulation of intellectual function and action, and working memory	Descriptive contribution: • Brain regions involved in self-reflection (in relation to one's ethical behavior) shown • Moral identity and internalized set of values exist in brain structures • Cognitive processes involved not only in ethical decision making, but also in the evaluation of risks and fears and intuitive reactions according to past experiences • Adaptation and modification of moral identity possible • Past and current experiences and positive or negative emotional stimulation trigger intuitive (moral) behavior Managerial implications: • Engaging in conscious self-reflection enhances awareness of one's moral identity • Enhancing awareness that experiences of similar situations trigger intuitive reactions • Training and learning possible
	Self-regulation	Anterior cingulate cortex (dorsal) Lateral prefrontal cortex	Involved in cognitive tasks of control Important for working-memory processes and in situations of orchestration beliefs in order to reason correctly	Descriptive contribution: • Brain regions involved in self-regulation shown • The role of intuition and emotions in ethical decision-making is emphasized • Highlights the possibility of self-regulation in the form of impulse control and reappraisal of emotional events Managerial implications: • Regulation of emotions possible, which in turn allows for cognitive reasoning when evaluating moral dilemmas • Reporting and communication of emotions positively affect the regulation of negative emotional responses • Putting own feelings into words; encouraging employees to do so as well
Others	Empathy	Anterior cingulate cortex Anterior insula Ventromedial prefrontal cortex	Relevant for affective, cognitive and motor control phenomena; also involved in controlling, avoiding, or regulating painful emotions Plays a major role in representing and integrating emotions; involved in sensation, affect, cognition Relevant for encoding the emotional value of sensory stimuli; also important for adherence to social	Descriptive contribution: • Brain regions involved in empathic reactions shown • Neurological research confirms the important role of empathy in relationships • Recognition of other persons' feelings and emotional states are important Managerial implications: • Becoming cognizant and sensitive of brain activities in relation to empathy • Trying to trigger the right stimulation-response setting • Trying to minimize threats and maximize rewards in relation to empathy • Coaching and training possible

			norms	
	Theory of Mind	Anterior cingulate cortex	Relevant for affective, cognitive and motor control phenomena; also involved in controlling, avoiding, or regulating painful emotions	Descriptive contribution: • Theory of mind helps explain processes in relation to engagement in an ideal role–taking process • Mental processes involved in deliberately assuming the position of others shown Managerial implications: • Trying to engage in ideal role–taking processes • Communicating arguments to all affected individuals • Coaching and training possible
		Temporoparietal junction	Involved in information processing and perception; integrates information from the external environment and from within the body; important for self-other distinctions	
		Posterior superior temporal sulcus	Attributed to multisensory processing capabilities (e.g. voices, speech and language recognition); involved in social perceptions	
		Dorsomedial prefrontal cortex	Associated with mentalizing and encoding the psychological traits of others	
Leading others	Trust, Fairness, Cooperation	Several areas of the prefrontal cortex (PFC) (e.g., ventromedial PFC, medial PFC, dorsomedial PFC)	PFC has been associated with cognitive tasks, personality expression and the orchestration of thoughts and actions in accordance with internal goals; it fulfills an executive function in differentiating between conflicting thoughts (like good or bad)	Descriptive contribution: • Brain regions in connection to trust, fairness and cooperation are shown • Confirms importance of trust as a lubricant for social interactions • Neuroresearch highlights stimulus-response settings advantageous for a trusting and fair environment Managerial implications: • Becoming cognizant and sensitive of brain activities in relation to trust and fairness • Trying to trigger the right stimulation-response setting • Trying to minimize threats and maximize rewards in relation to trust
		Amygdala	Involved in perceiving and processing emotions, and in automatic affective processes	
		Insula	Associated with sensitivity to norm violations, care and justice cognition	
		Caudate nucleus	Important for feelings of reward	