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Published in:
Leadership Quarterly

DOI:
[10.1016/j.leaqua.2020.101386](https://doi.org/10.1016/j.leaqua.2020.101386)

Publication date:
2022

Document Version
Peer reviewed version

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):

Boone, C., Buyl, T., Declerck, C., & Sajko, M. (2022). A neuroscience-based model of why and when CEO social values affect investments in corporate social responsibility. *Leadership Quarterly*, 33(3), Article 101386. <https://doi.org/10.1016/j.leaqua.2020.101386>

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A neuroscience-based model of why and when CEO social values affect investments in corporate social responsibility

Reference:

Boone Christophe, Buyl Tine, Declerck Carolyn, Sajko Miha.- A neuroscience-based model of why and when CEO social values affect investments in corporate social responsibility

Leadership quarterly - ISSN 1048-9843 - (2020), 101386

Full text (Publisher's DOI): <https://doi.org/10.1016/J.LEAQUA.2020.101386>

To cite this reference: <https://hdl.handle.net/10067/1659310151162165141>

**A Neuroscience-based Model of Why and When CEO Social Values Affect Investments in
Corporate Social Responsibility †**

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†Authors are in alphabetical order; the paper is truly an interdisciplinary project to which each author contributed equally. We would like to thank Dusya Vera (the Associate Editor) as well as the anonymous reviewers for their very constructive and helpful comments and feedback. In addition, we gratefully acknowledge financial support from the Research Foundation – Flanders (FWO-Vlaanderen) through the research grant G031714N.

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Running head: CEO social values, incentives, and CSR investments

Abstract

Why and when do CEOs invest in corporate social responsibility (CSR)? We theorize how CEOs' intrinsic motivations – their social values – and the incentivizing context interact to determine the utility they attach to generating collectively beneficial outcomes in decision-making, subsequently manifested in organizations' CSR investments. Based on a review of neuroscience evidence, indicating that social values are associated with distinct patterns of neural activation, we propose that these values are the compass by which CEOs navigate in complex decision environments. For CEOs with other-regarding values, generating collectively beneficial outcomes is part and parcel of their utility function. They are intrinsically motivated to invest in CSR, regardless of context. In contrast, CEOs with self-regarding values derive utility from generating collective benefits only when it is monetarily or socially incentivized. They are extrinsically motivated to invest in CSR when they stand to gain from it personally.

Keywords: Chief executive officer; Corporate social responsibility; Incentives; Social values; Neuroeconomics.

INTRODUCTION

"It's fantastic, and this is a great thing." (Kevin O'Leary, Canadian businessman, reacting to the news that the world's richest 85 people owned as much wealth as the bottom half of the global population; Hooton, 2014)

"[T]he narrative that business is all about money and profit is just fundamentally wrong. And it's doing great damage to the world, actually, because if business is not allowed to create value because it's fundamentally selfish, greedy, and it's a sociopathic institution, then our world is not going to fully escape from poverty and prosperity. It's going to reverse." (John MacKey, CEO of Whole Foods, and promotor of "conscious capitalism"; Harvard Business Review, 2013)

Both academic and popular outlets increasingly pay attention to how organizations affect collective wellbeing and societal welfare, through issues such as pay inequality, sustainable development, and, more broadly, corporate social responsibility (CSR) (Aguinis and Glavas, 2012; Long, 2016; McGinn, 2016). CSR is an umbrella term for all organizational actions and practices that generate benefits to multiple stakeholders, including employees, customers, and society as a whole (McWilliams and Siegel, 2001). Of topical interest, especially in the light of the recurring financial crises, is the question how the immense variance in firms' investments in CSR could be driven by the Chief Executive Officer (CEO) – the main decision-maker in the organization.

This matter lies at the heart of Hambrick and Mason's (1984) "upper echelons perspective", which argues that organizations are a reflection of their top managers' values and cognitions. Recent evidence suggests that particularly CEOs' *social values* – which refer to the extent to which a person intrinsically prefers a collectively beneficial more than a self-serving outcome – might represent important motives for their decisions related to CSR investments (e.g., Boddy et al., 2010; Haynes et al., 2015; Petrenko et al., 2016).¹ In strategic decision-making, executives' values – their stable and enduring "core conceptions of the desirable" (Rokeach, 1973: 2) – often dominate

¹ For the sake of parsimony, most of the literature on social values distinguishes between self- versus other-regarding values, which is also how we will portray the social values of CEOs. However, values are better represented as a continuum, whereby an individual will be more or less motivated to act in selfish ways depending on context, an issue we return to in the discussion section.

economic logic (Andrews, 1980). They are a motivating force or “inner compass” that crosscuts contexts, which is especially important in ambiguous contexts faced by CEOs (Miles, 2015; Rindova and Martins, 2018). Though CEOs’ values have always been a core building block of Hambrick and Mason’s (1984) conceptual framework, upper echelons scholars have long withheld from validating their vital relevance (Rindova and Martins, 2018), mostly because they are difficult to empirically assess (Hambrick and Wowak, 2019).

Recently, a surge of studies has empirically explored concepts related to CEOs’ social values, such as ideology (Chin et al., 2013), narcissism (Chatterjee and Hambrick, 2007), and greed (Haynes et al., 2017). However, they were typically inferred based on observable behavioral outcomes, e.g., by gauging CEOs’ ideology through their political donation patterns, or by using the accumulation of extraordinary wealth as an indicator of CEO greed (Haynes et al., 2017). Though we wholeheartedly applaud these efforts, one cannot derive CEOs’ motives from the actions that have been taken, as the same action (e.g., particular investments in CSR) can be the result of different motives (e.g., self- versus other-regarding values) (Avolio and Locke, 2002). This is an important omission in the literature because in order to learn how to adequately influence and shape behavior with, for instance, compensation mechanisms, one needs to understand its motivational drivers. We, therefore, argue that to fully understand how CEOs’ social values motivate behavior (e.g., investing in CSR), it is necessary to open the black box of decision making by unraveling how these values impact information-processing in the brain (Powell, 2014; Powell et al., 2011; Sagiv et al., 2017).

To do so, we integrate new developments in neuroeconomic research about how social values affect decision making with findings from the management literature, and develop a micro-level explanation for *why* and *when* CEOs with different social values are motivated to invest in

CSR. Specifically, we present an integrative interactionist model rooted in neuroscience which combines intrinsic (i.e., social values) and extrinsic incentives (i.e., monetary and social incentives) to explain CEOs' willingness to invest in CSR. With respect to extrinsic incentives we focus on contexts that include different types of compensation (e.g., Deckop et al., 2006) and institutional pressures (e.g., Aguinis and Glavas, 2012) because the current literature on the antecedents of CSR typically does not account for the possibility that CEOs might vary in their sensitivity toward these particular incentives (Hou et al., 2017; Wowak and Hambrick, 2010). In this way, our model helps to systematically develop “the straightforward, though often overlooked idea, that CEO behavior is driven by a complex web of individual- and social-level factors” (Hambrick and Wowak, 2019: 44).

The contribution of such a micro-level approach is threefold: First, through neuroscience we corroborate that CEOs' social values are *of substantial importance* with respect to organizational outcomes, such as CSR investments, because they impact CEO decisions in predictable ways. We will present evidence that social values are *imprinted as neural signatures in the brain*, both anatomically and functionally. This means that we may expect consistency in decision-making on the basis that CEOs with other- versus self-regarding social values also differ in how their brains are wired.

Second, by exploring the neural correlates of social values, we shed light on *the different motives that can guide CEOs' investments in CSR*. Self- and other-regarding values are associated with different neural signatures, which implies that different CEOs will rely on different motivational processes when making CSR decisions. For the CEOs who intrinsically value collectively beneficial outcomes (those with other-regarding social values), investing in CSR is intuitive – they are motivated to invest in CSR from their prosocially-oriented point of view. For

them, generating benefits for multiple stakeholders is part and parcel of their utility function. For CEOs with self-regarding values, however, economically-driven motives will prevail. They are motivated to invest in CSR only when they stand to gain personal benefits (such as an increase in income, wealth, or status) from these investments. We will review evidence that self-regarding values are associated with a more calculative decision-making style.

This leads to our third contribution: we propose that situational factors, such as monetary incentives (different types of compensation) and social incentives (institutional pressures) can *leverage these different motives to stimulate collectively beneficial outcomes and CSR investments*. That is, we will provide a sound, neuroscience-based explanation for why economically motivated, self-regarding CEOs may still decide to invest in CSR. A growing number of scholars in upper echelon research call for an integrative approach which combines intrinsic and extrinsic incentives to explain CEO behavior (e.g., Treviño, 1986; Busenbark et al., 2016). By building on research that shows how the brains of individuals with different social values respond differentially to monetary and social incentives, we will substantiate the idea that especially self-regarding CEOs will be influenced by contexts that motivate investments in CSR. A major implication of this is that contextual incentives can be designed in such a way that they motivate even self-regarding CEOs to engage in collectively beneficial behavior. This opens the door for institutional actors, such as regulatory bodies, to stimulate or create such contexts.

CEO SOCIAL VALUES: BACKGROUND AND CONCEPTUAL MODEL

The impact of social values on behavior has been extensively researched in many domains. In psychology, there is substantial experimental evidence, both in the laboratory and in the field, that individuals' social values – often measured as 'social value orientation' (SVO), a stable trait

shaped both by social learning and genetic predispositions (Bogaert et al., 2008; Israel et al., 2009) – predict their allocation of resources across a wide range of situations (Declerck and Boone, 2016), as well as their emotional reactions to equality violations (Stouten et al., 2005). In behavioral economics, likewise, much attention has been given to inter-individual differences in inequity aversion (Fehr and Schmidt, 1999) and justice sensitivity (Edele et al., 2013). Finally, the stability of values representing an individual's concern for the welfare of others is perhaps best captured with the well-validated, cross-cultural “basic human value system” identified by Schwartz and colleagues, in which a number of transcendental values are juxtaposed to those that advance the self (Schwartz, 1992). In the management literature, Schwartz' transcendence values have been found to positively affect ethical decision-making (Fritzsche and Oz, 2007) and socially responsible behavior (Crilly et al., 2008) in organizations.

In the upper echelons literature, scholars also increasingly study CEO traits or leadership styles that reflect a high intrinsic concern for collectively beneficial outcomes, such as altruism (Avolio and Locke, 2002; Haynes et al., 2015), commitment to ethics (Muller and Kolk, 2010), transformational (Waldman et al., 2006) and servant (Christensen et al., 2014) leadership, or, conversely, to (excessive) self-interest that compromises benefits for others, such as greed (Haynes et al., 2017; Haynes et al., 2015), narcissism (Chatterjee and Hambrick, 2007; O'Reilly et al., 2018; Petrenko et al., 2016), and psychopathy (Boddy et al., 2010). These CEO traits have also been linked to organizational outcomes that reflect benefits for multiple stakeholders. For example, CEO narcissism has been found to negatively affect equity in internal pay systems (O'Reilly et al., 2014), and to positively influence exploitative and unethical work behavior (Grijalva and Harms,

2014)². Likewise, CEO psychopathy – referring to a complete inability to feel empathy – reduces organizational commitment to employees (Boddy et al., 2012). In prior studies management’s commitment to ethics (Muller and Kolk, 2010) and ethical leadership (Tian et al., 2015) were positively associated with CSR.

Overall, these studies suggest that other-regarding CEOs are prosocially motivated – they are intrinsically incentivized to account for collective interests in their decisions. In contrast, self-regarding CEOs are not intrinsically motivated to do so. In line with this observation, the core of our micro-level conceptual model proposes that social values directly shape the willingness of CEOs to invest in CSR, because of the way in which concern for collectively beneficial outcomes enters their utility function (see Figure 1 – bottom). Self-regarding, in contrast to other-regarding CEOs, will only attach utility to generating benefits for stakeholders if it is in their best interest to do so (i.e., when the benefits for stakeholders coincide with their own benefits). Therefore, we argue that their willingness to invest in CSR will depend on the monetary and social incentives in the external decision-making context that align collectively beneficial outcomes with self-interest (see Figure 1 – top).

INSERT FIGURE 1 ABOUT HERE

In the remainder of the paper we first elaborate on the neural underpinnings of social values, and on how values directly affect the utility CEOs derive from generating collectively beneficial versus self-serving outcomes. We formulate propositions for *why* self- and other-regarding CEOs are differentially motivated to attain collectively beneficial outcomes, and as a logical consequence, investments in CSR. Subsequently, we address *how* and *when* context (i.e.,

² Note that when CSR engagement generates media attention and public praise, however, narcissistic CEOs also find it lucrative (Petrenko et al., 2016) (see later – where we explain that self-serving CEOs are sensitive to social incentives, such as public praise and media attention).

extrinsic incentives) interacts with intrinsic values in motivating self-regarding CEOs to favor collectively beneficial outcomes in decision making, spurring CSR investments in turn.

A NEURAL BASIS FOR INTRINSIC PROSOCIAL MOTIVES

Neuroscientific evidence for a neural signature of social values

A number of neuroeconomic studies have investigated how the utility of collectively beneficial versus self-serving outcomes is mentally represented in the brain of individuals. These studies indicate that there is a lot of overlap in the activation of brain regions implicated in *motivated decision-making*, especially in the *ventral striatum*, a region lying below the cortex at the crossroads of limbic and cortical neural circuits (Fehr and Camerer, 2007; Levy and Glimcher, 2012). This means that people can be motivated by both social and selfish rewards in roughly the same way. However, other studies have shown that stable individual differences in values can be associated with consistencies in how the brain responds to self-serving versus collectively beneficial outcomes, and how (through neuroplasticity) the firing pattern and associated neural wiring is changed accordingly, leaving a distinct neural imprint (summarized in Declerck and Boone, 2016; 2018).

To identify the neural correlates of individual differences in SVO, Haruno and Frith (2010), and more recently also Liu et al. (2019), used fMRI³ to compare brain activity of participants while they were evaluating different options of money allocations to themselves and others. As expected, the self-regarding individuals consistently preferred greater allocations to themselves than to

³ This technique makes use of the fact that hemoglobin, the iron-containing oxygen-carrier in the blood, behaves differently under changing magnetic fields depending on whether blood is oxygenated or de-oxygenated. Brain regions that are rich in oxygenated blood point to increased blood flow to that region and hence increased metabolic needs. From this correlation, neuronal activity is indirectly inferred. In an fMRI study, experimental subjects are asked to perform a choice-task under the scanner and the change in blood flow (the hemodynamic response, or blood oxygen level dependent (BOLD) signal) is continuously imaged and matched with the time-course of the experiment.

others, while those with an other-regarding orientation preferred equal allocations the most. For the latter group, the degree to which they disliked inequity correlated with neural activity in the *amygdala*, a subcortical brain region that has been well-studied for its role in unconscious learning (Le Doux, 2003) and experiencing (especially negative) emotional events (Anderson and Phelps, 2001).⁴ The finding that only other-regarding types activate the amygdala in response to unfair allocations has been interpreted to indicate that they are more emotionally alerted by an outcome which is not in line with their motivation to achieve collective well-being (Liu et al., 2019). Consistent with their deep-rooted concern for social issues and heightened sense of inequity aversion (Haruno et al., 2014), other-regarding types also tend to have more grey-matter volume dedicated to the amygdala (Fermin et al. 2016), which may further explain why their amygdala is more reactive to a breach of fairness in money allocation games (Liu et al., 2019).

In a subsequent experiment, Haruno, Kimura, and Frith (2014) found a direct link between SVO and motivated decision-making. This time, self- and other-regarding individuals were again scanned with fMRI while they were responding to unequal offers in an Ultimatum Game⁵. As expected, other-regarding participants (who dislike inequity) rejected unequal offers more readily than self-regarding participants, and this behavioral difference between the two types was tracked by a significant difference in neural activation in the *ventral striatum*, which is arguably one of the most important regions in the brain's motivation network by which emotional outcome

⁴ Note that fMRI cannot reveal cause-and-effect relations. It conveys the extent to which an event during the task *correlates* with the metabolic needs of a particular region of the brain. Any brain region fulfills many functions, and the observed pattern of activation could therefore be the result of several causes. But as the number of independently conducted neuroimaging experiments is growing, there is converging evidence to show consistency in observed brain-behavior relationships.

⁵ In this two-person game, a proposer (not under the scanner) can split a monetary endowment in any proportion between the self and an anonymous other (the responder under the scanner). If the responder accepts the offer, the split is implemented and both parties receive the proposed share. If, however, the responder refuses, neither party receives anything.

information is processed and used in shaping a subsequent response. The increased activity observed in the other-regarding types may indicate that they are more motivated to adapt their behavior to restore what they perceive to be unfair. Furthermore, in both their experiments (Haruno and Frith, 2010; Haruno et al., 2014), other-regarding types' increased neural activity elicited by unequal outcomes, was unaffected by cognitive load, meaning that even an effortful reasoning task performed concurrently does not change the way their social values are encoded in specific brain regions. This suggests that automatic emotional processes lie at the roots of their inequity aversion. Thus, other-regarding individuals seem to have internalized a prevailing fairness norm, and this is reflected in how their brain responds to inequity and drives the decision to sanction injustice. For the other-regarding type, the prospect of generating mutual benefits is sufficient to automatically activate the motivational circuit (centered on the ventral striatum) to tip decision making towards outcomes that increase collective well-being.

Other-regarding types also have an enlarged cortical volume dedicated to the *temporoparietal junction (TPJ)* (Morishima et al., 2012), a region of the brain that projects to the ventral striatum and is involved in decisions that require trust and perspective taking (Carter and Huetel, 2013). Increased activity in the TPJ has previously been shown to bias decisions towards mutually beneficial and generous outcomes (Park et al., 2017). Consistently, participants in an experiment who were *a priori* classified to have “high justice sensitivity,” showed increased TPJ as well as *dorsomedial PFC* activation when evaluating moral violations (Yoder and Decety, 2014). The TPJ and dorsomedial PFC are anatomically connected (Mars et al., 2012), and have repeatedly been implicated in a functional network involved in mentalizing and representing others' feelings and thoughts (e.g., Amodio and Frith, 2006; Lamm et al., 2019). During two mentalizing tasks conducted in the scanner, the dorsomedial PFC was furthermore shown to be

more activated for other-regarding individuals – i.e., those who donated more money and devoted more time to help another person (Waytz, Zaki and Mitchell, 2012). The activity of the dorsomedial PFC along with the TPJ can be interpreted as the need to understand others’ internal thoughts, feelings, and desires when making decisions that favor the collective well-being.

Neural connectivity pattern analyses also support the existence of a stable neural signature of other-regarding types that differs from that of self-regarding types. In an fMRI study by Hein et al. (2016), 36 female participants were scanned while they were allocating money to themselves and two other partners, the first one in a baseline condition, and the second one in an empathy condition where the participant was forced to witness the partner receive painful electric shocks. Other-regarding participants were identified as those individuals who showed a high level of generosity towards the first partner in the baseline condition. Their generous decisions in the baseline condition were associated with a functionally connected network (including the ventral striatum and two other cortical regions implicated in feeling empathy) that differed substantially from the pattern observed in the less generous self-regarding participants. Interestingly, neither this functionally activated network, nor the level of generosity observed in the baseline condition of other-regarding participants, changed after empathy for the second partner was induced. This suggests that, even in the baseline, an “other-regarding brain” is wired to be naturally empathic.⁶

⁶ The experiment by Hein et al. (2016) also included a third condition in which participants were induced to feel reciprocity towards the partner. In this condition, the partner gave up money to relieve the participant from receiving a painful electric shock, which elicited in her a desire to reciprocate. Self-regarding participants (those who donated less in the base-line condition) did not increase their donations when reciprocity was induced, and their pattern of connectivity with the ventral striatum also did not change much from one condition to the other. Interestingly, self-regarding participants responded strongly to the empathy induction, a point we will return to in the discussion.

In contrast, for the self-regarding type, who is more motivated by self-interest, creating collectively beneficial outcomes is not a default *modus operandi*. When deciding how resources should be allocated, they are more analytical in order to assess if expected pay-offs are in their favor. Hence, computational reasoning is expected to dominate their social decision-making scheme. Consistently, individuals with self-regarding preferences have an enlarged *dorsolateral prefrontal cortex (DLPFC)* volume (Fermin et al., 2016), which is also more active when solving complex mixed-motives dilemma-type problems compared to when solving coordination problems (Emonds et al., 2012). The DLPFC is the evolutionary most recent part of the human cortex that gives people cognitive control by making it possible to hold information in memory and computing which outcome will best serve self-interest (Kuo et al., 2009). When the decision context does not contain information that incentivizes collective outcomes (e.g., a lucrative reward for acting in the collective interest), the self-regarding type is more likely to ignore benefits for others and act in his or her own self-interest.

Other neuroimaging studies corroborate that individuals with opposing social values rely on different brain regions when there is a clear need to deliberate between alternative outcomes (i.e., when their decision can have either self-serving versus collectively beneficial outcomes). In an fMRI experiment by Bhatt et al. (2010), “high strategizers”, who deceived others during a bargaining game, activated the DLPFC to a greater extent than other behavioral types.

Finally, Liu et al. (2019) report that in a money allocation game, a self-regarding SVO (compared to an other-regarding SVO) was associated with increased activity in the *lateral orbitofrontal PFC (LOPFC)* when the outcome of the game was perceived to be unfair. The authors interpret the activity in the LOPFC as a conflict of interest that threatens individualists’ self-interested values which needs to be resolved cognitively.

In summary, from the experiments described above we learn that individual differences in self- versus other-regarding values are associated with different neural signatures, related to different information-processing affinities in the brain. These differences can be expected to be stable over time, as they were established both in brain anatomy (gray matter volume of the DLPFC, TPJ, and amygdala) *and* in brain function (the metabolic activity measured in these and other regions during decision-making). As these individual differences in neural activity patterns during ethical or social decision-making apply equally well to CEOs, we can formulate a first proposition:

Proposition 1a: When making social or ethical decisions, CEOs with other-regarding values, compared to those with self-regarding values, are likely to show more neural activity in the amygdala, ventral striatum, TPJ, and the dorsomedial PFC, and less neural activity in the lateral PFC (including the DLPFC and the LOPFC).

Implications for CSR

The robust findings that decisions of individuals who are intrinsically motivated by collective benefits (other-regarding individuals) can be differentiated from those who are not, purely on the basis of brain activation (which may be the result of increased brain volume), suggests that there are different ways in which CEOs can compute the utility of generating benefits for multiple stakeholders. Social values, through their association with different patterns of neural processing, are *an inner compass* that steers decisions related to collective outcomes in opposite direction depending on one's intrinsic motivation. When decisions are motivated by other-regarding values, concern for collectively beneficial outcomes is automatic, irrespective of context. When motivated by self-regarding values, decisions are more susceptible to external

conditions which determine whether or not the collectively beneficial outcome will serve the decision maker's self-interest.

We expect that this fundamental principle relating neural firing patterns to motives for decision-making also applies to CEOs who are strategically deciding whether or not to invest in a particular CSR initiative. Such initiative can be seen as an investment in the social good, with beneficial effects for multiple stakeholders (Hambrick and Wowak, 2019). *Ceteris paribus*, other-regarding individuals will be more motivated to attend to the concerns of multiple stakeholders in and of itself. They intrinsically prefer collectively beneficial decision outcomes, and because of that they are more likely to consistently balance the interests of all stakeholders in their decisions (Crilly et al., 2008). Deciding to invest in CSR helps them to reach that balance. At the level of the brain, we propose that their consistency in behavior may be associated with a chronic change in neural firing pattern so that ultimately their social values are characterized by a particular pattern of neural activation. Note that this does not imply a causal relationship between neural activation patterns and decision-making, as the neuro-imaging studies underscoring proposition 1a cannot reveal causality (see also footnote 4). While remaining agnostic about the direction or the sequence of events by which social values become linked with neural activity, we propose that:

Proposition 1b: For CEOs with other-regarding values, the increased neural activity in the amygdala, ventral striatum, TPJ, and dorsomedial PFC, and decreased neural activity in the lateral PFC, is associated with a greater likelihood of deciding to invest in CSR.

If the brain of CEOs with other-regarding values is wired so that it structurally biases decision-making towards the greater collective, the number of decisions favoring investments in CSR is bound to be high, from which we infer that a firm led by an other-regarding CEO will have

an overall higher level of CSR investment than one led by a self-regarding CEO. When making CSR-related decisions, self-regarding CEOs are primarily motivated by self-interest – e.g., increasing their personal wealth or prestige. Because of that, they are less likely to be motivated by the beneficial effects for other stakeholders, such as the well-being of employees or communities, unless pursuing such goals also serves their personal interest (Haynes et al., 2015). In the absence of extrinsic incentives, even their organizations' long-run fate is not likely to motivate them, as they may choose to leave their organization as soon as they feel joining another organization would grant them higher personal benefits, such as increased pay or status (Haynes et al., 2015).

But even without an intrinsic concern for collective benefits, self-regarding CEOs might still embrace CSR strategically when there are extrinsic incentives that motivate them to use CSR in order to advance their self-interest. For self-regarding CEOs, their neural signature is such that the utility of generating collective benefits is a function of context (see Figure 1): self-regarding CEOs will invest in CSR when they are motivated by extrinsic incentives that align self- and collective interests, making CSR investments logical from their economic point of view. This is what we explore in the next section.

A NEURAL BASIS FOR EXTRINSIC ECONOMIC MOTIVES

We focus on two types of extrinsic incentives: monetary (executive compensation) and social incentives (institutional pressures). With respect to *monetary incentives*, research on CEO compensation packages shows that they can be constructed in various ways to serve as motivation devices (Devers et al., 2007; Wowak et al., 2017), also to invest in CSR (Deckop et al., 2006). Likewise, *social incentives* can also incentivize CSR by eliciting group-appropriate behavior. For

instance, CEOs conform to institutional norms or stakeholder expectations, and they reciprocate favors in order to avoid bad-mouthing and sanctions, or to attain legitimacy and a good reputation (Aguinis and Glavas, 2012; Bundy et al., 2018). Based on neuroeconomic studies, we will make the case that such extrinsic incentives affect the utility of especially individuals with self-regarding values, and that this will change their default behavior towards more CSR by making decisions that increasingly take multiple stakeholders into account.

Monetary incentives

Executive compensation arrangements have been well-studied as incentivizing devices for CEOs (Devers et al., 2007), for instance for (not) stimulating investments in CSR (e.g., Deckop et al., 2006). Rewarding CEOs *stock options* and *financial bonuses* is generally expected to be negatively related to CSR investments, as these compensation arrangements tie CEOs' personal wealth to short-term performance outcomes (Edmans et al., 2012). They reward CEOs for attaining a rise in stock price or a specific level of year-end performance, but do not penalize them in the reverse case (Sanders, 2001; Hou, Li, and Priem, 2013). Because of that, CEOs who are interested in maximizing their *personal* wealth will be tempted to take excessive risks to inflate performance in the short-run, even if this were to the detriment of other stakeholders' long-run stability and wealth (Fahlenbrach and Stulz, 2011). For instance, Wowak et al. (2015: 1083) found that CEO stock options negatively affect "consumer well-being by inducing behaviors that increase the likelihood of product safety problems, which in some cases pose life-threatening risks." Such short-term pay discourages CSR investments that tend to contribute only to long-term organizational outcomes such as survival, growth, and resilience to external shocks (Flammer and Bansal, 2017; Ortiz-de-Mandojana and Bansal, 2016). Studies have indeed shown that

compensating CEOs with high bonuses reduces investments in social and environmental projects (Fabrizi et al., 2014; Manner, 2010).

In contrast, long-term oriented executive compensation arrangements, such as *restricted stock ownership*, can incentivize CEOs to promote CSR initiatives, because the positive effects of social and environmental practices on reputational benefits, organizational resilience, and superior performance take time to manifest, but pay off in the long term (DesJardine et al., 2019). With restricted stock ownership, a sizable portion of the CEO's wealth that cannot be readily exercised becomes tied to long-term performance outcomes (Johnson and Greening, 1999). It also diminishes the pressure on the CEO to meet quarterly earnings targets, which tend to be at odds with CSR investments (Deckop et al., 2006).

Finally, *CSR contracting* arose more recently as another important incentive system in a considerable number of corporations (Flammer et al., 2017). The integration of CSR criteria in executive compensation ties CEO pay to various social and environmental target outcomes, such as CO₂ emissions and employee satisfaction, thereby directly incentivizing executives to address the needs of stakeholders in their strategic decision-making. There is some evidence that long-term oriented CEO compensation arrangements and CSR contracting are positively associated with CSR performance (Deckop et al., 2006; Flammer and Bansal, 2017; Flammer et al., 2017; Mahoney and Thorne, 2005), suggesting that monetary incentives can indeed steer some CEOs' attention towards CSR investments.

Nevertheless, the empirical evidence on the incentive effect of compensation arrangements is not at all conclusive (Devers et al., 2007; Wowak and Hambrick, 2010). For example, scholars have documented both a positive (Berrone and Gomez-Mejia, 2009) and a negative (Berrone et al., 2010) association between CEO stock ownership and firm environmental performance. In their

person-pay interaction model, Wowak and Hambrick (2010) convincingly argue that the incentive effect of compensation on CEOs' decision-making is dependent on these CEOs' cognitive frames and intrinsic motives. For instance, if the actions that specific pay arrangements are meant to prompt are at odds with a CEO's intrinsic motives, the intended incentive effect might fade. Vice versa, CEOs might be especially responsive to specific incentives if the associated strategic actions are strongly aligned with their values (Wowak and Hambrick, 2010). In line with such a person-pay interaction logic, Hou et al. (2017) found that the incentive effect of a range of CEO compensation packages varied consistently over CEOs' tenure, and Benischke et al. (2019) found that CEOs' personality (extraversion, openness, and conscientiousness) affected their responses to equity compensation in terms of strategic risk taking.

As a vital motive for CEOs in executive compensation issues is their intrinsic drive for personal wealth maximization (Wowak and Hambrick, 2010), social values are bound to be an important factor. We turn to the neuroscientific evidence to further explore this assertion.

Neuroscientific evidence for monetary incentives. Social psychology experiments that make use of a game-theoretic paradigm lend themselves well to studying the combined effects of monetary incentive structures and social values. When, in such games, participants are interdependent for outcomes (i.e., the monetary pay-off they will receive is computed in function of the decisions of both partners) it turns out that the incentives embedded in the games affect the self-regarding participants to a greater extent than the other-regarding participants. This was shown in a large-scale behavioral and fMRI study that compared the cooperative versus defect strategies

in prisoner's dilemma games⁷ (in which *defect* is the economically rational, but collectively deficient response) and assurance games (in which the temptation to defect has been removed by raising the pay-off for mutual cooperation so that self- and collective interest become aligned). Thus, the assurance game provides the greatest monetary reward for choosing the mutually beneficial outcome, which generates a strong incentive to cooperate. As expected, other-regarding participants were more likely to cooperate in both types of games. In contrast, self-regarding participants were more calculative in the strategies they selected, choosing to defect in prisoner's dilemma games while cooperating in assurance games. This prominent switch in behavior according to game type corresponds to a personal profit-maximizing strategy (Boone, Declerck, and Kiyonari, 2010).

From an fMRI study conducted (with different participants) in parallel, it appears that the prisoner's dilemma game is a cognitively more demanding game, activating the DLPFC, precuneus, and TPJ to a greater extent compared to the assurance game (Emonds et al., 2012). Although these regions were not differentially activated between cooperate- and defect decisions, their level of activation depended on SVO in three ways (Emonds et al., 2011).

First, irrespective of the game type, self-regarding individuals (who cooperate when the outcome is likely to be in their favor, and defect otherwise) showed more neural activation in the DLPFC, suggesting that they are more deliberately weighing alternative outcomes for each decision – i.e., they are not rigidly following decision rules, but picking the strategy that best matches their self-interest. Consistent with the functions of the DLPFC in computation, working memory (Kuo et al., 2009) and rule breaking (Gross et al., 2018), self-regarding participants are

⁷ In a prisoner's dilemma game, mutual defection is the only Nash equilibrium, meaning that no individual can improve his outcome (relative to the other player) by changing strategy. Defect therefore reflects a deliberated choice requiring cognitive control (see Emonds et al., 2012; Kuo et al., 2009).

flexibly adapting behavior in function of context -- in this case two games with different incentives -- and weighing long-term advantages against impulsive shortsightedness (McClure et al., 2004).

Second, self-regarding individuals also showed more neural activation in the *precuneus*, which is a region of the brain that has been identified in previous research to be important in self-related mental representations, including perspective taking and self-referential goal-directed actions (Cavanna & Trimble, 2006). For self-regarding individuals in the scanner, these functions would correspond with selecting the strategy that serves their best interest, i.e., defect in the prisoner's dilemma game and cooperate in the assurance game (Emonds et al., 2011).⁸

Finally, self- and other-regarding participants also differed with respect to TPJ activation (Emonds et al., 2011). Self-regarding participants showed more activation in a posteriorly-located region (associated with theory of mind and intentionality), whereas other-regarding individuals showed more activation in the anterior part of the TPJ, which in previous research has been associated with routine moral judgments (Borg et al., 2006). Thus, anterior TPJ activation in other-regarding individuals may reflect the automaticity of their cooperative decision-making across games. In contrast, posterior TPJ activation in self-regarding individuals could be interpreted more in function of the cognitive mentalizing functions of the TPJ, by which a strategy is selected that takes into account the possible strategies of others, allowing them to seek out a competitive

⁸ In a later study (Emonds et al., 2014) the same authors report that precuneus activity was greater for other-regarding individuals when making cooperative decisions in a series of one-shot prisoner's dilemma games without feedback. Although this seems contradictory, note that the contexts of the two experiments are very different. It may be that precuneus is more active in self-regarding individuals whenever there are extrinsic incentives (pay-offs) to be evaluated (which was not the case in the 2014 study). Perhaps, among self-regarding types, perspective taking is more about self-referencing ("what's in it for me"), whereas for other-regarding types it is about taking the perspective of others when deciding whether or not to cooperate in a prisoner's dilemma.

advantage. This interpretation of the functional differentiation between the anterior and posterior TPJ is consistent with a resting-state connectivity analysis which showed the anterior part to interact more with emotion-processing regions, while the posterior part interacted more with its cortical connections involved in social cognition, including the precuneus (Mars et al., 2012).

Taken together, the results of these experiments suggest that individuals with a high intrinsic concern for personal benefits would have a neural signature in which the DLPFC is anatomically and functionally more prominent (see also the previous section), and that they are more likely to activate this region, together with the posterior TPJ and precuneus in order to select self-serving strategies. Their pattern of neural activation would make them more responsive to monetary incentives in order to make economically motivated decisions. Applying this logic to CEOs, our proposition reads as follows:

Proposition 2a: In the presence of monetary incentives that align collectively beneficial outcomes with self-interest, CEOs with self-regarding values, compared to those with other-regarding values, will show more neural activity in the DLPFC, precuneus, and posterior TPJ.

Implications for CSR. By analogy, we also expect that self-regarding CEOs will be calculative and guided by economic motives when making decisions that have implications for multiple stakeholders. Their decisions will be especially influenced by compensation arrangements that have the potential to increase their personal wealth, as for them, such incentives affect how they compute utility (see Figure 1). Not surprisingly, upper echelons research has indeed shown that especially narcissistic (self-regarding) bank CEOs become reckless, compromising organizational stability, when they are incentivized with stock options (Buyl et al.,

2019), suggesting that they are motivated to boost short-run organizational performance in order to maximize the share price and cash-in their stocks (cf., Wowak and Hambrick, 2010).

As for CSR investments: knowing that goal alignment is a core component of decision-making, CSR contracting and incentives with a long-term horizon could make self-regarding CEOs willing to comply with principles that benefit multiple stakeholders. This represents a first step towards answering Lorsch and Khurana's (2010: 34) call to find out *how* and *for what* senior executives should be paid "so that they are motivated not only to create wealth for themselves, but also to build companies that serve society." By (1) linking compensation to outcomes that go beyond personal wealth accumulation through CSR contracting, or by (2) changing the time horizon of rewards through restricted stock ownership, an internal "mental switch" is created whereby self-regarding CEOs will pay more attention to the outcome for others, because that would serve them well in their goal to maximize personal wealth.

First, through CSR contracting the incentive for personal gain is tied more directly to what others gain. Nevicka et al.'s (2011) experiment on narcissistic leadership, for example, showed that narcissistic team leaders performed better and directed the team towards a higher collective performance when the level of reward interdependence between team members was raised. Second, extending the time horizon of the reward schedule reduces the CEO's focus on short-term performance and therefore especially affects collective concerns expressed through CSR initiatives. Investments in CSR initiatives are typically not profitable in the short-run, though they could prove to become beneficial for the organization in time (Grunig, 1979; Aguinis and Glavas, 2012; Christensen et al., 2014).

Hence, if self-regarding CEOs are rewarded with stock options or financial bonuses, we expect that their high focus on obtaining short-term profits will drive out CSR initiatives, making

for an even stronger negative association of CEOs' self-regarding values with CSR. But if self-regarding CEOs are paid (to a substantial degree) in restricted stocks that can only be cashed in after an extended period, or by CSR contracting arrangements, they may be inclined to consider investing in long-term initiatives, including CSR initiatives. For other-regarding CEOs, who are intrinsically motivated to pursue CSR initiatives because this fits with their internalized norm to pursue collective benefits, the incentive effects of compensation arrangements are likely to be weaker or redundant. Thus:

Proposition 2b: In the presence of monetary incentives that align collectively beneficial outcomes with self-interest, the increased neural activity in the DLPFC, precuneus, and posterior TPJ CEOs with self-regarding values will be associated with a greater likelihood of deciding to invest in CSR.

As illustrated in Figure 2, under these circumstances, CSR decisions of self-regarding CEOs will converge with those of other-regarding CEOs.

INSERT FIGURE 2

Social incentives

A key insight from institutional theory is that organizations are constrained to behave in line with sets of accepted norms of the sociocultural milieu in which they operate (Meyer and Rowan, 1977). Social norms represent the unspoken but agreed upon habits and rules of conduct that spell out behavior in groups. They incentivize behavior by prescribing what should be done in order to gain social approval and/or to avoid sanctions (Cialdini and Goldstein, 2004). Among organizations, norms that reflect the common paradigms and shared practices arise over time. In their classical essay on "institutional isomorphism" DiMaggio and Powell (1983) argue that

organizations are compelled to conform to the leading norms because of coercive, mimetic, and normative pressures. This suggests that CEOs' decision-making will be influenced by such norms because they seek legitimacy for their actions, or because they fear penalization for not complying with the norms.

The mechanisms described by DiMaggio and Powell have been reported in prior studies on CSR (Aguinis and Glavas, 2012). Matten and Moon (2008) view the global adoption of CSR policies as part of the more generic worldwide spread of management ideologies, implying that CEOs' decisions to invest in CSR initiatives may in part be the result of normative pressures and a desire to achieve legitimacy by mimicking other organizations or by reciprocating legitimate actions of others. Other literature has emphasized the coercive pressures of norms that incentivize CEOs to pursue CSR initiatives to gain publicity or media attention (Grunig, 1979). In order to exert pressure on firms, stakeholders such as NGOs, the media, governments, social movements, and communities can transmit negative images about the firm to wider audiences, thereby incurring damage to a firm's public image and its customer relations (Tian et al., 2015). This might have a tangible impact on firms' operations, such as customer withdrawal or changing legislation (Zhu and Sarkis, 2007), or even more radical punishments such as boycotts (Chiu and Sharfman, 2011). As Bundy et al. (2018: 496) say: "a stakeholder can be an organization's best friend or worst nightmare." In a similar vein, Hambrick and Wowak (2019: 40) propose that CEOs' sociopolitical activism can be restrained or propelled by "the CEO's reading of anticipated support from proximal stakeholders."

A general finding in CSR literature seems to be that some CEOs will only invest in CSR because it boosts corporate reputation (Aguinis and Glavas, 2012) or because they fear sanctions if they do not invest (Prior, Surroca, and Tribó, 2008). In this respect, CSR scholars regularly

discern between *genuine* and *instrumental* CSR, the former being motivated by a sincere altruistic aspiration to advance the social good, the latter driven by strategic incentives such as avoiding sanctions or gaining in reputation (Crilly et al., 2012). Only by studying CEOs' intrinsic motivations and values can we discern between these two different intentions underlying CSR investments (Christensen et al., 2014), and discerning between both helps institutional actors to find the right triggers/incentives to stimulate decisions that generate the greater good. We turn to evidence from neuroscience to assert that the instrumental (economic or strategic) versus genuine (altruistic) motives in CEOs' CSR decisions are underscored by their social values.

Neuroscientific evidence for social incentives. Norms do not incentivize all the time. A common finding in psychology research is that norms have to be made *salient* (i.e., brought into focal attention) in order to elicit compliant behavior (Cialdini and Goldstein, 2004). For individuals holding other-regarding values, social norms that prescribe what people should (or should not) do to sustain (or not undermine) collective well-being are always salient, because they are part and parcel of their utility function (see Figure 1). Hence, they do not need to be coerced to follow social norms as long as the norm is compatible with their intrinsic preference for collectively beneficial outcomes (Declerck and Boone, 2016). For the self-regarding type, the social norms only become salient when there is something to gain or lose. When, for example, the negative consequences of being selfish are made clear, self-regarding individuals start acting more altruistic (i.e., norm compliance in this case is an instrument to avoid sanctions).

Instrumental norm compliance in order to avoid negative sanctions is nicely illustrated in the fMRI experiment by Spitzer et al. (2007). Participants were scanned while they split a sum of money (in any proportion) between themselves and an anonymous receiver. In the “no

punishment” condition the receiver passively accepted whatever was allotted, while in the “punishment” condition, the receiver could impose a monetary sanction if the allotment was perceived to be unfair. On average, the presence of the punishment threat doubled the level of generosity, and this was especially true for participants who scored high on Machiavellianism (a trait characterized by a cynical disregard for morality and strong focus on self-interest and personal gain). Brain contrasts between the two conditions revealed that the threat of punishment (an incentive to abide by the fairness norm) was associated with increased activity in the DLPFC, indicating that the brain accomplishes this task by relying on cognitive control, and that the perceived utility of generating a mutually beneficial outcome was deliberated. Interestingly, activity in the LOPFC, lying just beneath the DLPFC correlated positively with Machiavellianism. Since the LOPFC is known from other research to specifically process threatening information, the results of Spitzer et al. (2007) suggest that it is especially the self-regarding types (as those scoring high on Machiavellianism) that take the possibility of sanctions into account when making decisions related to collective outcomes.

Another way that a social norm can be made salient and incentivize collectively beneficial behavior is through a gain in reputation. If a social norm is widely followed, self-other comparison may lead to mirroring behavior. From psychology literature, we know that individuals who strongly care about their self-image compare themselves especially to elitist others who may help them to advance their reputation or status (i.e., upwards comparison) (Collins, 1996; Chen et al., 2009).

The neural mechanism for processing reputation gains is likely to differ from that of processing sanctions, in part because of the additional requirement to be able to mentally represent what others think, a capacity which has repeatedly been found to activate the *medial PFC* (Ochsner

et al., 2005; Amodio and Frith, 2006). Consistently, when participants in an fMRI experiment were asked how much they contributed to socially desired deeds (e.g., exerting effort on behalf of others), the medial PFC was more activated when answering in front of another person (implying the need to take one's reputation into account when disclosing information about the self) compared to when answering in solitude (Izuma et al., 2010). Hence during this task, activity in the medial PFC appears to be indicative of an instrumental reputation-related motive, much like the activity in the LOPFC was related the instrumental motive of avoiding sanctions. This differentiation within the PFC is consistent with an earlier functional analysis of the orbitofrontal PFC by Kringelbach and Rolls (2004) reporting that the medial part appears to be related to monitoring the reward value of many types of reinforcers while the lateral part (LOPFC) is specifically related to the evaluation of punishers.

To summarize, the results of behavioral- and neuroscience experiments corroborate that self-regarding individuals are more likely to respond to social norms when it allows them to boost their reputation, garner public praise, or evade punishments. Other-regarding individuals who have genuine concerns for other parties are less responsive to such contextual incentives. Applying this to CEOs, we propose:

Proposition 3a: In the presence of social incentives that align collectively beneficial outcomes with self-interest, CEOs with self-regarding values, compared to those with other-regarding values, will show more neural activity in the LOPFC (in the case of pecuniary sanctions), and more neural activity in the medial PFC (in the case of praise or reputation gains).

Implications for CSR. Upper echelons research provides some initial evidence for this proposition with respect to CEOs' investments in CSR. For instance, Petrenko et al. (2016) found that narcissistic (self-regarding) CEOs engage in CSR when such engagement generates positive media attention. Similarly, in a multinational panel sample of 593 organizations, Prior et al. (2008) report that CEOs' tendency to act opportunistically, as reflected in the manipulation of earnings to their advantage, was positively associated with CSR activities. The authors explain this finding by arguing that opportunistic CEOs proactively boost CSR activities instrumentally to increase their public exposure while avoiding the possibility that their opportunism might attract negative media attention and boycotts. This leads to our final proposition:

Proposition 3b: In the presence of social incentives that align collectively beneficial outcomes with self-interest, the increased neural activity in the LOPFC (in the case of pecuniary sanctions), and medial PFC (in the case of praise and reputation gains) of CEOs with self-regarding values will be associated with a greater likelihood of deciding to invest in CSR.

As illustrated in Figure 3, under these circumstances, CSR decisions of self-regarding CEOs will converge with those of other-regarding CEOs.

INSERT FIGURE 3

DISCUSSION

Theoretical contributions

Integrating insights from upper echelons and neuroeconomics research, we developed a conceptual model from which we derived propositions about how CEOs' social values interact with monetary and social incentives to affect their decisions regarding CSR investments. This

approach allowed us to tackle an important issue with respect to CSR research, namely to what extent an organization's investments in CSR reflect the motives of CEOs (Wang et al., 2016). Many CSR researchers have emphasized the difference between CSR investments based on strategic policy implementation (instrumental CSR) and those based on genuine concern for generating benefits for stakeholders (Crilly et al., 2012). However, because motives are inherently unobservable, it is difficult to empirically distinguish between both. Our intent in this paper was to explain how these different reasons for investing in CSR can be differentiated by brain activation, and associated with stable individual differences in CEOs' social values.

Our contribution to the extant upper echelons literature is threefold. First, a core assumption in Hambrick and Mason's (1984) conceptual framework is that executives' values affect strategic decision-making in profound ways. By integrating insights from neuroscience, we provide a sound biological underpinning for this assumption as there is evidence to suggest that social values are associated with differences in neural signatures, which in turn shape decision-making. By doing so, we are able to partly open the black box of Hambrick and Mason's (1984) seminal research model, shedding light on how and why CEO social values shape a firm's CSR strategy in different incentive contexts. Already a number of academic papers dedicated to a deeper-level understanding of executive decision-making are advancing the emerging fields of *neurostrategy* and *neuroethics* (e.g., Ashkanasy et al. 2014; Butler et al., 2015; Lee et al., 2012; Powell, 2011; Robertson et al., 2017; Waldman et al., 2011). The current theoretical paper, however, differs from this work in that the propositions we made are based on *actual results* of neuroscience experiments, rather than on the *potential* of neuroscience in general.

Second, we contribute to a more fundamental issue in upper echelons research, and in strategic management research more generally, namely the question of *rationality* in decision-

making. At present, it is commonly acknowledged that complex decisions have a substantial behavioral component (Cyert and March, 1963), and that, therefore, strategic decisions to some extent reflect the values and idiosyncrasies of the decision makers (Hambrick and Mason, 1984). This insight is the psychological micro-foundation of upper echelons theory: complex decision-making is subject to behavioral processes and not necessarily the outcome of economic optimization (Cyert and March, 1963; Hambrick and Mason, 1984). With our framework we underscore Levinthal's (2011) viewpoint that *behavioral* and *rational* choice cannot be separated because all complex decision-making inherently starts with behavioral-based problem framing and representation. An important implication of this view is that *multiple types of rationality* exist – what is considered a 'rational' decision outcome may differ from one CEO to another. In line with Rindova and Martins' (2018) concept of 'values-based' rationality, we argue that these different types of rationality are shaped by CEOs' social values. Put differently, values act as a compass in the process of the formation of behavioral representations of complex problems – i.e., other-regarding types are intrinsically motivated to pursue collectively beneficial outcomes as this is rational from their *socially*-oriented point of view, while self-regarding types use an *economic*, calculative rationality to determine whether collectively beneficial outcomes also serve their self-interest. Given social values' stability (associated with recognizable neural signatures), they make problem framing more systematic, generating within-individual consistency among choices made in different points in time and space (Rindova and Martins, 2018).

A final contribution is that we complement an interactionist framework with findings from neuroeconomic research to substantiate that strategic behavior can be the result of many different motives, determined by either internal values or external contexts. We thereby support Treviño's (1986) person-situation interactionist model and also respond to the growing plea for an

interdisciplinary consolidation of findings on decision-making in disparate fields (Busenbark et al., 2016; Sagiv et al., 2017). Specifically, we provided corollary evidence based on the results of neuroeconomic experiments to suggest that CEOs' social values, through association with different patterns of neural processing, affect how responsive they are to compensation arrangements and institutional pressures. With this, we also extend the literature streams on executive compensation and institutional pressures, as these studies usually assume that all CEOs are equally receptive to such incentives (Benischke et al., 2019).

Limitations, extensions, and future research avenues

An important contribution of this work is that we enrich the model in Figure 1 by bringing together neuroscience evidence for the proposition that different motives for CSR correspond to different patterns of neural activation in the brain. Most of the evidence we cited came from fMRI studies measuring simple brain contrasts between other- and self- regarding types in experimental contexts with and without extrinsic incentives. However, we note that neuroimaging is a fast-growing research domain, and that new tools are constantly becoming available, which in time will deliver us much more data to assess the validity of the propositions made in this paper. Particularly promising is multi-voxel pattern analysis (MVPA) to investigate patterns of activation in the brain based on training support vector machines. Together with dynamic causal modeling (testing for functional connectivity patterns) and tractography studies (investigating the actual neural connections) these techniques will generate increasingly detailed pictures illustrating how values are related to more specific neural- and behavioral responses. Going beyond the correlational nature of fMRI and MVPA, tools such as transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (DCS) that temporarily suppress or enhance brain

activity could be used to corroborate if the motivating potential of values can indeed be causally attributed to the presumed neural activity.

Although we think our model in Figure 1 is a valuable contribution to the upper echelon literature, it is not intended as a full-blown overarching explanatory framework for CSR investments. Instead, as a first step, we chose to develop a parsimonious, but deep-level analysis of the interactive effects of CEO social values and the incentivizing context on the utility attached to collectively beneficial outcomes and CSR. Of course, we are aware that the interacting factors that lead to a multidimensional construct such as CSR are bound to be complex. We believe, however, that our framework might serve as a baseline model that can be extended in many different ways, which in turn opens up many avenues for future research. Below we discuss the limits of our approach, outline avenues for future research, and provide specific guidelines for testing the current and/or similar models.

First, some might argue that a model based on neuroscience is reductionist, and therefore not very helpful in explaining *collective* behavior and outcomes at the *organizational* level. But an interdisciplinary reductionist approach is necessary to uncover the motivations that underlie CEO decision-making. Obviously, the proof of the pudding is in the eating: upper echelons research has indeed shown that CEO intrinsic motivations do have crucial effects on aggregate firm outcomes (Bromiley and Rau, 2016), and what we have added to this literature is an explanatory mechanism that ties intrinsic motivations to decision-making rationalities. Notwithstanding this, we still need to explain how individual (CEO) intrinsic motivations scale to collective (organizational) behavior, which is an important task for further research (Powell et al., 2011). It would be very fruitful to study when, and to what extent, CEO other-regarding values have a spill-over effect to other hierarchical layers, facilitating an organizational climate where people engage in collectively

beneficial behavior because they empathize with one-another (cf., Connelly et al., 2016). Alternatively, the vital condition that determines whether or not a CEO's social values materialize in organizational-level CSR outcomes may well be the CEO's degree of managerial discretion (Chin et al., 2013).

A second limitation is that we assumed that contextual incentives (executive compensation and institutional pressures) are exogenous to the model. However, we might expect that sorting effects drawing CEOs to specific types of contexts depending on their values are, in all likelihood, operating (Wowak et al., 2017). For example, self-regarding (relative to other-regarding) CEOs might be more attracted to firms that allow short-term personal wealth maximization (e.g., large bonuses) or that operate in less visible industries that are less likely to face high stakeholder pressure than those in more visible industries. It could also be that self-regarding CEOs are better able to reengineer their compensation arrangements to match their preferences. However, as long as such sorting processes are incomplete, an interactionist logic predicting joint effects of values and the incentivizing context is still valid. In this respect, it is interesting to mention that Wowak and Hambrick (2010) demonstrate dramatic changes of pay arrangements during many CEOs' tenures, implying sufficient variance in combinations of compensation packages and CEO characteristics to study interaction effects.

Third, for the sake of parsimony, we conceptualize social values as a dichotomy – i.e., we implicitly suggest that individuals have either self-regarding or other-regarding values. While such a dichotomous categorization of social values is commonplace in the extant research, in reality social values are better characterized as a continuum (Murphy and Ackermann, 2014): people may be motivated by either self- vs. other-regarding values, depending on the decision context. This becomes even more evident in the brain: we are all wired for both (Declerck and Boone, 2016).

Values may introduce a bias in decision-making by activating one neural pattern more than another, but the basic brain processes operate in all individuals alike, meaning that all are capable of deciding in both self- and other-regarding ways. This also means that we may expect that there are specific conditions in which also self-regarding CEOs will invest in CSR without incentives, and that there are factors that will interfere with the internalized social norms of other-regarding CEOs to make them stop investing in CSR. Thus, while we conceptualize social values as relatively stable and enduring, in line with other scholars (e.g., Rokeach, 1973), we do not intend to say that self-regarding CEOs will never invest in CSR without incentives, or that other-regarding CEOs will always invest in CSR, regardless of the context.

A good example is the donation study by Hein et al. (2016) described earlier. These researchers showed that activating the empathy motive by drawing attention to someone's suffering had a proportionally greater impact on the generous decisions made by self-regarding individuals, while it had no impact on the behavior of other-regarding participants (i.e., they were equally generous with and without experimentally inducing the empathy motive). Strikingly, inducing empathy also temporarily changed the functional connectivity pattern in the brain of self-regarding individuals, causing a shift in the brain's functional empathy network so that it came to resemble the brain of the naturally empathic other-regarding type. This finding corroborates that, despite stable neural signatures, situational changes that create an empathic environment alter the neural firing pattern so that even self-regarding individuals can be induced to act more genuinely altruistically – at least temporarily. Because of this, highlighting partnerships and the commonalities between people might be an effective way to bypass the computational neural circuits of the DLPFC and, instead, foster empathic feelings which facilitate social rationality and our innate capacity to show concern for others.

Knowing that even self-regarding individuals will temporarily act in a genuinely altruistic way when an empathy motive is induced (as described by Hein et al., 2016), we thus expect that, when primed to empathize with specific stakeholders or societal groups, self-regarding CEOs will be more genuinely motivated to invest in CSR. For instance, we anticipate that both other-regarding and self-regarding CEOs will engage more in corporate philanthropy after the occurrence of a natural disaster which caused distress to a great number of people. In the light of such a devastating event that triggers universal empathy, we expect that also the difference in *genuine vs. instrumental* care (associated with respectively other- and self-regarding CEOs) will fade. This could be a fascinating topic for future research.

If we can create situations that alter the decision-making modus of self-regarding CEOs to make them pay more attention to collectively beneficial outcomes, we might expect the corollary also to be true – that there are circumstances which interfere with the default mode of other-regarding CEOs so that they will stop acting in altruistic and generous ways. Specifically, we know from experimental research that the default behavior of other-regarding individuals is cooperation as long as they expect others not to systematically free-ride on their efforts (Bogaert et al., 2008; Camerer and Fehr, 2006). As a result, the social-rationality decision modus of other-regarding individuals mainly thrives in high-trust contexts. Trust has indeed been identified as a major precedent for their cooperativeness, even when it is elicited in subtle ways, for example, with a handshake or a short personal introduction (Boone et al., 2010). Hence, future scholars could enrich the model with additional moderators that account for different levels of trust in the decision-making context of CEOs. For instance, one might argue that other-regarding CEOs' continued engagement with specific stakeholders might dampen if there are signs that these stakeholders are untrustworthy or not cooperating.

Finally, the interactive approach adopted in the current study is primarily meant to explain the heterogeneity in organizations' CSR investments (see Figure 1); however it can logically be extended to other outcome variables. While there are many options, we elaborate on two of them: the organization's culture and long-run organizational outcomes. First, we already mentioned above that we might expect spill-over effects of the CEO's values across all hierarchical layers in the organization. One direction for future scholars would thus be to explore if and how CEOs shape their *organization's culture* (cf., Haynes et al., 2015), both through establishing specific norms and guidelines in the organization, and by setting an example through their leadership (Berson et al., 2008). This may manifest itself in, for instance, pay (in)equality and employees' extra-role behavior (or the lack thereof). Second, future scholars could link CEOs' values to more *long-run organizational outcomes*. If decision-making of self-regarding CEOs is, on average, more associated with DLPFC activation, we might expect them to be able to more flexibly and strategically adapt their actions to specific situations. This will have profound implications on their organization's long-run resilience. On the one hand, their flexibility might help them to take action and counter environmental distress situations in the relatively short-run (Patel and Cooper, 2014). On the other hand, it might decrease their resilience in the longer run, as their instrumental motives and calculative rationality may make them more prone to practices such as severe downsizing or fraud if it helps them to gain personal benefits (see, e.g., Rijsenbilt and Commandeur, 2013), or to depletion and lock-in of resources (Buyl et al., 2019).

Besides investigating additional outcome variables, a more in-depth focus on CSR itself may also deepen our understanding of how different motives affect behavior. So far, we have considered CSR as a broad, 'umbrella' concept that includes all organizational actions and practices intended to benefit stakeholders (McWilliams and Siegel, 2001). However, unpacking

the different dimensions of CSR in terms of different stakeholders (e.g., employees, customers, community, environment) could reveal that there are limits to other-regarding CEOs' willingness to invest in collectively beneficial outcomes. From psychology research, we know that cooperative behavior is often constrained by the type of relationship with the beneficiaries, i.e., individuals who have a high intrinsic concern for mutually beneficial outcomes may exhibit concern for in-group members, but not for out-group members (Yamagishi and Kiyonari, 2000). Already we know that people show a bias favoring their in-group when group belonging is highlighted (Wit and Kerr, 2002) or when there is intergroup competition (Bornstein, 2003). The latter is highly relevant for CSR given its multidimensional nature – when firms are experiencing financial constraints, different stakeholder groups often compete for limited resources (Wang et al., 2016). How would other-regarding CEOs prioritize different stakeholders? Would they display in-group favoritism towards the stakeholder group they identify themselves with, or would they try to balance these tensions? Would an other-regarding CEO belonging to an ethnic minority show an exaggerated attention bias towards diversity issues? These questions are wide open for further research.

Despite their limitations, models as depicted in Figure 1, or similar ones constructed with different moderators or outcome variables, have much merit because they can be tested empirically. We strongly invite scholars for direct empirical tests of our proposed conceptual model. To do this, we do not have to put CEOs in the scanner. Many of the behavioral implications we have described can be readily tested, because most of the relevant concepts, such as CSR contracting (Flammer et al., 2017) or stakeholder pressure to engage in CSR (e.g., Tian et al., 2015), have already been operationalized in previous studies. With respect to assessing CEO values, reliable and valid standard paper and pencil techniques have been used in both psychology

and leadership research (e.g., Agle et al., 1999; Schwartz, 1992). Other creative methods to assess values could involve content analysis of interviews or the Q&A part of firms' quarterly earnings conference calls, the latter representing one of the few incidences of spontaneous, unscripted CEO communication (Davis et al., 2014). Recently, scholars have also made use of novel video-based psychometric approaches to capture CEO personality traits (Petrenko et al., 2016). Given its unobtrusive nature and the rapid growth of big data (e.g., social media), these measurements might become particularly useful in future research.

Practical implications

The theoretical framework presented in this paper also has important implications for practice. First, previous research has shown that investments in CSR have serious repercussions for the organization's long-run fate – that is, a lack of regard for other stakeholders jeopardizes organizations' resilience to systemic shocks (DesJardine et al., 2019). In addition, CSR is also important for society at large, given the impact of organizations' survival and stability on societal welfare (Sutcliffe and Vogus, 2003). Given the link between CEO social values and CSR investments, our framework underscores that an important task of board of directors is, therefore, to select and hire the 'right' CEO, whose social values align with the organization's goals and mission.

Second, another crucial implication of our framework is that it is possible to create circumstances to curb the potentially detrimental effects of CEOs' self-regarding values in order to stimulate collectively beneficial outcomes. This opens up opportunities for actors such as the board of directors, the government, or activist groups to better steer the behavior of self-regarding CEOs. For instance, board of directors and compensation committees could carefully design and

negotiate compensation packages that align CEOs' self-interest with collective interests through, e.g., CSR contracting.

More generally, governmental bodies could roll out specific rules and regulations for executive compensation, which we expect to also affect especially the self-regarding CEOs. Given their concern for reputation (which we associated with increased medial PFC activation) and their fear of punishments (associated with increased LOPFC activation), they may be more influenced by activists, such as NGOs, who are publicly calling out executives' selfish and greedy behavior. Conversely, they may be positively incentivized by public praise for their collectively beneficial actions. Finally, Hein et al.'s (2016) study suggests that stimulating climates that lend themselves to empathize might even induce temporal shifts in CEOs' motives, such that even self-regarding CEOs will be genuinely concerned about other parties. Such incentives would create an internal "mental switch" whereby self-regarding CEOs would pay more attention to collective welfare, and invest in CSR.

There are two caveats to creating such extrinsic incentives. First, it is important to realize that, despite their potentially positive effect for self-regarding CEOs, extrinsic incentives by themselves are not likely to rewire the brain to the extent that they completely change the motivating force of values. That is, self-regarding CEOs will, in general, still be motivated by self-interest and their CSR decisions will in the first place be instrumental. If there are any loopholes in the incentive structure that would allow double-dealing – i.e., apparent compliance with the conditions of the incentive, without actually taking the appropriate actions – self-regarding types may take advantage and cheat. As an example, Volkswagen seemingly complied with regulations regarding emissions of Diesel engines, until it became apparent that they were manipulating the

tests. Hence, a recommendation for boards or governmental bodies is that CSR-eliciting extrinsic incentives need to be designed in a very careful way, so that they do not leave room for cheating.

Second, boards and governmental bodies should also be wary of potential unintended side effects of such extrinsic incentives for other-regarding CEOs. Other-regarding CEOs are, in general, intrinsically motivated to invest in CSR because of their genuine concern for generating collective benefits for their stakeholders. However, as mentioned above, they are also very sensitive to cues of untrustworthiness or dishonesty. Hence, when they have the feeling that specific incentives are only put in place for the sake of instrumentally stimulating investments in a specific stakeholder, their engagement with this stakeholder might wane. In sum, all of this suggests that revealing the underlying motives of CEOs (their social values) is key, as this gives boards, as well as institutional actors, handles for leveraging these motives to stimulate collectively beneficial outcomes.

Conclusion

Why and when do CEOs invest in CSR? That was the question we sought to explore. Based on evidence from neuroscientific research, we argued that CEOs' intrinsic motivations – their social values – and the incentivizing context jointly affect strategic decision making, as manifested in CSR investments. While other-regarding CEOs will, *ceteris paribus*, be more likely to invest in CSR based on their intrinsic preferences, self-regarding CEOs will only do so when their self-interest is aligned with the interests of stakeholders. For boards and institutional actors, this generates possibilities to create the right environment for CEOs in order to stimulate collectively beneficial outcomes. We hope this conceptual paper will represent a source of inspiration for scholars to further develop and empirically test this line of argumentation.

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FIGURE 1
Micro-level Conceptual Model of CEO Social Values, Contextual Incentives, and CSR Investments

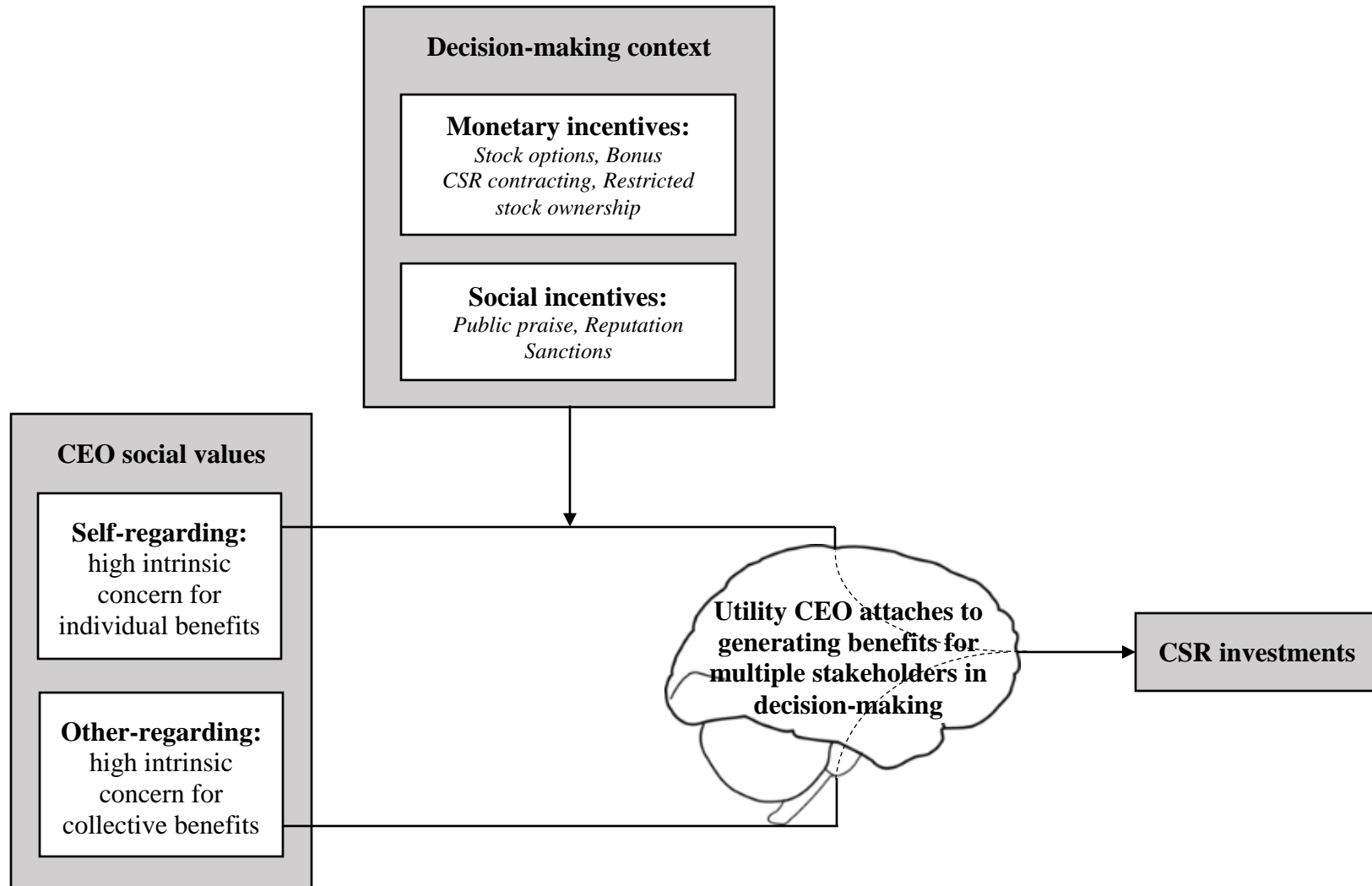


FIGURE 2
Proposed Interaction Effect of CEO Social Values and Monetary Incentives on CSR Investments

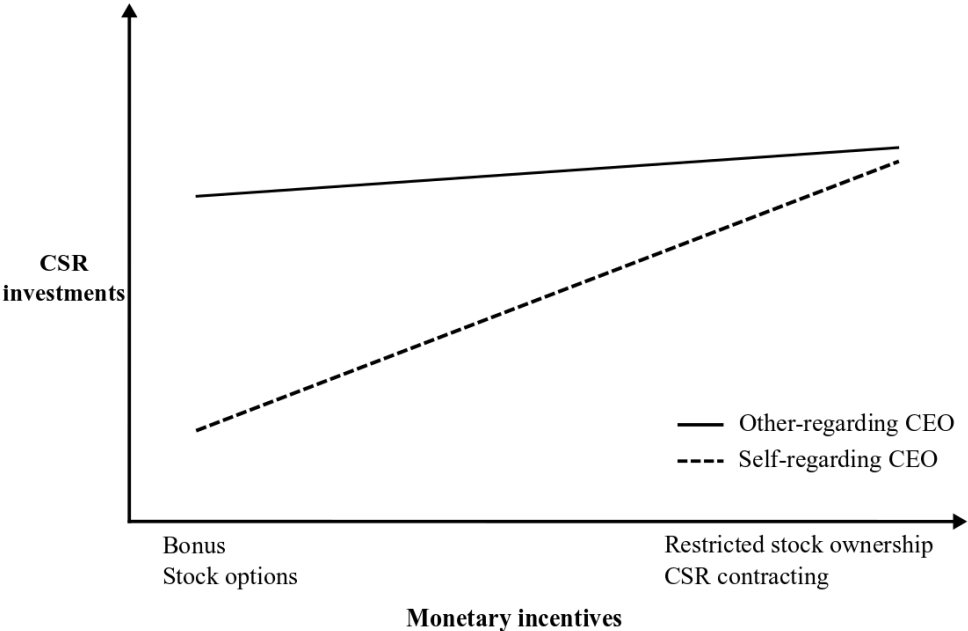


FIGURE 3
Proposed Interaction Effect of CEO Social Values and Social Incentives on CSR Investments

