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THE NEUROSCIENCE OF HIGH-TRUST ORGANIZATIONS

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Human beings are embedded in various organizations. Organizational cultures can promote prosocial behaviors such as trustworthiness or antisocial behaviors such as theft. Studies in social neuroscience have identified the neurochemical oxytocin as a key neurologic signal for trustworthiness. On the basis of the neuroscience research and field studies done in businesses, this article describes the key factors that can help to promote trust within organizations. A model is given for how to intervene in organizations to increase trust, and real organizational examples are used to show how various companies have done this. This approach to "neuromanagement" provides a scientific foundation to understand an important factor that affects performance in organizations.

Keywords: oxytocin, prosocial behavior, empathy, culture, performance

All of the well-known and major motivational models of human behavior including self-determination theory (Deci & Ryan, 1995) and the four-drive theory of human nature (Lawrence & Nohria, 2002) emphasize a basic need for humans to bond, relate, and develop supportive social relationships with others. Voluntary group formation requires two key factors: (a) specifying an objective and (b) sufficient trust among group members (Barraza & Zak, 2013). Although objectives are organization-specific, designing policies to promote trust is generalizable across organizations. Trust affects an organization's ability to accomplish its objectives because it acts as an economic lubricant, easing the social interactions necessary to meet strategic goals (Zak & Knack, 2001).

My laboratory has spent a dozen years characterizing the neurologic basis for trust (summarized in Zak, 2012). In the last half decade, we have applied this knowledge to quantify how organizations and leadership practices can directly influence trust among individuals at work. Organizational culture (how a group of people transmits norms of behavior and values to others) is often thought to be fixed, but extensive research shows that it changes as people learn and their environment evolves (McElreath & Henrich, 2007). We have also identified the constituent factors that can be used to create high trust in organizations. That is, we have worked with organizations to implement management policies, procedures, and systems that enhance trust. Our data show that trust substantially boosts an organization's performance, employee engagement, retention, and well-being. We call this application of neuroscience to management *neuromanagement*.

My research established the first mathematical derivation of trust that arises from voluntary cooperation and showed how it affects economic performance (Zak & Barraza, 2013; Zak & Knack, 2001). I can condense the mathematics into a single phrase: Colleagues have to want to help. A foundational insight from neuromanagement is that colleagues' decision to work is voluntary. All

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employees today are volunteers. Yes, they are paid, but they choose an organization at which to work, and culture can either promote engagement or drive them elsewhere. Many companies such as Google and Facebook provide employees with various perks such as food and on-site health and wellness to keep them engaged and productive. However, randomly dropping benefits on employees tends to increase engagement short term but not long term. A more systematic approach to managing culture is needed.

Neuromanagement uses neuroscience to continuously tweak organizational practices for high performance and engagement. Leaders need to create the conditions in which people want to expend their effort, energy, and creativity to move the organization toward its objectives, creating the opportunity to express one's intrinsic motivation and achieve high performance (Norton, Mochon, & Ariely, 2011; Pink, 2009). An organization in which people would choose to come to work even if they were not being paid is one that thrives on intrinsic motivation.

The Neurobiology of Prosocial Behavior

My group discovered the role of a brain chemical that produces the "I want to help" effect (Barraza & Zak, 2013; Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005; Zak, 2012; Zak, Kurzban, & Matzner, 2004, 2005). It is called *oxytocin* (OT). In a more than decade's worth of human experiments in my laboratory and at numerous field sites, my colleagues and I have shown that OT is the biological basis for the Golden Rule: If you treat me well, my brain will synthesize OT and this will motivate me to reciprocate. The brain's production of OT, combined with its effects on the central and peripheral nervous systems, motivates voluntary cooperation. Furthermore, OT makes it feel good to cooperate with others. It does this by increasing our awareness of others' emotional states—OT is the neurochemical substrate of empathy. By simulating how another feels, OT produces more effective cooperation among social creatures such as humans.

More concretely, by taking blood samples before and after various types of social interactions, my experiments have demonstrated that when one is trusted, one's brain produces OT in proportion to the degree of trust shown (Morhenn, Park, Piper, & Zak, 2008; Zak et al., 2005). Furthermore, the amount of OT released predicts the degree of reciprocation. OT is a quickly-produced brain signal, turning on when we are shown trust and shutting down during periods of high stress or extreme competition (Zak, 2012).

How do we know this? The impact of OT on reciprocity and trust has been largely studied using sequential cooperative dilemmas such as the trust game (TG; Berg, Dickhaut, & McCabe, 1995). In the TG, participants are placed into dyads and randomly assigned to a role of a decision-maker (DM), either DM1 or DM2. Both DMs are allocated a fixed dollar amount, often $10, as an endowment from the experimenters. After instruction, DM1 can choose to send any integer amount (including zero) of the $10 to the DM2 in his or her dyad.

Participants know that whatever is sent comes out of DM1's account and is tripled in DM2's account. DM2 is then prompted to send some integer amount back to DM1 (including zero). *Transfers* from DM2 to DM1 are not multiplied and constitute a dollar-for-dollar allocation out of DM2's account and into DM1's account. The typical version of the TG used in OT studies has participants making a single decision as either DM1 or DM2 so that the effects of reputation are removed. Moreover, decisions are made via computer so that matched participants are not identifiable to each other or to the experimenters. This minimizes extraneous factors that might influence the decision (e.g., partner demographics).

The consensus view in experimental economics is that the amount that DM1 sends to DM2 is a measure of trust (Smith, 1998). The more money DM1 sends to DM2, the greater the degree of trust because more money is at risk if DM2 defects. Likewise, the money sent by DM2 to DM1 is an index of the former's reciprocity or trustworthiness (i.e., the amount DM2 reciprocates given a signal of trust from DM1). In the TG, 95% of DM2s who are sent money return at least some (Smith, 1998; Zak, 2008). Because participants typically play a single round of the TG, there is no chance of future cooperation as a rationale for reciprocity. As a result, there are good reasons for DM2s to keep all of the money they receive. Moreover, the interaction is computer-mediated and anonymous;

therefore, defectors can escape identification. If there are no tangible incentives to reciprocate, then what motivates or signals reciprocity?

Using the TG, we found that peripheral OT for DM2s who received an intentional signal of trust was an average of 41% higher compared with DM2 controls receiving the same average amount of money determined by a random draw that did not signal trust ($N = 67$, $p = .05$; Zak et al., 2004, 2005). We have also found that the within-subject change in OT is proportional to the money received (Morhenn, Park, Piper, & Zak, 2008). The TG was the first nonreproductive stimulus shown in humans to our knowledge that stimulated OT release (OT also functions as a hormone, contracting the uterus during birth and initiating the flow of milk in the breast). Among nine other hormones assayed, including arginine vasopressin, testosterone, dihydrotestosterone, adrenocorticotropic hormone (ACTH), cortisol, prolactin, estradiol, and progesterone, none had direct or indirect effects on OT or reciprocity.

Other laboratories have replicated and extended my findings, and my group also developed a safe way to infuse synthetic OT into the human brain (through the nose). When we did this, trust and other positive social behaviors such as generosity and charity increased substantially compared with those who received a placebo (Barraza & Zak, 2013; Kosfeld et al., 2005; Zak, Stanton, & Ahmadi, 2007; Zak, 2012; Zak et al., 2007). Unlike most social-science findings, we have established the causal effect of OT on prosocial behaviors in healthy adults from various cultures.

Empathy and OT

My laboratory has shown that OT increases prosocial behaviors such as trust because it enhances the subjective experience of empathy. There are three distinct forms of empathy (Batson, Ahmad, & Lishner, 2009): empathic distress, empathic concern (compassion), and perspective-taking (the process of inferring the mental state of others). The former two are associated with affective states whereas the latter is believed to be a primarily cognitive process. Empathic distress is characterized by reactive and aversive feelings (e.g., worry, anxiety, and discomfort) that are focused on the self (e.g., Batson, 1991; Davis, 1996). Singer and colleagues (2008) tested the effects of OT on the experience of empathy using the empathy-for-pain paradigm and subsequent behavior in the TG. Participants intranasally received either 24 IU of OT or a placebo before watching someone have pain induced or having the pain themselves and then made decisions in the TG. The authors found that OT did not affect brain activation in regions previously found to be associated with empathy (e.g., anterior insula) for self-experienced pain or for other-witnessed pain. The authors concluded that OT does not promote empathy; however, this result only applies to one particular kind of empathy—empathic distress.

My group found that empathic concern, and not empathic distress, is associated with endogenous OT release (Barraza & Zak, 2009). Using a 100-sec video of a 2-year-old boy who has terminal brain cancer, a video that is narrated by his father, we asked viewers to rate a series of adjectives relating to their affective states after viewing it. We found a 47% increase in OT immediately after viewing this video relative to baseline ($N = 23$, $p = .004$). This increase in OT was positively correlated with self-reported empathic concern ($r = .20$, $p = .01$) after controlling for self-reported empathic distress. In the same experiment, we also found a positive correlation between self-reported concern and DM1 generosity in a money-sharing task called the ultimatum game ($r = .24$, $p = .05$). The analyses for self-reported empathic distress yielded negative or null correlations. These null findings for empathic distress parallel those from Singer and colleagues (2008) investigating the effects of OT infusion on empathy using the empathy-for-pain paradigm.

OT also appears to affect the perspective-taking aspect of empathy. Domes, Heinrichs, Michel, Berger, and Herpertz (2007) tested if OT affected performance on the "Reading the Mind in the Eyes" (RMET), a task that measures the ability to read emotional states in others. When intranasally given 24 IU OT, participants were more accurate in identifying emotional faces in the RMET than those given placebo (72% vs. 69% placebo, $p = .02$). OT also increased the ability to correctly assess emotions that were difficult to identify by those on placebo ($p < .006$). Taken together, this research shows that OT is part of the neurophysiology of human prosociality, increasing prosocial

behaviors even when there is little incentive to help others. Our research has found that OT appears to be dysregulated in individuals with social anxiety and borderline personality disorders as well as in those with trait aggressiveness who demonstrate in-group bias instead of cooperation (Zak, 2012).

Here is the takeaway: OT is stimulated by positive social encounters and stays active in the brain for approximately 30 min thereafter. After the release of OT, the self-other boundary is reduced in proportion to the change in OT and colleagues more effectively act as teammates. Our findings over many years have important implications for creating trust in organizations.

The Neuroscience of Creating High-Trust Organizations

The neuromanagement challenge is to design an environment in which OT can be released many times during the day to facilitate high engagement and effective teamwork. Understanding the brain circuit that OT activates (Zak, 2012) has allowed me to derive a set of actionable ways to design organizational cultures that bolster and sustain interpersonal trust. The causal flow is this: An organization's culture produces opportunities for OT release, and that builds trust between colleagues and improves performance. The empirical tests of this model confirm its efficacy both for building trust and for inspiring performance.

My research identified eight factors that are the building blocks of organizational trust and can be directly translated into both organizational practices and leadership behaviors based on our trust model (see Figure 1). I created the acronym OXYTOCIN so they would be easy to remember. OXYTOCIN stands for Ovation, eXpectation, Yield, Transfer, Openness, Caring, Invest, and Natural. More than just identifying these factors, the science done by my laboratory and others provides precise prescriptions for the implementation of the OXYTOCIN policies for maximal

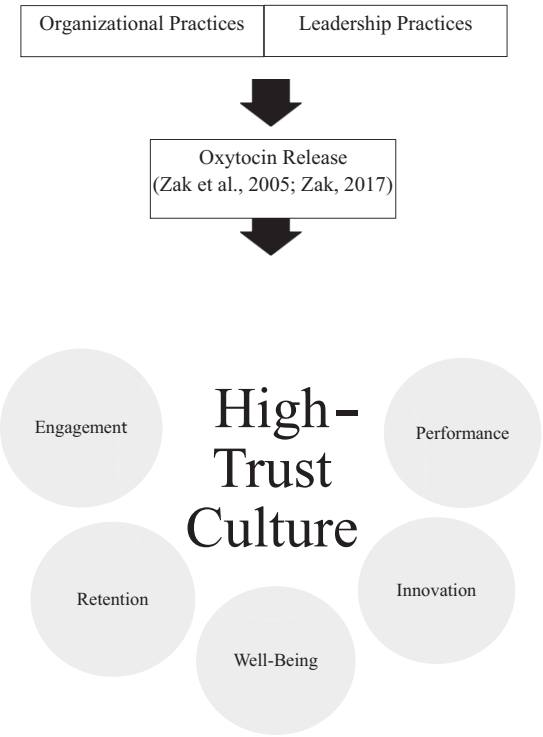

Figure 1. Organizational trust model. Organizational and leadership practices can cause oxytocin release among colleagues that increases the efficiency of teamwork, improving business outcomes.

impact on brain and behavior. I describe these factors in detail here and include examples of exemplary execution of these factors as case studies to show how to implement management interventions.

Ovation

Ovation recognizes colleagues who perform exceedingly well. Being recognized by others induces OT synthesis and causes the brain's reinforcement learning chemical, dopamine, to be released (Skuse & Gallagher, 2009). By itself, dopamine rewards us for attending to anything new in our environment and establishes pathways in the brain through which this new knowledge can be accessed in the future. Dopaminergic learning essentially says, "This is important, remember it, and do it in the future." Drugs of abuse such as methamphetamine and cocaine flood the brain with dopamine, causing users to learn that this stimulus is very important. This is why withdrawal is painful and abstaining from drugs by long-term users is so difficult.

Public *ovation* causes greater OT release than recognition done privately, strengthening social connections to those in the organization. In addition, *ovation* that is unexpected produces a larger dopamine response than planned celebrations; therefore, it will more effectively reinforce the behavior of those being recognized. Public and unexpected recognition together are the *ovation* double whammy, causing both dopamine and OT release. This creates a neurologic craving for the next *ovation*—both among those being recognized and in those who are part of the celebration but were not themselves recognized. As Dean Kamen, legendary inventor of the Segway and many other ingenious products, told me at an innovation conference at Google, "You get what you celebrate." A recent global survey reported that companies with a strong culture of recognition have 31% lower colleague turnover (Deloitte, 2014). To summarize the neuroscience research on recognition, *ovation* that is unexpected, public, tangible, personal, close in time to the goal being met, and comes from peers has the most powerful effect on brain and behavior.

The Container Store "lives" *ovation*. They do it in their daily huddle, they do it at all-hands meetings, and they do it on Valentine's day. The Container Store has repurposed Valentine's day to be "We Love Our Employees" day. They buy full-page ads saying this in the *New York Times*. They have written "We Love Our Employees" on the rooftop of their Dallas headquarters, and the company's leaders have recorded video "love notes" to their employees. These videos come on Valentine's day with a gift basket that every employee receives. The baskets are filled with chocolates, fancy personal-care items, and other gifts.

Beyond this annual event, every employee who works for The Container Store for 10 years has his or her name engraved on a glass plaque in the lobby of their headquarters. On their 10-year employment anniversary, the employee and his or her spouse visit the Dallas headquarters, during which they stay at the Four Seasons Hotel and are pampered at the company's expense. This *ovation* is repeated for every 5 years of additional service. Employees at The Container Store love working there: Annual employee turnover in retail is 66%; at The Container Store turnover is less than 15%. During a visit to their headquarters, I met the first employee hired at The Container Store—she was still working there 33 years later (Gale, 2003).

Expectation

Expectation occurs when colleagues face challenges as a group. Group challenges stimulate the release of OT and build trust among team members. Neurobiology tells us why designing challenges are important. Similar to all biological systems, the brain is also an economical system: It saves energy by only producing neurochemicals such as OT when they are needed (Zak, 2014). This means without a pressing reason to work as a team, OT release is less likely to occur, thereby inhibiting effective cooperation. However, any old challenge will not do. Managers need to set hard but achievable *expectations* to stimulate colleagues' brains to synthesize OT.

At the same time, managers should not set impossible goals. Threat stressors inhibit OT through the release of a neurochemical called epinephrine. When we face threat stressors, we shift into a survival mode in which it is each person for himself or herself, just the opposite of teamwork.

Impossible goals over the long run create chronic stress that not only inhibits OT production but also adversely affects physical and psychological health.

Another potent inhibitor of OT is testosterone, which averages 5 to 10 times higher in men than in women (primarily depending on a man's age). In fact, men administered synthetic testosterone, compared with placebo controls, become entitled alpha males and are less generous and cooperative (Zak, 2014). As a result, *expectations* should not pit one team directly against another but rather should have the entire organization working toward the same goal.

Challenges will devolve into chronic stress unless objectives are clear and have concrete end points. The key components of *expectation* are goals that are achievable with sufficient effort, concrete, and time limited. After setting *expectations*, leaders need to provide feedback often, no less often than weekly. If targets are not being met, then leaders should work with team members to help them reach their goals (for example, reallocating resources or developing a revised implementation plan). If the goal is met, then return to the first factor to stimulate OT release—*ovation*. Celebrate the victory and have the team describe to others how it was done so that innovations are shared among teams.

Before 2007, teachers in Washington, D.C., nearly always received superior reviews year after year, although many of their students could not read or write. For example, in 2007 only 8% of eighth graders passed the grade-level competency exam in mathematics (Turque, 2010a). Schools in D.C. performed poorly despite having the third highest spending per student in the United States (Reuters, 2007). Desperate for change, Mayor Adrian Fenty created a new position, education chancellor, which absorbed the power previously held by the Board of Education. Fenty hired noted education reformer Michelle Rhee as the first education chancellor in 2007. Rhee developed a performance-and-evaluation instrument for teachers called *IMPACT*. The first thing the instrument did was to provide "clear performance expectations" (District of Columbia, 2014). By setting clear and concrete goals, and a way to evaluate if these goals were being met, teachers began getting feedback on their performance, and principals could offer assistance, including instructional coaches, to those not reaching goals.

Teachers agreed to a new contract with a 20% pay raise and student-performance bonuses of $20,000 to $30,000 in exchange for reduced job security. A total of 241 teachers that fell below performance goals were fired. By 2010, student pass rates for the DC Comprehensive Assessment increased by 14 and 17 percentage points for reading and math, respectively (Turque, 2010b). Rhee made many other changes in addition to clarifying *expectations*, including closing nonperforming schools, adding early-childhood education, expanding gifted-child classes, and providing additional music and art classes. These are all likely to have contributed to the dramatic improvements in children's outcomes.

Yield

Yield occurs when colleagues choose how to perform a task. It is the antidote to micromanagement that pervades many organizations. It enhances one's control at work and fosters a culture in which mistakes are viewed as learning opportunities. By providing a reason to engage with colleagues, it promotes OT release. When colleagues have the appropriate training and experience to complete a project, it allows them to commit to goals by taking ownership of the outcome. Inevitably, a colleague will execute the project slightly differently than others would have. This generates variation in business processes. As a result, *yield* permits business processes to be crowd-sourced for innovation.

In a high-trust organization, a leader's role is more like a coach or counselor than an omnipotent dictator. Indeed, the best learning is accomplished through (small) mistakes because it is encoded more powerfully in the brain than simply learning a new fact. It is (small) mistakes that lead to improvements. *Yield* fundamentally comes down to accepting different methods of execution, facilitating control, and minimizing the perception of high workload demands.

In 2003 Cali Ressler and Jody Thompson developed new management guidelines at Best Buy, the large electronics retailer. They called their plan *ROWE*, for Results-Only Work Environment. A key component of ROWE was a companywide policy of *yield*. Supervisors set clear goals

(*expectations*) for every colleague, and then individuals chose how, when, and where to do their work. Set work hours were abolished along with sick days.

By clarifying *expectations* and how objectives were measured, team members focused on meeting goals rather than "presenteeism" (Stevenson, 2014). Colleagues took ownership over projects, and those who reached their goals were recognized and lauded (*ovation*). ROWE treats colleagues as knowledge workers who can determine how to best to accomplish their goals. After ROWE was implemented, voluntary turnover rates fell 90% and productivity increased 41% (Stevenson, 2014).

Transfer

Transfer enables self-management by permitting colleagues to choose which projects they work on. By enabling development of mastery over a set of skills, it effectively utilizes the full range of colleagues' expertise and experience. It also decreases the stress of uncertainty and provides a motivation to build teams to complete projects (Zak, 2014). In this way, it reduces chronic stress and increases the likelihood of OT release, building trust. A meta-analysis of 114 studies with more than 20,000 participants confirmed that high levels of autonomy, self-efficacy, and empowerment—all proxies for *transfer*—increase job satisfaction, customer service, job attendance, and commitment (Stajkovic & Luthans, 1998).

Netflix and Virgin Group have recently adopted an aspect of *transfer*: They have eliminated the accounting of vacation days. Do you need the afternoon off? Just take it. As long as your team is working on its projects, and *expectations* are being fulfilled, where, when, and how one does one's work are not relevant. In addition, the reduction in paperwork and other transactions costs are a net boon to these companies. Adults can choose when and how much vacation to take, and *transfer* treats employees like adults.

In his last article in the *Harvard Business Review*, Peter Drucker wrote,

> Knowledge workers must, effectively, be their own chief executive officers. It's up to you to carve out your place, to know when to change course, and to keep yourself engaged and productive during a work life that may span some 50 years. (Drucker, 1999/2005)

Transfer is unlikely be implemented before *ovation*, *expectation*, and *yield* are established, but it is their logical extension.

Valve develops online games such as Counter-Strike, Half-Life, Portal, and Left 4 Dead. Valve employees are not assigned to a work group; rather, they are given desks with wheels. They are then encouraged to shop around and see what projects others are working on and ask to join a project that seems "interesting" and "rewarding" (Valve Corporation, 2012, p. 9). The extremely short employee handbook, which looks something like a comic book, states in a section called "What If I Screw Up?"

> Providing the freedom to fail is an important trait of [Valve]—we couldn't expect so much of individuals if we also penalized people for errors. Even expensive mistakes, or ones which result in a very public failure, are genuinely looked at as opportunities to learn. (Valve Corporation, 2012, p. 20)

No work is assigned to colleagues in this flat organization, there are no bosses, and colleagues rotate being the lead on projects. At Valve, work groups evaluate each other's contribution after every project ends and constantly practice *ovation*. This is *transfer* at its very best. Valve has grown to more than 300 employees and its market value is estimated to be $2.5 billion.

Openness

Openness occurs when information is broadly shared with colleagues. Open and candid communications promote trustworthiness by reducing fear and uncertainty about the organization's strategies and plans. Companies such as Whole Foods and Trader Joe's share quarterly profit-and-loss statements with colleagues and provide classes to teach how to understand them. One cannot expect

honest information to flow from colleagues to managers (*yield*) unless the converse is also true. In addition to reducing the stress from uncertainty about the future, *openness* engages colleagues in discussions of value creation for the organization irrespective of their job title.

In the information age, it is almost inevitable that data and plans will be viewable by those within (and perhaps outside of) an organization. *Openness* circumvents leaks by providing colleagues with timely information. According to Whole Foods founder and CEO John Mackey, store-level data are used to motivate colleagues to reach targets, reduce costs, and prepare for a move if a store is unprofitable (Zak, 2012). Indeed, departments at Whole Foods are run similar to independent ventures as teams source local foods, hire colleagues, and rotate promotional items (*transfer*). This cannot work if department leaders are not given the *openness* to view store revenues, profits, and costs as well as the processes and suppliers used by other store units. The setting of *expectations* and opportunities for *ovation* similarly require knowledge of the organization's goals. Without *openness*, colleagues subsist on rumors and fears. It provides the most information to the most people so that they can perform at their best.

The Brazilian manufacturing company Semco was going bankrupt in the 1980s when Ricardo Semler took over the family business. Semler reorganized Semco around radical *openness* and a democratic workplace. At Semco, workers choose the work groups they will join (*transfer*), with salary and productivity data shared broadly (*openness*). "Counselors" solicit colleagues' opinions on projects, with a one-person, one-vote rule used for all decisions and a norm of optional meetings. Semler's core idea is that all employees need information to manage themselves and contribute value to the organization. *Openness* also extends to decisions about 6-month assignments to various teams. If one wants to continue in a group, then the 8 to 12 people with whom one has worked with must want you to remain. Semco's annual revenue exceeds $200 million, and the majority of its workforce is unionized (Semler, 1989).

Caring

Caring intentionally builds relationships with colleagues. As social creatures, human beings naturally form relationships with others. For some reason, we are told we should not form friendships at work. The Gallup organization has found that those who report having a best friend at work are substantially more engaged than those who do not (Rath, 2006). My field experiments in businesses across sectors have found a similar effect—those who report that they work in a *caring* environment are more productive and innovative (Alexander & Zak, 2015). Not only is there no reason to check your humanity at the door when you get to work, my studies show that doing so damages engagement, health, and productivity.

Organizations that encourage *caring* tap into a fundamentally important human trait. The empathy that follows OT release is also the foundation for ethical behavior (Zak, 2012), reducing the need for a large number of rules for employee actions. For example, Thrivent Financial has a "rule-busting committee" that identifies onerous or useless rules and gets rid of them (Zak, 2012). Thrivent recently eliminated their intricate rules on travel expenditures, replacing them with "use good judgment." *Caring* workplaces tend to avoid legal and ethical violations that can imperil organizational health.

Caring-promoting policies include paid time to volunteer in one's community, on-site daycare so colleagues can visit their children at work, and permitting dogs in the office. My laboratory has shown that volunteering and being around children and dogs are powerful OT stimulants (Zak, 2012). Because the OT brain circuit is blunt, once OT has been stimulated, enhanced empathy occurs for the next 30 min. This means if you visit your child in on-site daycare on a break from work, for the next 30 min your stress will be lower, empathy higher, and the ability to effectively collaborate with others enhanced. Building *caring* ties among colleagues is an effective way to engage team members to reach organizational goals.

"American business is ruining America." This is what Bob Chapman, the chief executive of Barry-Wehmiller, told me when I visited his corporate headquarters in St. Louis. In viewing employees as human resources, most businesses treat people like replaceable machines. Chapman took the helm of Barry-Wehmiller, then a small and nearly bankrupt concern, in 1975 after the death

of his father. Today, Barry-Wehmiller owns more than 60 manufacturing operations on five continents and generates more than $2 billion in annual revenue.

This economic success grew from Chapman's focus on people. The company's mission statement states: "Building great people is our business." It does this by establishing a *caring* culture at every company it acquires. Chapman showed me videos of grizzled manufacturing veterans at companies that Barry-Wehmiller had acquired. In these videos, men who had never been acknowledged for their hard work and expertise have their opinions heard and acted on. Peers are given *ovations*, and those being recognized—sometimes for the first time in their careers—break down in tears. This is not just for the cameras. Chapman believes he and his management team have a sacred covenant to treat people well and return them home each day physically and emotionally healthy (Zak, 2012). Barry-Wehmiller's success shows that a culture of *caring* is important to colleagues' motivation as well as physical and mental health, resulting in enhanced value for organizations.

Invest

Invest enables whole-person growth. Psychologists from Carl Jung to Abraham Maslow to Martin Seligman, as well as many studies in positive psychology, confirm the importance of personal growth to thrive in life (Ryff, 1995). High-*invest* organizations, as defined by the Association for Talent Development (ATD), average 49 hr of training annually, while the average company spends only 31 hr a year training colleagues (Association for Talent Development, 2015). However, high levels of engagement at work require more than just professional development; one must also be growing personally (Ryff & Keyes, 1995). If one's personal life is dysfunctional, then the ability to bring one's full energy and passion at work will be inhibited. As a result, high-trust organizations *invest* in the whole person, subsidizing opportunities for professional and personal growth and measuring if these are occurring. When organizations *invest* in the professional growth and development of colleagues, it a powerful signal of trust.

Our own data (Zak, 2017) show that high-*invest* organizations retain talented team members longer. *Invest* also creates talent ambassadors who direct others to work for the organization because they are "raving fans." Just as word of mouth is the most powerful consumer marketing, raving fan colleagues are the best talent recruiting. I saw this during a study we did for Zappos.com. Approximately half of the Zapponians who participated in the study on a nonwork day wore Zappos logo shirts. When I asked why, they said that Zappos values resonated with their own and that working for Zappos was a big part of their identities. Zappos has created raving fans who volunteer to work for them. And it works. In 2009, Zappos received approximately 30,000 job applications for 450 positions (Michelli, 2011).

"Decurion provides places for people to flourish" is the first statement on the website for this company that operates theaters and develops real estate. President Christopher Forman has correctly connected profitability to full-person development (Kegan, Lahey, Fleming, & Miller, 2014). The website also states: "We see business as a place of wholeness, connection, excellence, and meaning" (Decurion Corp., 2014). They do this by investing in their 1,100 "members" (not employees) personally, professionally, and emotionally.

They see human development as their ultimate goal and view work as a way to stimulate personal growth. They are also highly profitable, generating annual revenue of $175 million. Professional growth is encouraged by moving people between positions (*invest*) and letting everyone in the company know when members acquire new competencies (*ovation*). Proficiency is reinforced by having members teach others the skills one has learned. Leaders promote personal growth by seeking to align individual goals with projects at work. Decurion managers are trained to be coaches and servant leaders, leading personal discussions ("touchpoint meetings") with members that focus on goals (*expectation*) and encourage risk-taking (*yield*). Decurion has even created a 10-week *transfer*-focused course ("The Practice of Self-Management") as another way to *invest* in its members.

Natural

An organization is *natural* when leaders are honest and vulnerable. Being *natural* demands that leaders not only talk about trust but are trustworthy themselves. Rather than dictate to others, *natural* leaders ask for help, solicit opinions, and when a decision is made they embrace outcomes whether the result is positive or negative. Experiments from my laboratory have shown that being vulnerable releases OT in observers (Zak et al., 2004, 2005). This neurochemical response causes people to want to help (Zak, 2012). Indeed, asking for help from volunteer colleagues is the first step to being a *natural* leader. Trust is not earned by dictating orders to subordinates; rather, it depends on engaging volunteers for organizational success. A leader cannot force an organization to be successful, but he or she can set goals, nurture the culture, and provide the resources needed for success. Honestly asking for help reveals a leader's vulnerability, but is also taps into evolutionarily old social motivations to work as a team to meet objectives.

The second aspect of *natural* leaders is allowing one's imperfections to show. Psychologists have called the showing of one's mistakes the "pratfall effect" (Aronson, Willerman, & Floyd, 1966). Revealing one's imperfections generally makes leaders more likable, empathetic, and able to be forgiven when mistakes are made. For example, President John F. Kennedy's popularity increased after he accepted responsibility for the botched Bay of Pigs invasion in 1961. This "pratfall" showed he was trying to make the best decisions and needed the support of the American people to be an effective leader (Berglas, 1996).

However, an important caveat is that leaders who show vulnerabilities engender trust only if they are perceived as being competent. Incompetent leaders who ask for help from others undermine people's perception of their reliability and integrity. This means that during a major crisis leaders may have to demand changes, but in nearly every other situation, admitting that you do not have all of the answers is an effective way to both build trust with one's team and engage colleagues in reaching the organization's goals. This is consistent with a servant-leadership model (Blanchard & Hodges, 2002; Greenleaf, 2002). A recent study found that servant-leaders are significantly more trusted by their colleagues than are hierarchical leaders (Sendjaya & Pekerti, 2010).

During a visit to Herman Miller's headquarters in Holland, Michigan, I noticed that Curt Pullen, the company's North American president, was sitting in a (really nice) open office space typing away on his laptop. I had not seen Curt in a year, so I stopped by and asked if I could interrupt him. He said he needed a break from building next year's strategic plan, so we went to the coffee bar and grabbed lattes. Several employees said Hi, and Curt inquired about how they were doing. He exhibited several behaviors the neuroscience shows are important to create a *natural* culture: He was warm and competent but also casual (no tie) and relaxed. He was in charge, but he did not need to assert this by lording his power over others. Curt embodies *natural*.

While we spoke, he was approachable, open, and attentive, interested in hearing my sometimes contrarian opinions and genuinely kind to those around him. We talked about our children and our aspirations and how these are integrated into our career goals. I felt privileged to spend an hour with Curt, who is, after all, responsible for a billion-dollar division. Herman Miller cultivates *natural* not only by who they hire but also by the respectful and fun workplace culture they have created. Former Herman Miller CEO Max De Pree wrote: "The first responsibility of a leader is to define reality. The last is to say thank you. In between, the leader is a servant." Being gracious, kind, and interested in others for who they are has been part of Herman Miller's culture since the 1930s when Max De Pree's father was CEO. To this day, their culture continues to be an essential aspect of their success. Two indicators of the exceptional culture are the low turnover of employees and consistent revenue growth.

The Role of Purpose

My laboratory has shown that "causes" that transcend the individual induce OT release (Barraza et al., 2015; Lin, Grewal, Morin, Johnson, & Zak, 2013). Curing cancer, saving the environment, helping the homeless—our studies have shown that communicating why these goals are important

at human scale not only engages our empathy but also motivates people to voluntarily donate money to help others. This is important because all organizations have a "transcendent purpose." By that I mean the way that an organization improves the lives of its employees, customers, and society. Otherwise, why would the organization exist? This view is consistent with two of the greatest management thinkers of the 20th century: W. Edwards Deming and my Claremont Graduate University colleague Peter Drucker. Drucker wrote: "Management is not culture-free. . . . It is a social function. It is, therefore, both socially accountable and culturally embedded" (Drucker, 1974, p. 18). Business always has a transcendent purpose that is necessarily broader than its transactional purpose. My studies show that communicating transcendent purpose to people is highly motivating.

High-purpose organizations provide an additional way to cause OT release in colleagues: People in them understand that they are working to help others. When purpose narratives are nurtured and shared throughout the company, motivation and teamwork increase. The neuroscience has a final prediction: Colleagues who work in organizations with high trust and high purpose will enjoy their work. Trust and purpose reinforce each other in the brain, creating a positive feedback loop. When we test this prediction in the laboratory, in field experiments, and in surveys of employees, we indeed find that colleagues experience joy at work when they are both trusted and understand their organization's transcendent purpose.

Conclusions

Research published by my laboratory has established that the neurobiological substrates of empathy and trust are associated with the synthesis of OT and activation of a brain circuit using OT receptors (Zak, 2017). The analysis reported here demonstrates that organizations that sustain a high level of trust have substantially greater engagement by colleagues, an effect that has been measured multiple ways. This indicates that organizational trust should be considered a valuable asset that can be measured and managed to sustain a competitive advantage over rivals. Leadership practices and organizational policies, systems, and processes affect interpersonal interactions that either facilitate or inhibit OT release. Neuroscience now provides consultants with insights about specific practices and behaviors that can directly improve organizational performance by nurturing a culture of trust.

Continuing research by my laboratory is examining how specific interventions to increase trust by changing leadership practices and policies will improve engagement by employees and performance by companies. My research has established the groundwork to use neuroscience to optimize these interventions on brain and behavior, and we are still collecting data to show how much of a performance bump these interventions provide. Identifying interventions that increase trust is rich ground that consultants can till to improve company performance. By taking a neuroscientific approach to measuring and intervening in organizations, my collaborators and I have found that organizations that instantiate interpersonal trust and transcendent purpose inspire performance at both the individual and organizational levels (Zak, 2017).

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