

SCARF: a brain-based model for collaborating with and influencing others

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SCARF: a brain-based model for collaborating with and influencing others

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In a world of increasing interconnectedness and rapid change, there is a growing need to improve the way people work together. Understanding the true drivers of human social behavior is becoming ever more urgent in this environment.

The study of the brain, particularly within the field of social, cognitive and affective neuroscience is starting to provide some underlying brain insights that can be applied in the real world (Lieberman, 2007). Social neuroscience explores the biological foundations of the way humans relate to each other and to themselves and covers diverse topics that have a different degree to which they can be operationalized and unambiguously tested. Topics include: theory of mind, the self, mindfulness, emotional regulation, attitudes, stereotyping, empathy, social pain, status, fairness, collaboration, connectedness, persuasion, morality, compassion, deception, trust and goal pursuit.

From this diversity, two themes are emerging from social neuroscience. Firstly, that much of our motivation driving social behavior is governed by an overarching organizing principle of minimizing threat and maximizing reward (Gordon, 2000). Secondly, that several domains of social experience draw upon the same brain networks to maximize reward and minimize threat as the brain networks used for primary survival needs (Lieberman and Eisenberger, 2008). In other words, social needs are treated in much the same way in the brain as the need for food and water.

The SCARF model summarizes these two themes within a framework that captures the common factors that can activate a reward or threat response in social situations. This model can be applied (and tested) in any situation where people collaborate

in groups, including all types of workplaces, educational environments, family settings and general social events.

The SCARF model involves five domains of human social experience: Status, Certainty, Autonomy, Relatedness and Fairness.

Status is about relative importance to others. Certainty concerns being able to predict the future. Autonomy provides a sense of control over events. Relatedness is a sense of safety with others, of friend rather than foe. And fairness is a perception of fair exchanges between people.

These five domains activate either the 'primary reward' or 'primary threat' circuitry (and associated networks) of the brain. For example, a perceived threat to one's status activates similar brain networks to a threat to one's life. In the same way, a perceived increase in fairness activates the same reward circuitry as receiving a monetary reward.

The model enables people to more easily remember, recognize, and potentially modify the core social domains that drive human behavior. Labelling and understanding these drivers draws conscious awareness to otherwise non conscious processes, which can help in two ways. Firstly, knowing the drivers that can cause a threat response enables people to design interactions to minimize threats. For example, knowing that a lack of autonomy activates a genuine threat response, a leader or educator may consciously avoid micromanaging their employees or students. Secondly, knowing about the drivers that can activate a reward response enables people to motivate others more effectively by tapping into internal rewards, thereby reducing the reliance on external rewards such as money. For example, a line manager might grant more autonomy as a reward for good performance.

Before exploring the domains of SCARF individually a brief context of the underlying science of the SCARF model, namely, the approach (reward)-avoid (threat) response and the impact of this response on mental performance, is provided.

Foundations of the SCARF model

The approach (reward)-avoid (threat) response: a survival instinct

According to Integrative Neuroscientist Evian Gordon, the 'minimize danger and maximize reward' principle is an overarching, organizing principle of the brain (Gordon, 2000). This central organizing principle of the brain is analogous to a concept that has appeared in the literature for a long time: the approach-avoid response. This principle represents the likelihood that when a person encounters a stimulus their brain will either tag the stimulus as 'good' and engage in the stimulus (approach), or their brain will tag the stimulus as 'bad' and they will disengage from the stimulus (avoid). If a stimulus is associated with positive emotions or rewards, it will likely lead to an approach response; if it is associated with negative emotions or punishments, it will likely lead to an avoid response. The response is particularly strong when the stimulus is associated with survival. Other concepts from the scientific literature are similar to approach and avoidance and are summarized in the chart below.

The approach-avoid response is a survival mechanism designed to help people stay alive by quickly and easily remembering what is good and bad in the environment. The brain encodes one type of memory for food that tasted disgusting in the past, and a different type of memory for food that was good to eat. The amygdala, a small almond-shaped object that is part of the limbic system, plays a central role in remembering whether something should be approached or avoided. The amygdala (and its associated networks) are believed to activate proportionally to the strength of an emotional response.

The limbic system can process stimuli before it reaches conscious awareness. One study showed that subliminally presented nonsense words that were similar to threatening

words, were still categorized as possible threats by the amygdala (Naccache et al, 2005). Brainstem – Limbic networks process threat and reward cues within a fifth of a second, providing you with ongoing nonconscious intuition of what is meaningful to you in every situation of your daily life (Gordon et al. Journal of Integrative Neuroscience, Sept 2008). Such studies show that the approach-avoid response drives attention at a fundamental level – nonconsciously, automatically and quickly. It is a reflexive activity.

It is easy to see that the ability to recognizing primary rewards and threats, such as good versus poisonous food, would be important to survival and thus a part of the brain. Social neuroscience shows us that the brain uses similar circuitry for interacting with the social world. Lieberman and Eisenberger explore this finding in detail in a paper in this journal entitled 'The Pains and Pleasures of Social Life' (Lieberman & Eisenberger, 2008).

The effects of approaching versus avoiding

The significance of the approach-avoid response becomes clearer when one discovers the dramatic effect that these states can have on perception and problem solving, and the implications of this effect on decision-making, stress-management, collaboration and motivation.

In one study, two groups of people completed a paper maze that featured a mouse in the middle trying to reach a picture on the outside. One group had a picture of cheese on the outside, the other a predator – an owl. After completing the maze both groups were given creativity tests. The group heading towards the cheese solved significantly more creative problems than those heading to the owl (Friedman and Foster, 2001). This study, supported by several other similar studies, shows that even subtle effects of this approach-avoid response can have a big impact on cognitive performance.

Translating this effect to the social world, someone feeling threatened by a boss who is undermining their credibility is less likely to be able to solve complex problems and more likely to make mistakes. This reduced cognitive performance is

Response	Synonyms in literature	Which traditional primary factors activate the response	What social factors/situations activate the response
Approach	Advance, attack, reward, resource, expand, solution, strength, construct, engage.	Rewards in form of money, food, water, sex, shelter, physical assets for survival.	Happy, attractive faces. Rewards in the form of increasing status, certainty, autonomy, relatedness, fairness.
Avoid	Withdraw, retreat, danger, threat, contract, problem, weakness, deconstruct.	Punishment in the form of removal of money or other resources or threats like a large hungry predator or a gun.	Fearful, unattractive, unfamiliar faces. Threats in the form of decreasing status, certainty, autonomy, relatedness, fairness.

driven by several factors. Firstly, when a human being senses a threat, resources available for overall executive functions in the prefrontal cortex decrease. There is a strong negative correlation between the amount of threat activation, and the resources available for the prefrontal cortex (Arnsten, 1998). The result is literally less oxygen and glucose available for the brain functions involved in working memory, which impacts linear, conscious processing. When feeling threatened by one's boss, it is harder to find smart answers because of diminished cognitive resources. Secondly, when threatened, the increased overall activation in the brain inhibits people from perceiving the more subtle signals required for solving non-linear problems, involved in the insight or 'aha!' experience (Subramaniam et al, 2007). Thirdly, with the amygdala activated, the tendency is to generalize more, which increases the likelihood of accidental connections. There is a tendency to err on the safe side, shrinking from opportunities, as they are perceived to be more dangerous. People become more likely to react defensively to stimuli. Small stressors become more likely to be perceived as large stressors (Phelps, 2006). When the boss appears threatening, perhaps they just do not smile that day, suddenly a whole meeting can appear threatening and the tendency can be to avoid taking risks.

Clearly the threat or avoid response is not an ideal state for collaborating with and influencing others. However, this response is the default situation that often occurs in teams. Due to the overly vigilant amygdala, more tuned to threats than rewards, the threat response is often just below the surface and easily triggered. Just speaking to one's supervisor, or someone of higher status is likely to activate this response. Thus it is much easier to cause aggravation (activate an avoid response) than it is to help others think rationally and creatively (the approach response). Many psychological and brain studies now support this idea, showing that the avoid response generates far more arousal in the limbic system, more quickly and with longer lasting effects than an approach response (Beaumeister, 2001). This discovery that our brain is inherently attuned to threatening stimuli helps explain many disquieting parts of life, from why the media focuses on bad news to why people are self-critical. It also points to the need to understand the social nature of the brain and proactively minimize common social threats.

On the other hand, an approach response is synonymous with the idea of engagement. Engagement is a state of being willing to do difficult things, to take risks, to think deeply about issues and develop new solutions. An approach state is also closely linked to positive emotions. Interest, happiness, joy and desire are approach emotions. This state is one of increased dopamine levels, important for interest and learning. There is a large and growing body of research which indicates that people experiencing positive emotions perceive more options when trying to solve problems (Frederickson, 2001), solve more non-linear problems that

require insight (Jung-Beeman, 2007), collaborate better and generally perform better overall.

In summary, the SCARF model is an easy way to remember and act upon the social triggers that can generate both the approach and avoid responses. The goal of this model is to help minimize the easily activated threat responses, and maximize positive engaged states of mind during attempts to collaborate with and influence others.

The SCARF model

While the five domains of the SCARF model appear to be interlinked in many ways, there is also value in separating out and understanding each domain individually. Let's look now at some of the supporting research for each domain then explore how threats and rewards might be managed in each.

Status

In researcher Michael Marmot's book **The Status Syndrome: How Social Standing Affects Our Health and Longevity**, Marmot makes the case that status is the most significant determinant of human longevity and health, even when controlling for education and income. This finding is supported by Sapolski's work with primates (Sapolski, 2002). Sapolski found that in primate communities, status equals survival: higher status monkeys have lower baseline cortisol levels, live longer and are healthier.

Status is about relative importance, 'pecking order' and seniority. Humans hold a representation of status in relation to others when in conversations, and this affects mental processes in many ways (Zink, 2008). The brain thinks about status using similar circuits for processing numbers (Chaio, 2003). One's sense of status goes up when one feels 'better than' another person. In this instance the primary reward circuitry is activated, in particular the striatum, which increases dopamine levels. One study showed that an increase in status was similar in strength to a financial windfall (Izuma et al, 2008). Winning a swimming race, a card game or an argument probably feels good because of the perception of increased status and the resulting reward circuitry being activated.

The perception of a potential or real reduction in status can generate a strong threat response. Eisenberger and colleagues showed that a reduction in status resulting from being left out of an activity lit up the same regions of the brain as physical pain (Eisenberger et al., 2003). While this study explores social rejection, it is closely connected to the experience of a drop in status.

Reducing status threat

It can be surprisingly easy to accidentally threaten someone's sense of status. A status threat can occur through giving advice or instructions, or simply suggesting someone is

slightly ineffective at a task. Many everyday conversations devolve into arguments driven by a status threat, a desire to not be perceived as less than another. When threatened, people may defend a position that doesn't make sense, to avoid the perceived pain of a drop in status.

In most people, the question 'can I offer you some feedback' generates a similar response to hearing fast footsteps behind you at night. Performance reviews often generate status threats, explaining why they are often ineffective at stimulating behavioral change. If leaders want to change others' behavior, more attention must be paid to reducing status threats when giving feedback. One way to do this is by allowing people to give themselves feedback on their own performance.

Increasing status reward

Organizations know all about using status as a reward and many managers feel compelled to reward employees primarily via a promotion. This may have the unfortunate side effect of promoting people to the point of their incompetence. The research suggests that status can be increased in more sustainable ways. For example, people feel a status increase when they feel they are learning and improving and when attention is paid to this improvement. This probably occurs because individuals think about themselves using the same brain networks they use for thinking about others (Mitchell, 2006). For example, when beating one's own best time at a task or sporting activity, the reward circuitry from a sense of being 'better than' is activated, but in this case, the person one is 'better than' is oneself in the past.

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Status can go up when people are given positive feedback, especially public acknowledgment. One study showed activation of the reward circuitry in children being as strong as money as when told 'that's correct' by a repetitive computer voice. (Scott, Dapretto, et al., 2008, under review). Leaders can be afraid of praising their people for fear of the

request for promotion. However, given the deeply rewarding nature of status, giving positive feedback may reduce the need for constant promotions, not increase it.

Finally, status is about one's relative position in a community of importance such as a professional group or social club based on what is valued. While society, especially advertising and the media, would have people spend money in order to be 'better than others', it doesn't have to be a zero-sum game. Status can be increased without cost to others or an effect on relatedness. As well as playing against oneself, one can also change the community one focuses on, as when a low level mailroom clerk becomes the coach of a junior baseball team. Or, one can change what is important, for example deciding that the quality of one's work is more important than the quantity of one's work.

Certainty

The brain is a pattern-recognition machine that is constantly trying to predict the near future. For example, the motor network is useless without the sensory system. To pick up a cup of coffee, the sensory system, sensing the position of the fingers at each moment, interacts dynamically with the motor cortex to determine where to move your fingers next. Your fingers don't draw on fresh data each time; the brain draws on the memory of what a cup is supposed to feel like in the hand, based on expectations drawn from previous experiences. If it feels different, perhaps slippery, you immediately pay attention (Hawkins, 2004). The brain likes to know the pattern occurring moment to moment, it craves certainty, so that prediction is possible. Without prediction, the brain must use dramatically more resources, involving the more energy-intensive prefrontal cortex, to process moment-to-moment experience.

Even a small amount of uncertainty generates an 'error' response in the orbital frontal cortex (OFC). This takes attention away from one's goals, forcing attention to the error (Hedden, Garbrielli, 2006). If someone is not telling you the whole truth, or acting incongruously, the resulting uncertainty can fire up errors in the OFC. This is like having a flashing printer icon on your desktop when paper is jammed – the flashing cannot be ignored, and until it is resolved it is difficult to focus on other things. Larger uncertainties, like not knowing your boss' expectations or if your job is secure, can be highly debilitating.

The act of creating a sense of certainty is rewarding. Examples are everywhere in daily life: music that has simple repeating patterns is rewarding because of the ability to predict the flow of information. Meeting expectations generates an increase in dopamine levels in the brain, a reward response (Schultz, 1999). Going back to a well-known place feels good because the mental maps of the environment can be easily recalled.

Reducing the threat from uncertainty

Any kind of significant change generates uncertainty. Yet uncertainty can be decreased in many simple ways. This is a big part of the job of managers, consultants and leaders. As people build business plans, strategies, or map out an organization's structure, they feel increasing levels of clarity about how an organization might better function in the future. Even though it is unlikely things ever go as planned, people feel better because certainty has increased. Breaking a complex project down into small steps does the same. Another key tool involves establishing clear expectations of what might happen in any situation, as well as expectations of desirable outcomes.

Increasing the reward from certainty

Some examples of how increase certainty include making implicit concepts more explicit, such as agreeing verbally how long a meeting will run, or stating clear objectives at the start of any discussion. In learning situations, the old adage is 'tell people what you are going to tell them, tell them, then tell them what you told them', all of which increases certainty.

The perception of certainty can be increased even during deeply uncertain times. For example, when going through an organizational restructure, providing a specific date when people will know more information about a change may be enough to increase a sense of certainty. Much of the field of change management is devoted to increasing a sense of certainty where little certainty exists.

Autonomy

Autonomy is the perception of exerting control over one's environment; a sensation of having choices. Mieka (1985) showed that the degree of control organisms can exert over a stress factor determines whether or not the stressor alters the organism's functioning. Inescapable or uncontrollable stress can be highly destructive, whereas the same stress interpreted as escapable is significantly less destructive. (Donny et al, 2006). The difference in some rodent studies was life and death (Dworkin et al, 1995).

An increase in the perception of autonomy feels rewarding. Several studies in the retirement industry find strong correlations between a sense of control and health outcomes (Rodin, 1986). People leave corporate life, often for far less income, because they desire greater autonomy.

A reduction in autonomy, for example when being micro managed, can generate a strong threat response. When one senses a lack of control, the experience is of a lack of agency, or an inability to influence outcomes.

Reducing autonomy threat

Working in a team necessitates a reduction in autonomy. In healthy cultures, this potential threat tends to be counteracted

with an increase in status, certainty and relatedness. With an autonomy threat just below the surface, it can be helpful to pay attention to this driver. The statement 'Here's two options that could work, which would you prefer?' will tend to elicit a better response than 'Here's what you have to do now'.

Increasing rewards from autonomy

Providing significant autonomy in an organization can be difficult. Yet even a subtle perception of autonomy can help, for example by having self-directed learning portals, where employees get to design their learning curriculum, and self-driven human resource systems.

Allowing people to set up their own desks, organize their workflow, even manage their working hours, can all be beneficial if done within agreed parameters. Sound policy establishes the boundaries within which individuals can exercise their creativity and autonomy. Sound policy should enable individual point-of-need decision-making without consultation with, or intervention by, leaders. In this regard, sound policy hard-wires autonomy into the processes of an organization.

Relatedness

Relatedness involves deciding whether others are 'in' or 'out' of a social group. Whether someone is friend, or foe. Relatedness is a driver of behavior in many types of teams, from sports teams to organizational silos: people naturally like to form 'tribes' where they experience a sense of belonging. The concept of being inside or outside the group is probably a by-product of living in small communities for millions of years, where strangers were likely to be trouble and should be avoided.

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The decision that someone is friend or foe happens quickly and impacts brain functioning (Carter & Peltchrey, 2008). For example, information from people perceived as 'like us' is processed using similar circuits for thinking one's own thoughts. When someone is perceived as a foe, different circuits are used (Mitchell, 2006). Also, when treating someone as a competitor, the capacity to empathise drops significantly (Singer et al, 2006).

Neuroscientist John Cacioppo talks about the need for safe human contact being a primary driver, like the need for food (Cacioppo, 2008). In the absence of safe social interactions the body generates a threat response, also known as feeling lonely. However, meeting someone unknown tends to generate an automatic threat response. This explains why one feels better at a party knowing three people rather than one. Alcohol helps to reduce this automatic social threat response, enabling strangers to communicate more easily, hence its use as a social lubricant the world over. In the absence of alcohol, getting from foe to friend can be helped by an oxytocin response, an experience of connecting with the other person. Oxytocin is a hormone produced naturally in the brain, and higher levels of this substance are associated with greater affiliative behavior (Domes et al, 2007). Studies have shown far greater collaboration when people are given a shot of oxytocin, through a nasal spray. (Kosfield, 2005). A handshake, swapping names and discussing something in common, be it just the weather, may increase feeling of closeness by causing the release of oxytocin (Zak et al, 2005). The concept of relatedness is closely linked to trust. One trusts those who appear to be in your group, who one has connected with, generating approach emotions. And when someone does something untrustworthy, the usual response is to withdraw. The greater that people trust one another, the stronger the collaboration and the more information that is shared.

Reducing threats from lack of relatedness

Increasing globalization highlights the importance of managing relatedness threats. Collaboration between people from different cultures, who are unlikely to meet in person, can be especially hard work. The automatic foe response does not get diminished by social time together. This response can be mitigated by dedicating social time in other forms. For example, using video to have an informal meeting, or ensuring that people forming teams share personal aspects of themselves via stories, photos or even social-networking sites. In any workplace it appears to pay off well to encourage social connections. A Gallup report showed that organizations that encourage 'water cooler' conversations increased productivity (Gallup, November 2008).

Increasing the rewards from relatedness

Positive social connections are a primary need; however, the automatic response to new social connections involves a threat. To increase the reward response from relatedness, the key is to find ways to increase safe connections between people. Some examples include setting up clearly defined buddy systems, mentoring or coaching programs, or small action learning groups. Small groups appear to be safer than large groups. The Gallup organizations research on workplace engagement showed that the statement 'I have a best friend at work' was central to engagement in their 'Q12' assessment

(Gallup Organization). Perhaps even having one trusting relationship can have a significant impact on relatedness.

Fairness

Studies by Golnaz Tabibnia and Matthew Lieberman at UCLA showed that 50 cents generated more of a reward in the brain than \$10.00, when it was 50 cents out of a dollar, and the \$10 was out of \$50 (Tabibnia & Lieberman, 2007). This study and a number of others illustrate that fair exchanges are intrinsically rewarding, independent of other factors. The need for fairness may be part of the explanation as to why people experience internal rewards for doing volunteer work to improve their community; it is a sense of decreasing the unfairness in the world.

Unfair exchanges generate a strong threat response (Tabibnia & Lieberman, 2007). This sometimes includes activation of the insular, a part of the brain involved in intense emotions such as disgust. Unfair situations may drive people to die to right perceived injustices, such as in political struggles. People who perceive others as unfair don't feel empathy for their pain, and in some instances, will feel rewarded when unfair others are punished (Singer et al, 2006).

Reducing the threat from unfairness and increasing the reward from fairness

A threat response from a sense of unfairness can be triggered easily. The following statements are examples of what employees might say in reaction to a threat to fairness:

- 'He has a different set of rules for Mike and Sally than for the rest of us.'
- 'Management tell us that we need to lose headcount, but our sales are carrying the other division and they don't have to cut anyone.'
- 'They do all this talk about 'values' but it's business as usual at the top.'

The threat from perceived unfairness can be decreased by increasing transparency, and increasing the level of communication and involvement about business issues. For example, organizations that allow employees to know details about financial processes may have an advantage here.

Establishing clear expectations in all situations – from a one-hour meeting to a five-year contract – can also help ensure fair exchanges occur. A sense of unfairness can result from a lack of clear ground rules, expectations or objectives. Allowing teams to identify their own rules can also help. In an educational context, a classroom that creates the rules of what is accepted behavior is likely to experience less conflict. Examples of the success of self-directed teams in manufacturing abound (Semler, 1993). Much of what these self-driven teams do is ensure fairness in grass-roots decisions, such as how workloads are shared and who can do which tasks.

The issue of pay discrepancies in large organizations is a challenging one, and many employees are deeply unhappy to see another person working similar hours earning 100 times their salary. Interestingly, it is the perception of fairness that is key, so even a slight reduction in senior executive salaries during a difficult time may go a long way to reducing a sense of unfairness.

The wider implications of the SCARF model

Managing oneself

The SCARF model helps individuals both minimize threats and maximize rewards inherent in everyday experience. For minimizing threats, knowing about the domains of SCARF helps one to label and reappraise experiences that might otherwise reduce performance. Labelling (Lieberman et al, 2007) and reappraisal (Ochsner & Gross, 2005) are cognitive tools that have been verified in brain studies to be effective techniques for reducing the threat response. These techniques have been shown to be more effective at reducing the threat response than the act of trying to suppress an emotion (Goldin et al, 2007). Knowing about the elements of SCARF helps one understand issues such as why you can't think clearly when someone has attacked your status, instead of just trying to push the feeling aside.

Knowing the domains of SCARF also allows an individual to design ways to motivate themselves more effectively. An example might be focusing attention on increasing one's sense of autonomy during a time of uncertainty, such as focusing on the thrill of doing whatever you like when suddenly out of work.

Education and training

Successful educators, trainers and facilitators intuitively use the SCARF model. They know that people learn best when they are interested in something. Interest is an approach state. Teaching children who feel threatened, disconnected, socially rejected or treated unfairly is an uphill battle. For example, educators can create a nurturing learning environment by pointing out specifically how people are improving, which increases a sense of status. This is particularly important when learning anything new, which can create a threat response. Educators can also create certainty by presenting clear outlines of what is being learned, and provide a perception of some autonomy by introducing choice into the classroom. The key here is for educators, trainers and coaches to value the approach state as the necessary state for learning, and to put effort and attention into maintaining this toward state.

Coaching

Personal and executive coaching can increase all five SCARF domains. Status can be increased through regular positive feedback, attention to incremental improvements, and the achievement of large goals. Certainty can be increased

by identifying central goals, and subsequently reducing the uncertainty inherent in maintaining multiple focuses. Breaking down large goals into smaller steps increases certainty about how a goal can be reached. Finding ways to take action when challenges appear insurmountable can increase autonomy. Relatedness can be increased through the relationship with the coach. Fairness can be reduced through seeing situations from other perspectives. The SCARF model helps explain why coaching can be so effective at facilitating change, and points to ways of improving its delivery.

The SCARF model points to more creative ways of motivating that may not just be cheaper, but also stronger and more sustainable.

Leadership development

The SCARF model provides a robust scientific framework for building self-awareness and awareness of others amongst leaders. Many new leaders may negatively impact the domains of SCARF by accident. They may know how things should be done, and subsequently provide too much direction and not enough positive feedback, thereby affecting people's status. They often don't provide clear expectations, impacting certainty. They micro manage, impacting autonomy. They want to maintain a professional distance, impacting relatedness. And, they may impact fairness by not being transparent enough. When the opposite happens and you meet someone who makes you feel better about yourself, provides clear expectations, lets you make decisions, trusts you and is fair, you will probably work harder for them as you feel intrinsically rewarded by the relationship itself. Spending time around a leader like this activates an approach response and opens up people's thinking, allowing others to see information they wouldn't see in an avoid state.

Organizational systems

SCARF has many implications for how organizations are structured, including reward systems, communications systems, decision processes, information flow and

remuneration structures. In the space available in this article we will explore just one of these – reward systems. Techniques for motivating and rewarding staff are largely based on the carrot and stick principle, with the carrot mostly involving money or a promotion. The SCARF model points to more creative ways of motivating that may not just be cheaper, but also stronger and more sustainable. For example, success could be rewarded by increasing people's autonomy by allowing them to have greater flexibility in their work hours. Or, rewards could be provided via increasing the opportunity for learning new skills, which can increase a sense of status. Or, people could be rewarded through increasing relatedness through allowing more time to network with peers during work hours.

Summary

While the five domains of SCARF reflect core brain networks of greatest significance when it comes to collaborating with and influencing others. Understanding these drivers can help individuals and organizations to function more effectively, reducing conflicts that occur so easily amongst people, and increasing the amount of time people spend in the approach state, a concept synonymous with good performance.

Understanding the domains in the SCARF model and finding personalized strategies to effectively use these brain insights, can help people become better leaders, managers, facilitators, coaches, teachers and even parents.

In the early 2000s, the philosopher Theodore Zeldin said, 'When will we make the same breakthroughs in the way we treat each other as we have made in technology?' These findings about the deeply social nature of the brain, and the deep relevance of the domains of SCARF in everyday life, may provide some small steps in the right direction.

Suggestions for future research

An abbreviated list of potential research issues includes the following questions:

- Which of the domains of SCARF generate the strongest threats or rewards?
- Which domains have the longest-term impact?
- What are the links between the domains?
- How can studies be designed to identify individual domains?
- What are the best techniques for minimizing threat and maximizing reward in each of the domains?
- Do people vary in the importance of the 5 domains, and if so are there patterns across men and women, age groups or cultures?
- Is there value in assessing these domains in individuals or culturally in organizations?
- What are the organizational implications of this model for how systems are set up?
- Testing what aspects of the model are most effective to which individual leaders?

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References

- Arnsten, A. F. T. (1998). The Biology of Being Frazzled. *Science*, 280, 1711-1712.
- Baumeister, R. F., Bratslavsky, E., & Vohs, K.D. (2001). Bad Is Stronger Than Good. *Review of General Psychology*, 5(4), 323-370.
- Baumeister, R. F. & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117, 497-529.
- Cacioppo, J. T., & Patrick, B. (2008). *Loneliness: human nature and the need for social connection*. New York: W. W. Norton and Company.
- Carter, E. J. & Pelfrey, K. A., (2008). Friend or foe? Brain systems involved in the perception of dynamic signals of menacing and friendly social approaches. *Journal Social Neuroscience, Volume 3, Issue 2 June 2008*, pages 151-163.
- Chiao, J. Y., Bordeaux, A. R., Ambady, N. (2003). Mental representations of social status. *Cognition*, 93, 49-57.
- Domes, G., Heinrichs, M., Gläscher J., Büchel, C., Braus, D., Herpertz, S. (2007). Oxytocin Attenuates Amygdala Responses to Emotional Faces Regardless of Valence. *Biological Psychiatry*, 62(10), 1187-1190.
- Donny, E. C., Bigelow, G. E., & Walsh S. L. (2006). Comparing the physiological and subjective effects of self-administered vs yoked cocaine in humans. *Psychopharmacology*, 186(4), 544-52.
- Dworkin, S. I., Mirkis, S., Smith J. E. (1995). Response-dependent versus response-independent presentation of cocaine: differences in the lethal effects of the drug. *Psychopharmacology*, 117(3), 262-266.
- Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science*, 302, 290-292.
- Fredrickson, B. L. (2001). The Role of Positive Emotions in Positive Psychology: The Broaden-and-Build Theory of Positive Emotions. *American Psychologist*, 56, 218-226.
- Friedman R. and Foster J. (2001). The effects of promotion and prevention cues on creativity. *Journal of Personality and Social Psychology*, 81, 1001-1013.

- Gallup, 13 November 2008, Newsflash: Workplace Socializing Is Productive Gallup Organization. Employee Engagement. Retrieved November 20, 2009 <http://www.gallup.com/consulting/52/Employee-Engagement.aspx>
- Gilbert, D. (2006). *Stumbling upon happiness*. Knopf Publishing Group.
- Goldin, P. R., McRae, K., Ramel, W., & Gross, J. J. (2007). The Neural Bases of Emotion Regulation: Reappraisal and Suppression of Negative Emotion, *Biological Psychiatry*, 63, 577-586.
- Gordon, E. (2000). *Integrative Neuroscience: Bringing together biological, psychological and clinical models of the human brain*. Singapore: Harwood Academic Publishers.
- Gordon, E. et al. (2008), An "Integrative Neuroscience" platform: application to profiles of negativity and positivity bias, *Journal of Integrative Neuroscience*.
- Hawkins, J. & Blakeslee, S. (2004). *On Intelligence*. Times Books.
- Hedden, T., & Gabrieli, J. D. E. (2006). The ebb and flow of attention in the human brain. *Nature Neuroscience*, 9, 863-865.
- Izuma, K., Saito, D., Sadato, N. (2008). Processing of Social and Monetary Rewards in the Human Striatum. *Neuron*, 58(2), 284-294.
- Kosfeld, M. Heinrichs, M., Zak, P. J., Fischbacher, U., & Fehr, E. (2005). Oxytocin increases trust in humans. *Nature*, 435, 673-676.
- Lieberman, Eisenberger, Crockett, Tom, Pfeifer, & Way (2007). Putting Feelings Into Words: Affect Labelling Disrupts Amygdala Activity in Response to Affective Stimuli. *Psychological Science*, 18(5), 421-428.
- Lieberman & Eisenberg (2008) The pains and pleasures of social life, *NeuroLeadership Journal*, Edition 1.
- Eisenberger & Lieberman (2004). Why it hurts to be left out: The neurocognitive overlap between physical and social pain. *Trends in Cognitive sciences*, 8, 294-300.
- Jung Beeman, M., (2007), presented at the first NeuroLeadership Summit, Asolo, Italy.
- Lieberman, M. D. (2007). Social Cognitive Neuroscience: A Review of Core Processes. *Annual Review of Psychology*, 58, 259-289.
- Mason, M. F., Norton, M. I., Van Horn, J. D., Wegner, D. M., Grafton, S. T., & Macrae, C. N. (2007). Wandering minds: the default network and stimulus-independent thought. *Science*, 315, 393-395.
- Mather, M., Mitchell, K. J., Raye, C. L., Novak, D. L., Greene, E.J., & Johnson, M. K. (2006). Emotional Arousal Can Impair Feature Binding in Working Memory. *Journal of Cognitive Neuroscience*, 18, 614-625.
- Mineka, S. & Hendersen, R. W. (1985). Controllability and predictability in acquired motivation. *Annual Review of Psychology*, 36, 495-529.
- Mitchell, J. P., Macrae, C. N., & Banaji, M. R. (2006). Dissociable Medial Prefrontal Contributions to Judgments of Similar and Dissimilar Others. *Neuron*, 50, 655-663.
- Naccache, L., Gaillard, R.L., Adam, C., Hasboun, D., Clemenceau, S., Baulac, M., Dehaene, S., & Cohen, L. (2005). A direct intracranial record of emotions evoked by subliminal words. *Proceedings of the National Academy of Science*, 102, 7713-7717.
- Ochsner, K. N., & Lieberman, M. D. (2001). The emergence of social cognitive neuroscience. *American Psychologist*, 56, 717-734.
- Ochsner K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences*, 9(5), 242-249.
- Phelps, E. A. (2006). Emotion and cognition: Insights from Studies of the Human Amygdala. *Annual Review of Psychology*, 57, 27-53.
- Rodin, J. (1986). Aging and health: effects of the sense of control. *Science*, 233, 1271-1276.
- Sapolski, R.M. (2002). *A Primate's Memoir: A Neuroscientist's Unconventional Life Among the Baboons*. Scribner.
- Schultz, W. (1999). The Reward Signal of Midbrain Dopamine Neurons. News in *Physiological Sciences*, 14(6), 249-255.
- Scott, Dapretto, et al., under review (2008), *Social Cognitive and Affective Neuroscience Journal*.
- Semler, R. (1993). *Maverick: The Success Story behind the World's Most Unusual Workplace*. Warner Books.
- Seymour, B., Singer, T., & Dolan, R. (2007). The neurobiology of punishment. *Nature Reviews Neuroscience*, 8, 300-311.
- Singer, T., Seymour, B., O'Doherty, J.P., Stephan, K.E., Dolan, R.J., Frith, C.D., 2006. Empathic neural responses are modulated by the perceived fairness of others. *Nature*, 439, 466-469.
- Subramaniam, K., Kounios, J., Bowden, E.M., Parrish, T.B., & Jung-Beeman, M. (In press 2008). Positive mood and anxiety modulate anterior cingulate activity and cognitive preparation for insight. *Journal of Cognitive Neuroscience*.
- Tabibnia, G., & Lieberman M. D. (2007). Fairness and Cooperation Are Rewarding: Evidence from Social Cognitive Neuroscience. *Annals of the New York Academy of Sciences*, 1118, 90-101.
- Zak, P. J., Kurzban, R., Matzner, W. T. (2005). Oxytocin is associated with human trustworthiness, *Hormones and Behavior*, 48(5), 522-527.
- Zink, C. F., Tong, Y., Chen, Q., Bassett, D. S., Stein, J. L., & Meyer-Lindenberg A. (2008). Know Your Place: Neural Processing of Social Hierarchy in Humans. *Neuron*, 58, 273-283.