The Responsive Organization

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THE RESPONSIVE ORGANIZATION:
UNDERSTANDING THE DUAL PROCESSES OF THE HUMAN MIND AND HUMAN INTERACTION IN STRATEGY MAKING

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Abstract

Modern cognitive science identifies a dynamic system of interacting fast and slow processes as essential to human thinking. The fast system observes and reacts to environmental stimuli and the slow system interprets events and reasons about future actions. When the fast and slow processes interact they form a dynamic system that enables individuals to respond effectively to changing conditions. We project this dynamic perspective onto human interaction in organizations where observations and experiential insights gained by employees and operating managers are linked to forward-looking planning considerations that take place around the top-management echelons. This identifies the responsive organization that is able to observe and react to frequent and often abrupt environmental changes and thereby adapt organizational activities to the changing reality.

Keywords: dynamic systems, interactive strategy-making, emotional intelligence, fast and slow processes, organizational adaptability

Humans have two complementary ways of thinking. A fast process that observes the surrounding world and a slow process that interprets observations and experiences gathered from ongoing interactions with the environment (Kahneman 2011). These processes are linked to the human body by the phenomena it observes, the actions it carries out, and the outcomes it senses along the way (Gallagher 2005; Tomasello 2008). The actions taken by the body affect the mind and it is this embodied engagement that creates meaning to our surroundings. In principle, things and events are observed in fast processes and the various impressions are interpreted and projected forward in slow processes. The combination of fast and slow processes interact as a dynamic system that allows individuals to observe, respond, sense, and adapt to changing and evolving circumstances. This *embodied dynamicism* can explain how the body's activities promote cognitive development, understanding, and ongoing advancement (Thompson 2010). We can project comparable dynamic systems of fast and slow processes onto the human interaction that takes place among individuals in groups and within organizations. The employees that execute organizational transactions and engage with various stakeholders as they carry out these activities observe many things that happen in the environment and gain first-hand experiences from the things they do and the way people react to them. These diverse impressions can, in principle, be collected and included for further deliberations in periodic forward-looking planning considerations that, in turn, may provide directions for future organizational development. In the management literature, these dynamic systems are often referred to as corporate strategy making processes.

In this article we introduce the fast and slow processes of the human mind and transpose them into an organizational setting where activities are performed by individuals that interact with other individuals both within and outside the firm. Based on insights from modern cognitive science and neuroscience, we theorize about the importance of human emotions and interactive mechanics in the responsive organization and discuss the strategic leadership implications of the underlying propositions.

This exercise provides a different way to understand the dynamic of contemporary organizations and develops new insights about the conditions under which firms respond and adapt effectively to environmental change. In line with the *domains-interaction* approach (Cornelissen 2005, 2006), we use the dual processing perspective of the human mind to create new meaning around effective interaction among individuals and project this understanding onto corporate strategy making processes.

In the following, we first examine the dynamic system ascribed to the human brain and discuss the role of emotions in dealing with environmental change and the implications for effective individual reactions. We then transpose the fast and slow systems perspective of the mind onto organizations of interacting individuals and develop propositions regarding the effective process dynamic in an organizational setting. The current understanding of the human brain functions as embodied engagement is used to develop more elaborate interpretations of effective organizational dynamics and strategy making processes within the *responsive organization*. Finally, we discuss the implications for organizational studies and management.

BACKGROUND

It is still a common view that we humans have an unemotionally rational, abstract, and logical mind that is able to represent the world with a mental capability that transcends our bodily nature. Mintzberg's (1990, 1994) critique of the planning approach and the design school can be seen as a reaction to this predominant view. His notion that we plan with the left side of the brain and manage with the right was an initial recognition that emotions and creativity matter as much as rationality (Mintzberg 1976). We realize now that this representation of the human mind is a gross simplification (e.g., Hines 1987) although the critique continues to be very topical. But, it is articulated differently to day and considers behavioral differences rather than hemispheres (Akinci and Sadler-Smith 2012). The distinction between left and right brain thinking is outdated since we now know that people manage and plan using both sides of the brain. Nonetheless, the distinction between fast and slow thinking

(Kahneman 2011) may shed new light on the relationship between planning and managing. The body and its reactions affect our mind and neuroscience can enlighten how embodied engagement gives meaning to actions, emotions, concepts and language.

The revelation that the human mind seems to operate through complementary processes embedded in so-called fast and slow processing is central to our analysis. However, Kahneman´s (2011) description of the interaction between fast and slow thinking describes cognition without a body. In reality, there are interplays between brain, body, and environment as the fast processes act on environmental influences and sense the effects of immediate reactions while the slow processes reason around future things to do (e.g., Gallagher 2005; Tomasello 2008). The fast processes operate with little effort and observe outcomes automatically from ongoing interactions between the body and the surrounding environment. The slow processes are effortful conscious activities that interpret outcomes from interactions with the environment and consider forward moves through reasoning based on observed relationships. Hence, the world presents itself through the fast processes, whereas the slow processes interpret and reason about what the fast processes have experienced.

We can conceive of three major approaches to cognitive science: Cognitivism, connectionism and embodied dynamicism (Thompson 2010). Mintzberg raised his critique in the era of cognitivism and Kahnemann´s research is in several areas common with connectionism. However, we want to emphasize the third approach, embodied dynamicism, when we analyze the dynamic of individuals interacting within organizations. *Cognitivism* is based on a metaphor of the mind as a computer with mental processes performed by symbolic manipulation in the brain (Newell and Simon 1976). It is focused on algorithms that govern planning and problem solving as non-conscious mental computing processes where "the connection between mind and meaning, on the one hand, and subjectivity and consciousness, on the other, was completely severed" (Thompson 2012: 5). Hence, cognitivism has projected the computer as a socio-cultural activity into the brain without describing the influence of

culture in cognition and thereby produced a model "from which the human actor has been removed" (Hutching 1995: 363).

In contrast, *connectionism* emphasizes perceptual processes and their relation to the environment where a central metaphor is the neural network. Hence, knowledge is processed by training neural networks and cognitive development is an emergent activity in a complicated architecture of networks. Cognitivism places cognition in the brain, whereas connectionism offers a connection to, but no description of, a sensory-motor interaction with the environment. However, the human body is still missing in the cognitive processing. Kahneman (2011) does not present the body as an integral part of cognition and the fast thinking system is a perceptual system. The fast system includes "innate skills that we share with other animals. We are born prepared to perceive the world around us, recognize objects, orient attention, avoid losses and fear spiders. Other mental activities become fast and automatic through prolonged practice" (Kahneman 2011: 21). While the body might be implied somewhere underneath this description, it is not explicitly incorporated or mentioned in this practice.

Embodied dynamicism offers an explanation of how the body's activities can promote cognitive development. In this context cognition is the exercise of skillful knowledge development from embodied action (Calvo and Gomila 2008; Semin and Smith 2008; Varela, Thomson and Rosh 1991). Thompson (2010: 11) describes a dynamic system model where mental processes change over time based on interaction between external and internal forces brought together in a skillful exercise of know-how as an embodied approach. Cognition is no longer a disembodied manipulation of symbols in recognition of perceptual patterns that are separate from the sensory-motor activity. It is not the brain that thinks, it is an acting person. This approach to cognition, also referred to as *enactive*, implies that "you lay down a path in walking" (Varela 1987: 63).

That is, we want to describe the creation of knowledge as embodied dynamicism between fast and slow thinking and we want to find organizational level analogous to fast and slow thinking in the human mind in accordance with an enactive approach. This also reflects interaction between tacit and

explicit knowledge, between intuitive processes and conscious insightful knowledge, and between two different poles in the cognitive landscape. Both ends have strengths and weaknesses, but together they can create productive thinking.

Fast and slow thinking can also be described as peripheral and central cognitive processes in the sense that fast thinking builds on external attention to actions in the environment and slow thinking on internal attention and mental processes. Hence, we expect more fast thinking around the many interactions we perform in everyday activities compared to slow thinking linked to reflective activities performed in periodic meetings and planning exercises. The distinction between central and peripheral gives us a new perspective where knowledge linked to procedural and autobiographic memory is personal and attached to the individual. Therefore, dispersed employees engaged in specific operational activities may have more knowledge than the managers that lead them. Employees throughout the organization may have many ideas about how things can be performed and improved in the daily operations consistent with the fact that the fast processes in the human brain generate ideas. It implies that peripheral processes, whether they are individual or organizational, have a large innovative potential compared to the central processes. This begs the questions of how to better exploit the richness of the peripheral knowledge and insight possessed by individuals with operational expertise and how to manage these people who are more knowledgeable than oneself.

THE HUMAN MIND

A traditional description of human brain activity adopts a central planning metaphor that reflects a person in control because intended actions seemingly are carried out by the body through the direction of the brain. Since we can see and monitor things along the way, humans also seem to master diagnostic control processes. Hence, the activation of the central executive functions in the frontal cortex of the brain indicates that we control the body. However, things are more complicated because

the actions carried out by the body also affect our thoughts (Tomasello 2008). The body shapes the way we think, process information, and communicate.

If we restate this discovery in management jargon, it means that decentralized actions influence and form a central plan within the brain. This way modern cognitive science has brought the fast and the slow mental processes together. The binding principle between our conscious understanding, *concept*, and unconscious observations, *percept*, is our continuous physical interaction with the real world that surrounds us (Figure 1). The body is always on duty. It observes unfolding events, reacts to the observations, and senses the effects of those actions and thereby continues to learn from on-line experimentation that constitutes a multitude of ongoing encounters with the environment. In contrast, the mental processes operate off-line when imagining the future or speculating about longer-term consequences and potential counter effects. This particular paradigm is often referred to as the *embodiment of mind* (Gallagher 2005). The paradigm is not interested in where mental functions are located in the brain but rather how they develop over time and how information moves around in dynamic patterns. Hence, the cognitive process depends on ongoing updating from experiential encounters by the body that feed conceptualizations of the surrounding reality to assure that the interpretation of the environment is reasonably correct.

Please insert Figure 1 about here

The ability to think and operate within the embodiment of mind depends on the intimate interaction between brain, body and environment. Stephen Grossberg (2000: 244) explains that "the brain is organized to obey principles of complementarity, uncertainty, and symmetry breaking … known complementary properties exist because of the need to process complementary types of information in the environment." Hence, the processes of mental conceptualization that create understanding, meaning, and cognition are influenced by perceptual impressions from action

encounters with the external environment. So, the human brain may be better understood in terms of complementary cycles of perception, cognition, emotion, and actions that link the brain functions to the physical surroundings in continuously operating feedback cycles (Grossberg 2000).

When the information updating gets skewed due to a limited number of physical encounters, or experiments, the concept is increasingly informed by historical experiences that eventually become outdated and invalid. It is easy to extend this description to organizational situations of cognitive biases developing among executives as they become more and more remote from the actual corporate activities that he or she is responsible for (e.g., Bazerman and Moore 2009). The development of environmental misperceptions may also (partially) explain organizational inertia so commonly observed in management studies (e.g., Hannan and Freeman 1989) and the limitations of 'dominant logics' (Bettis and Prahalad 1995) as executive decision makers increasingly rely on outdated experiences when they gain seniority and rise in the corporate ranks.

Dual processing accounts of cognition

Creativity and innovation can be interpreted as evolving properties of interacting fast and slow processes in the human mind. Cognition can be described as the dual process of reasoning (judgment) and decision-making (taking actions). Stanovich (2004), for example, provides a list of dual-process models that all see cognition as interaction between two sub-systems. The dual-process theories attached to these two sub-systems took shape over more than two decades. They were implicit in the early research on heuristics and biases by Kahneman and Tversky (1982) and have gained support in recent neurophysiology research (e.g., Prado and Noveck 2007). The cognitive processes of System 1 and System 2 are complementary and can be described as a relationship between fast and slow processes (Evans 2003). The relative qualities of the two cognitive systems are listed in Table 1. See Lieberman (2007) and Evans (2008) for recent overviews of the different core processes.

Please insert Table 1 about here

Ideas may develop in both systems, but the judgment of which ideas are the better ones is based on the slow System 2. Alternative initiatives are considered, and the slow System 2 creates temporal models by reasoning and assesses their consequences in a simulate way using imagination. When initiatives are carried out in the real world, the decentralized processes of the fast system are active. The intuitive sensing of these activities is a part of the fast processing system. New experiential insights gained by individuals from ongoing actions in the fast system are subsequently passed on to the slow system for forward consideration. This forms the interacting effects between actions induced by the slow system, immediate actions taken in response to external events, and continuous observations of outcomes in the fast system. So, the human mind operates through complementary fast and slow processes where ongoing enactments with the surrounding environment are observed in the fast system and assessed in the slow system to determine appropriate forward actions. The effects of responsive actions carried out by the body are observed and fed forward to the analytical capacity in the brain for further considerations.

The compass of emotions

Emotions are important to the way the fast and slow brain systems operate and how humans think. Feelings and thoughts speak together and there are several competing models available to explain how this emotional intelligence operates. While many authors ignore the role of emotions, the emotional processing is associated with System 1 rather than System 2 (Evans 2008). Emotional intelligence can be defined as "the ability to perceive and express emotion, assimilate emotion in thought, understand and analyze emotions and regulate emotions in oneself and others" (Mayer, Salovey and Caruso 2000: 396). Emotions are involved in everything that happens in the human brain and two areas of the brain

seem particularly important: (1) the *frontal lobes* of the brain and (2) the *limbic system* deep inside the brain. The limbic system has two areas, *amygdala* and *hippocampus*, that seem heavily involved in the dynamic systems processing. They are physically placed between the cerebrum and brain stem and as such interfere in interactions between the consciousness of the slow brain system and the urges of the fast system. Here we refrain from illustrating particular areas of brain activity because it may give a misleading impression of exactitude that does not exist (Weisberg, Keil, Goodstein and Gray 2008). Instead we point to the underlying theoretical mechanic that seems to be at play. Urges are closely related to the body's fast reactions where immediate sensations can be simple but with strong signals, e.g., anger creates 'warm' feelings and fear creates 'cold' feelings. However, these emotional feelings influence how individuals think, learn, and store things in memory as well as the way they deal with each other.

Emotions reflect different tendencies to act. Humans arguably record four sides of the emotions: Immediate sensations, awareness, bodily sensations, and reactions of other people to our behavior (Watson and Tellegen 1999). If the amygdala creates a warm feeling of anger, this immediate feeling is first sent to the frontal lobes, where we can put consciousness and language onto the feeling and then into the body where we can detect the anger as tension. Emotional outbursts are essential for our actions and individuals learn to navigate their emotions (Fredens and Prehn 2009: 175). Inspired by Johnson-Laird (2006) we consider a two-dimensional framework to explicate the emotional navigation (Figure 2). Here, there are two emotional scales, one ranging between passive-active and another ranging between positive-negative (Fredens 2009: 62). The passive-active range determines whether we go ahead or stop. Active emotions signal forward action. Passive emotions signal full stop. The passive-active range illustrates how emotions affect motivation by signaling winning or risky situations.

Please insert Figure 2 about here

The hippocampus seems particularly active in the positive-active area, whereas the amygdala is active in the passive-negative field. When people feel on top of things they are in the positive-active corner. Whenever an unforeseen event happens, amygdala steps in with passive emotions to halt things while we find out how to react here and now. There is a sense of uncertainty that can be expressed as fear but it will gradually turn into anger in the passive-negative field. Here emotional intelligence can help recognize uncertainty and conceive of it as a means to seek new opportunities. A first sign of this is surprise and curiosity. This is where ideas pop up with visions about creating something new. The joy of anticipation represents a movement from the passive-positive corner towards the active-positive. Now control is regained in a new way. The joy of expectation is greater than the joy of achieving. Hence, the brain's fast system is filled with ideas, but it is the handling of emotions that lets people select and work the best of them through analyses in the slow system.

When people are in the active area and the individual ability to navigate emotions move from the negative-passive towards the positive-active sphere they become more creative and responsive. Positive emotions affect how the mind works and widen the span of possibilities we see (Fredrickson 2009). In dynamic environments unforeseen events bring individuals into new unexpected situations of fear and anger that, in turn, can lead to creative tension. Hence, Nonaka (1994) explains how learning and knowledge creation among individuals in a group thrives on intension, autonomy, and fluctuation. Intension is a central sense of direction and aspiration that guides the actions taken by individuals in the organization. A certain level of autonomy gives the individuals freedom to act and absorb new knowledge from their actions. Fluctuation is imposed by the uncertainty of the environment and forms creative tension. Hence, people take responsive actions to observed changes in the environment and they explore the surroundings by sensing the effects and outcomes of these immediate reactions. This fast processing mode among individuals is channeled through the 'limbic system' where autonomy and

tension affect an emotional state that can stimulate optimism and creative effort. In an organizational setting this means that creative, innovative, and responsive individuals require a certain level of authority to take actions with autonomy within individual areas of responsibility while central aspirations create inspirational tensions. Since organizations are constituted by groups of individual employees, the emotional condition of the employees affects the general level of creativity in the organization. Subsequently, this will also affect their propensity to take responsive actions and form new experiential insights about the changing environment.

Proposition 1.1: *Organizations that give individual employees authority to take initiatives towards central aspirations will drive creativity and innovation among individual employees and encourage them to take responsive actions within their areas of responsibility as environmental conditions change.*

Proposition 1.2: *Organizations where individual employees take actions within their areas of responsibility in response to observed changes in the environmental conditions will gain updated experiential insights about the business environment from observed effects of the responsive actions.*

New insights about different aspects of a changing business environment are obtained as individual employees do things in the organizational periphery, interact with various stakeholders, and observe the effects of those actions. If individual employees are allowed to react to observed changes and respond to them within their areas of responsibility in line with common aspirations, the organization will be able to build a large reservoir of relevant experiential knowledge from many responsive actions. These diverse insights on different aspects of the current environmental context can be usefully engaged in internal analyses among various decision makers across the organization and provide better information for concrete decision-making situations.

GROUPS AND ORGANIZATION

People rarely act on their own but operate as social beings within a group of individuals that might be part of an organization that exists to pursue a common purpose. These individuals will coordinate

their actions with the people around them and use their feedback to make sense of the situation and its surroundings (Lieberman 2007).

Cognitive load and collaborative learning

The ability of individual members in an organization to respond and take entrepreneurial initiatives when conditions change is important for responsiveness and adaptation. As pointed out by Teece (2007: 1319) "enterprises with strong dynamic capabilities are intensely entrepreneurial". Here we often pay particular tribute to the dynamic managerial capabilities of top management as a source of strategic differentiation (e.g., Adner and Helfat 2003; Helfat and Peteraf 2010). However, this perspective discards the significance of dynamic interaction between many organizational members involved in the execution of operational activities and pays little attention to the potential experiential knowledge among individuals operating in different parts of the organization.

Cognitive capability deals with the individual ability to learn and use acquired knowledge to improve everyday routines. However, adaptation to new complex and ambiguous situations requires the presence of other cognitive attributes. It requires intense collaborative efforts between many individuals because the individual cognitive architecture has limits. The amount of information required to solve highly complex and ambiguous problems exceeds the capacity of single individuals (Antonenko, Paas, Grabner and van Gog 2010). This human limitation is addressed by cognitive load theory (Sweller 1988; Paas, van Gog and Sweller 2010).

Cognitive capabilities in organizational settings are concerned with how individuals acquire and handle knowledge in a social context. People store information in memory as *implicit* knowledge based on elementary skills discerned from means-end analysis and experiential heuristics. This reflects 'knowing how' to go about something from experience even though it cannot be expressed and thereby resembles Polanyi's (1967) concept of tacit knowledge. This works fine when individuals perform routine tasks, but when unexpected problems arise under unfamiliar circumstances there is a need for

generalized knowledge expressed in an *explicit* way. Explicit knowledge can be captured in verbal and figurative descriptions and stored in information systems. Dealing with ambiguous and unknown situations requires access to different types of explicit knowledge employed in non-routine approaches that generate ideas and create insights from new task experiences (Bransford, Brown and Cocking 1999). That is, when issues are complex and uncertain the limitations of cognitive load can be circumvented by learning collaboratively from diverse knowledge and experiential insights in dealing with the problems (Kirschner, Paas and Kirschner 2009).

The complementary interaction between slow and fast action processing systems observed in the human mind can be transposed to the way information is processed among individuals in a group and an organization with multiple groups. The individuals in a group are by nature collaborative and their effective interaction requires a certain cognitive tension among them. Hence, there is a need for people that see objects in a holistic way informed by general impressions from a functional perspective. These people are typically involved in operational activities and often observe the subtle changes in the environment before anybody else and gain new insights about these changes from their initial responses to them. There is also a need for people, including general managers and planners, who see the surroundings and situations in an analytical way and interpret new insights to form a better understanding of the business environment. The *holists* are operating in the fast system where new impressions are gathered from ongoing interactions with stakeholders in the organizational periphery and the *analysts* are operating in the slow system of central reasoning and planning.

Hence, a collection of individuals in an organization with both central decision makers located around top management and people that act in dispersed operating entities constitutes a dynamic system of slow and fast processes that resemble the dynamic system of the human mind (Figure 3). Here we have a dynamic system of interacting fast processes of doing things on an ongoing basis in the periphery and slow reflective processes at the center with lower frequency. The perception about the surrounding environment is developed by observing things and immediate experiences gained from

responsive actions taken by operational actors to deal with them. In turn, the conception of the environmental reality evolves from central analytical forward-looking considerations informed by diverse experiential insights among individual employees and lower-level managers in the organization. Hence, we may talk about an 'organizational mind' conceptualized as the firm's strategic plan, which is updated and revised through the experiential learning gained from dispersed actions taken on an ongoing basis in response to changes observed in local situational contexts.

Please insert Figure 3 about here

Effective organizational learning under conditions of turbulence hinges upon a setting conducive to collaborative learning. This includes organizational norms, attitudes and expectations that encourage and inspire ongoing discourse in all parts of the firm. It includes discussions around responsive actions in different operating entities to emerging changes that create new insights in local entities with involved employees. This knowledge can also be communicated to and exchanged with individuals in other parts of the organization. Hence, it is important to encourage localized discourse as well as enabling connections between specialized local knowledge communities and central planning units when dealing with complex organizational issues.

Proposition 2.1: *Organizations that are able to generate diverse experiential insights through operational actions taken in response to environmental changes form a more nuanced view of the surroundings and thereby develop a better understanding of the changing environmental conditions.*

Proposition 2.2: *Organizations that are able to collect diverse experiential insights generated through operational actions responding to environmental changes and incorporate them into their central forward-looking considerations gain a better understanding of the surrounding business environment.*

The interaction between the fast and slow systems in the human mind implicates an active interface to the surrounding environment, which can be extended to groups, organizations and broader communities formed by people. The way individuals perceive the environmental context through

embodied engagement constitutes important sources of information to the group and the organization in which they operate. The group context also provides the means to receive direct feedback that may enhance both the individual knowledge as well as the collective knowledge held across the group. In the social context of groups and organizations, culture influences how individuals perceive the environment and how interaction takes place between individuals.[1]

Looping effect

At the organizational level, the norms and values embedded in the culture influence the way people think and behave. At the community level, the traits of regional and national cultures influence the way people think and act in that particular society. So, culture is an inseparable part of human development and actions taken within a given environmental context. We are shaped and classified by the culture we live and act in as well as our actions shape the culture. This reciprocal interaction is referred to as the *looping effect* (Hacking 1999). Humans are part of social networks that abide by certain rules where the individuals shape the network and the network shapes them. These human networks can "exhibit complicated, shared behaviors without explicit coordination or awareness" (Christakis and Fowler 2009: 25). The study of cultural neuroscience focuses on how thinking and actions vary according to the culture in specific groups (Adolph 2009; Vogeley and Roepstorff 2010) and observes how content is communicated and spread among people within the group, organization and community. The collective cognitive capabilities implied by this can develop into distinct behaviors displaying heterogeneous abilities to react to environmental changes.

A network of individuals forms a collective intelligence without a formal control center and has non-linear emergent properties defying simple aggregation (Kaufman 1993). Hence, creativity and innovation is more than individual mental activity. According to Csikszentmihalyi (1996: 1) "an idea or

[1] Organizational culture can be defined as "a set of structures, routines, rules, and norms that guide and constrain behavior" (Schein 2004: 1). It is a dynamic phenomenon created by interaction among people in a group and is initially shaped by a leader who imposes his/her values and assumptions on the group.

product that deserves the label 'creative' arises from the synergy of many sources and not only from the mind of a single person. It is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively". Therefore, innovative behavior depends on an organizational setting with creative surroundings with the right stimuli among interacting networked individuals. Maintaining a positive emotional climate that motivates individual engagement is one of the means to form a creative culture.

Cultural transformation

Collaborative learning requires a setting where individuals can act and interact within a supportive social system. However, this can only be fully understood by considering the role of culture, for example, as it influences the ability to communicate observations and exchange insights from new knowledge. Hence, Mesoudi (2011: 1) argues that "explanation of human behavior that ignores culture, or treats it in an unsatisfactory manner, will almost certainly be incomplete". Culture can be perceived as information that affect individual behaviors thus implying that cultural variation arises from learning processes where information stored in individual brains is exchanged within a social system (Richerson and Boyd 2005). That is, culture is information acquired from other individuals through social transmission mechanisms comprised by knowledge, beliefs, attitudes, norms, preferences and skills stored in the brain.

Different sub-groups of people can co-develop distinct values and norms and compete with other sub-groups based on these behavioral traits. This is consistent with evolutionary theory where firms compete on the basis of superior routines that may be partially transferred and reorganized for adaptive purposes (Nelson and Winter 1982). Here information becomes a basic inheritance mechanism where the evolutionary process depends on the ability to express and interpret the information effectively (Distin 2011). Hence, language as a communication tool that allows storage of explicit knowledge becomes essential. The development of common terminologies, definitions, concepts and generally

understood practices in organizations and societies provides a basis for a cultural evolutionary process. Communication and information systems in organizations can be seen in this light and their particular use can drive corporate cultures that form a basis for evolutionary adaptation.

Variations in culture can be passed on between individuals within a sub-group as well as with individuals in other sub-groups in the surrounding society. Hence, we seem to observe that human socio-economic development is based on gradual accumulation of many successive modifications to increase efficiencies. Human innovations do not appear as random mutations but occur in small incremental steps (Richerson and Boyd 2005). As Mesudi (2011: 33) argues "successful innovations are always slight modifications of what went before, or the combination of previously separate innovations." The cultural diversification and change can arise as a consequence of 'drift' where individuals in creative processes develop new traits at random, from 'migration' of individuals between groups, or simply via personal contacts in external networks.

Cultural evolution provides a highly adaptive mechanism for organizations, and societies, comprised by groups of individuals. It seems to be a unique human phenomenon as we observe behavioral variations among human groups much greater than among groups of animals. That is, the ability for collaborative and social learning is not merely a byproduct of individual learning and social behaviors but is based on distinctly human "special-purpose mental mechanisms" (Richerson and Boyd 2005: 100). So, the ability to engage in responsive actions and sharing experiential information in collaborative learning is a culturally driven and economizing way to deal with turbulent environmental contexts. This dynamic process creates new insights and uncovers effective responses that can be applied more broadly across the organization through adapted replications of approaches that work. As Richerson and Boyd (2005: 113) argue: "organisms capable of imitation can afford to be choosy, learning when learning is cheap and accurate, and imitating when learning is likely to be costly or inaccurate". So, the combination of fast and slow processing systems where interactions are bound together by cultural artifacts in the social fabric appears as both an efficient and effective way to deal

with unexpected events in an uncertain world. Cultural evolution suggests that open collaborative learning is superior in terms of cost and adaptive capacity. The exchange of information in collaborative discussions between individuals with diverse insights, experiences, and orientations develops better solutions to complex problems under ambiguity. Specific cultural settings are conducive to this kind of creative and innovative interaction among engaged individuals.

When we consider responses to events and review what was learned from these encounters our memory goes into a flex state where it is easy to reorganize. Our memories are malleable (Pashler, Rohrer, Cepeda and Carpenter 2007) and reviews help us recall what we have learned. Review opens for dialog between the slow and the fast system and adds knowledge to the cultural dimensions of shared beliefs, expectations, and relevant actions. The adaptive interaction between individuals and their environment is an essential characteristic of this cultural updating (Triandis 2007) primarily based on the fast system. It is context dependent as it presents the environment. The slow system builds on abstraction to re-present the world where thinking is de-contextualized. Hence, the distinction between fast and slow thinking is between the real context and an abstract world view. Since human minds exist in context, thinking and action emerge from one moment to another through interaction with the environment rather than from context-free plans in the slow system.

Context can refer to many things, but the essential part is that cognition and culture have a reciprocal relationship of influence (Vaughn 2010). The employees' thinking, emotions and actions influence cultural norms and values and vice versa especially if the organization creates an interaction between the fast and the slow system, i.e., between the periphery and the center of the organization.

Proposition 3.1: *Organizations with a corporate culture that encourages exchange of individual experiences and insights across different hierarchical levels and functional areas form a more nuanced view of the surroundings and thereby develop a better understanding of the changing business environment.*

Proposition 3.2: *Organizations with a decision structure, communication and information systems that facilitate exchange of information between individuals across management levels and functional areas develop more effective solutions to deal with emerging challenges in the business environment.*

Organizations and communities with cultures that encourage, enable, and facilitate creative and innovative behaviors supported by internal information exchange and communication links respond more effectively to unexpected environmental events through collaborative learning efforts. Hence, corporate and national cultures that drive effective responsive behaviors constitute potential vehicles for sustainable evolutionary development.

ORGANIZATIONAL RESPONSIVENESS

When we transpose the dynamic functions of the human mind to organizational settings the logical linear processing capability can be seen as an attempt at analytical planning and the holistic relational sensations of the brain resemble the emotional and social aspects of management. Strategic management is often perceived as a central process of planning, execution, and monitoring (e.g., Ansoff 1988; Anthony 1965; Richards 1986). The implied control loop updates management on organizational outcomes that may point to needs for corrective action. These decisions are typically confined to top management and may, therefore, preclude updated experiential inputs from different parts of the organization. Decentralization moves power down the organization where operating managers and employees can voice opinions and take responsive actions within their areas of responsibility. This gives influence to people located closer to relevant situational information and operational expertise (e.g., Child and McGrath 2001; Daft and Lewin 1993; Volberda 1996). These local reactions generate experiential insights about different aspects of the environment that can be forwarded for consideration in the central planning process. Hence, it is important to combine central forward-looking control features with an ability to learn from operational actions taken in response to observed changes. That is, central planning activities should be connected to experiential learning from decentralized initiatives (e.g., Andersen 2004; Andersen and Nielsen 2009; Brews and Hunt 1999). In this dynamic context the fast processes are associated with the slow processes. So, when the slow processes think and deliberate about the environment it should happen on the basis of current updates from ongoing operational

activities. Hence, the strategic deliberations of top management should be connected to the actions taken by employees and lower-level managers as they interact with various stakeholders in their daily business transactions.

The slow planning and control processes can develop a shared cognitive understanding of the firm's competitive environment by engaging key people in the exchange and discussion of experiential insights (e.g., Andrews 1987; Ansoff 1988; Hill et al. 2000). Involving decision makers from different parts of the organization in the planning process may form a shared cognition across a broad set of constituents with different experiences. Hence, planning can be interpreted as a discourse that reconciles diverse insights and shapes a common understanding of strategic developments in the firm (e.g., Hendry 2000; Page 2007) and thus provides guidance to on-going decisions. The fast decision process where empowered managers in different parts of the organization interact with various stakeholders to explore alternative solutions in view of changes in the local business context can generate new insights on an ongoing basis. That is, autonomous responsive actions that allow local experimentation may uncover new business opportunities (Burgelman 1996; Burgelman and Grove 2007) that can be fed into the periodic strategy deliberations in the central planning process. Hence, strategic management and control processes can conduct updated forward-looking evaluations of opportunities uncovered by decentralized responsive actions.

These combined fast and slow processes can stimulate an underlying *dynamic* that depicts an organizational ability to take actions, interact and adapt. The dynamic is meta-stable without equilibria and fix-points, i.e., there is only movement (Kelso and Engstrøm 2006). Hence, a dynamic based on fast and slow processes can create a system that changes and adapts in non-linear ways. The human brain, the organization as well as society in general can be seen as such systems. Dynamic systems are difficult to predict and the implication is that "we can no longer, as we can with linear systems, decompose the systems into subsystems, solve each subsystem individually, and then reassemble the system into complete solutions" (Pfeifer and Bongard 2009: 93). In other words, from an

organizational perspective individual actions operate in conjunction with other actions in different parts of the firms that together with ongoing events in the environment can have unpredictable outcomes. That is, an integrative structure circumscribed by dispersed actions can be construed as a cohesive dynamic system where the elemental parts constitute the organization's response capabilities.

The ongoing innovative actions derive from many dispersed managerial decisions that interact with numerous individuals inside and outside the organization (e.g., Bower 2005; Bower and Gilbert 2007) and thus constitute nonlinear processes. The planning process is driven by rational deduction and linear computations aimed at comprehending, predicting and creating a more certain way forward. Combined fast and slow processes establish a contrasting difference between nonlinear and linear processing modes. These contrasts can be reconciled by the complementary nature of the intelligence function in the human mind and interaction between individuals in organizations.

Complexity of the mind

The fast and the slow systems represent two different strategies. The slow system has the potential of creating technical solutions and routines that may be brought to operate automatically in the fast system. On the other hand the fast system that has no sense of voluntary control but is nonetheless the main source of explicit belief and deliberate choices in the slow system (Kahneman 2011: 21). This distinction can be compared to the difference between technical and adaptive change challenges (Heifetz 1994; Heifetz and Linsky 2002). Knowing how to perform specific tasks is largely a technical challenge and when an operational task breaks down we may have a technical solution available to deal with the problem. But many ongoing encounters and interactions between people in everyday activities are more than technical because they are highly uncertain and complex. Hence, they are adaptive and can only be met by transforming the individual mindsets and advancing them to a more sophisticated stage of mental development (Kegan and Lahey 2009). In an adaptive challenge you lay down the path in walking, which is the exact description of an enactive approach. There is no advance planning, the

plan emerges during the walk. Technical challenges build on contingency planning formed through forward-looking cognitive considerations. In adaptive challenges the plan is created while walking, it is pragmatic and experimental based on incremental insights gained from ongoing everyday situational encounters. Hence, an adaptive solution requires new means of perceiving developments in the fast system and better analytical tools assessing this information in the slow system.

Kegan and Lahey (2009) distinguish between three human meaning systems: The socialized, the self-authoring, and the self-transforming mind. The socialized mind builds on social learning that is very sensitive to social influences and group-thinking. The content of the socialized mind is based on cultural transmission even though group-thinking does not originate from culture (Kegan and Lahey 2009). The self-authoring mind builds a filter through which the individual sees the world and creates a priority for receiving information. The self-transforming mind is able to stand back from its own filter, and look at it, and not just through it. These three mental levels offer an opportunity to understand a progressive development of the interaction between the fast and the slow system. It adds an important dimension to our description of collaborative learning, where the socialized mindset should be challenged in a direction towards the self-transforming mindset that challenges group-thinking and thereby overcomes immunity to respond and change.

Proposition 4.1: *Organizations that operate through complementary fast and slow processes where the fast processes observe the effects of ongoing interactions with different stakeholders as individual employees execute operational daily activities are more responsive and open to environmental change.*

Proposition 4.2: *Organizations that operate through complementary fast and slow processes where the slow processes reflect upon future concerns in rational analysis based on experiential insights from individual employees throughout the organization deal more effectively with environmental change.*

Hence, individuals in the organization observe environmental changes and gain new insights from the responsive actions they take and when this information is engaged in the central planning considerations the diverse insights can help interpret the environmental conditions through rational analysis. An interactive dynamic between slow and fast processes creates a balance between ongoing

identification of contextual situations and collective forward-looking reasoning that enhance the ability to handle abrupt and unexpected changes. Organizations that embrace such a culture of collective reasoning deal better with unprecedented complex situations and this culturally driven evolution has a strong adaptive capacity (Richerson and Boyd 2005). However, problems may arise when the culturally transmitted routines lose the ability to observe and react to emerging changes in the environment. This creates problematic conditions of slow moving inward looking firms where learning processes in the fast system that gain experiential insights is subdued.

Proposition 5: *Organizations that are unable to process individual experiential knowledge gained from ongoing business activities in its central forward looking considerations will eventually suffer from outdated perceptions of the environment that inhibit the ability to respond and adapt the organization.*

The logic behind the superiority of interacting fast and slow processes in organizations is supported by individual motivation, interacting dynamics, collaborative learning and cultural network arguments. Autonomy and individual involvement generate responsive initiatives that foster positive energy for individual effort. Responsive initiatives taken by individuals within the organization interact with central managerial evaluations that form a common understanding of environmental developments and stake out a direction for organizational actions. Collaborative efforts among individuals across the organization with different functional expertise, business experiences, and managerial orientations can deal more effectively with the challenges imposed by a turbulent environment with many diverse stakeholders.

DISCUSSION & CONCLUSION

The human mind operates through fast and slow processing systems where the interaction between them provides current updates on environmental developments and interprets their consequences as a basis for making informed forward-looking decisions. Similarly, individual observations of environmental changes and decentralized responsive actions in organizational sub-groups combined

with central evaluations of experiential insights provide timely knowledge about conditions in a changing environment. Hence, effective organizations enable ongoing observations and responsive actions that experiment with current ways of doing things and encourage intense communication that feeds into forward-looking considerations at the executive center to assess developments and point to a better way forward.

Hence, it is an essential leadership challenge to enable this dynamic interactive system by structuring the organization appropriately and allow for both fast and slow processes as well as establishing appropriate communication and information systems to facilitate the needed interaction. Another implication then is that strategic leadership assumes a different role of enabling effective fast and slow processing by establishing an organizational setting and corporate culture that is conducive to human interaction and collaborative learning. This means that a prime role of senior management is to think about appropriate decision structures, management information systems, and control processes based on durable corporate values, behavioral guidelines and consistent incentives.

Decision structures and related management information systems are important features that characterize and frame an organization's strategy making process (Sutcliffe 1994; Sutcliffe and Weber 2003). Centralization of decision rights confines decision making to the top executives while dispersion of power allows managers at lower hierarchical levels to take responsive actions within their areas of responsibility. In turbulent environments organizations must deal with an increasing amount of information, complex interactions, and a multiplicity of individual knowledge-based competencies (Child and McGrath 2001). One solution to these challenges is to move decisions closer to the location of relevant operational information and individual managerial expertise (Daft and Lewin 1993; Volberda 1996). Under pervasive environmental uncertainty the organizational structure should become more decentralized (e.g., Bigley and Roberts 2001; Child 1997). However, a shift from hierarchical to more decentralized structures should embrace coordination through lateral communication between decision makers in different functional areas (e.g., Achrol 1997; Galbraith

1995; Möller and Rajala 1999). So, even though modern organizations often are described as decentralized, non-hierarchical, and autonomous (e.g., Castells 1996; Galbraith 1994; Heydebrand 1989) they also need central integrative processes and structure to be effective (e.g., Hill, Martin and Harris 2000; Jellinek and Schoonhoven 1990). That is, decentralization may increase responsiveness but is not sufficient for sustainable performance outcomes.

Here we can use the dynamic between interacting fast and slow processes to explain why this is the case. This dynamic ensures that environmental changes are observed and reacted to on an ongoing basis through the fast system comprised by individuals acting on behalf of the firm with various stakeholders as they carry out their specific functional responsibilities. Collaborative learning among individuals in the organization facilitates better solutions to complex environmental challenges and develops a more complex mindset. Open communication ensures that key observations and good solutions are brought forward to the slow system of analytical considerations about forward-looking actions. The management literature helps us pinpoint how the fast system is anchored in the responsiveness of decentralized actors and how the slow system is anchored in the central and often top management driven planning processes.

However, the management literature tells us less about how this interaction is best organized and strategy process research has given limited attention to this issue. The proposed approaches to strategic controls have largely derived from research on management control systems that often seem to adopt a central control perspective. This opens for potential future research on how to organize effective interacting processes between fast and slow information processing systems that might extend initial work on interactive management controls (e.g., Simons 1990, 1994, 2000). As a starting point, we know that communication and information systems play a role in binding individual decision makers together for mutual adjustment processing as discussed in the organization literature. We also know that collaborative learning discussed in cognitive science is the basis for creative thinking and innovative solutions to complex environmental challenges.

Creating the responsive organization

Dispersion of decision power allows exploratory initiatives to be taken by managers within the organization that may uncover new business opportunities. The strategic management process with related control systems can be used for forward-looking evaluations of strategic opportunities deriving from these decentralized experimental actions (e.g., Ansoff 1988; Richards 1986). Using management information systems to monitor organizational outcomes can provide new insights when outcomes deviate from expectations and new action patterns are revealed (Simons 1990, 2000). Hence, the strategic planning process can be used proactively to improve the cognitive understanding of changing business conditions if it is fed continuously with updated environmental insights from daily operations.

However, these idealized processes are often not set up to accomplish the intended interaction between business activities in the field and central analyses. There are many descriptions of planning departments that conduct analytical work without concerns for adaptive knowledge developed by people operating throughout the organization and that have the latest updates on environmental events (e.g., Mintzberg 1994a, b). Similarly, many people with functional responsibilities may incur many field observations but have nowhere to communicate what seems to constitute important developments because collaborative learning is missing. Or, they may simply be confined to focus on their key performance indicators thereby sticking to technical rather than adaptive strategies. To the extent these are strictly enforced, and tied to pecuniary rewards, there is little room for responding to new situations and experiment with better solutions. This way information can be lost where 'weak signals' in the organizational periphery otherwise might give pre-warnings about important things to come. These conditions cut off the connection between ongoing situational observations in the field, and immediate responses to these, and the rational analytical considerations conducted in the planning department at corporate headquarters.

The proposed organizational setting is consistent with empirical studies of corporate entrepreneurship where strategy making is characterized as environmental scanning, planning flexibility, deep involvement (locus) and interactive strategic control (Barringer and Bluedorn 1999; Simons 1994). These elements are also consistent with the premises of the Bower-Burgelman model (Bower 2005; Burgelman 1996) where top management establishes the structural setting and corporate direction while responsive initiatives taken deep within the organization create new important strategic opportunities. So, the cognitive competencies of individuals within the organization are required for this to come to fruition and it is an important leadership role to drive this entrepreneurial potential towards higher performance and lower risk (Sathe 2003).

What the fast-slow systems thinking from cognitive science can do in this context, is to provide a foundation for understanding the required human processes from the individual to the organizational level as important underpinnings of a firm's dynamic capabilities. However, this perspective also raises new relevant questions, such as, how the priming of executives and managers can support interactive strategy making behaviors, how social looping effects among sub-groups of specialists and learning communities are enhanced, and how this can be embedded in a corporate culture conducive to collective learning practices. The fast system of decentralized observations and responsiveness may require availability of some slack to experiment that can be at odds with requirements for economic efficiencies. However, the ability to engage in responsive initiatives may be a very economical way to deal with unexpected environmental developments and uncertain conditions in general because they constitute small low-cost probes with limited risk exposures and thus may constitute an efficient way to search for potential solutions under complex circumstances.

The interaction between the fast probing processes and the slow reasoning processes provides the means to evaluate the small probes, select those that seem to work the best, and convert them into larger organizational initiatives where coordination of activities is important as the stakes for corporate success increase. The higher exposures are dampened by the fact that the small probes already have

identified viable solutions and that a common corporate culture makes it easier to transpose good solutions to other parts of the organization. Hence, collective learning approaches supported by effective communication and information systems can allow good solutions to be refined along the way and become even better. In short, the interaction between fast and slow systems may constitute an effective way to respond and adapt to the often abrupt and highly complex environmental changes that need new innovative solutions.

This requires structure, processes, systems and cultural traits that enhance a dynamic based on interacting fast and slow processing systems including dispersed responses and experimentation, collective learning for viable solutions, and gradual cultural transmission to implement them based on central forward-looking analyses. The implication for management practice is that individual cognition matters and, therefore, requires active efforts to involve people and facilitate interaction among them across functions and hierarchies. It implies that a primary leadership role is to instill responsive entrepreneurial behaviors based on supportive organizational structures and systems that facilitate local experimentation and collective learning across a broad set of actors in the firm while submitting potential solutions to the scrutiny of central planning.

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Table 1. Comparative characteristics of the 'fast' and 'slow' processing systems in the human mind

The fast brain system System 1 *Decentralized processes*	The slow brain system System 2 *Central processes*
▪ Evolutionary old ▪ Autonomous ▪ Fast execution ▪ Execution is mandatory when the stimuli are triggered ▪ No heavy load on central processing ▪ Not dependent on input from high-level control systems ▪ Operate in parallel ▪ Many processes can be executed at the same time ▪ Behavioral regulation by emotions ▪ Unconsciously adaptive	▪ Evolutionary new ▪ Conscious and aware ▪ Slow execution ▪ Reasoning and judgment before decisions are made ▪ Computationally expensive ▪ Dependent on input and updated stimuli from system 1 ▪ Operate serially ▪ Only few processes can be executed at the same time ▪ Language and rule-based ▪ Adaptive consciousness

Figure 1. Interaction between external stimuli and internal cognition in the individual mind

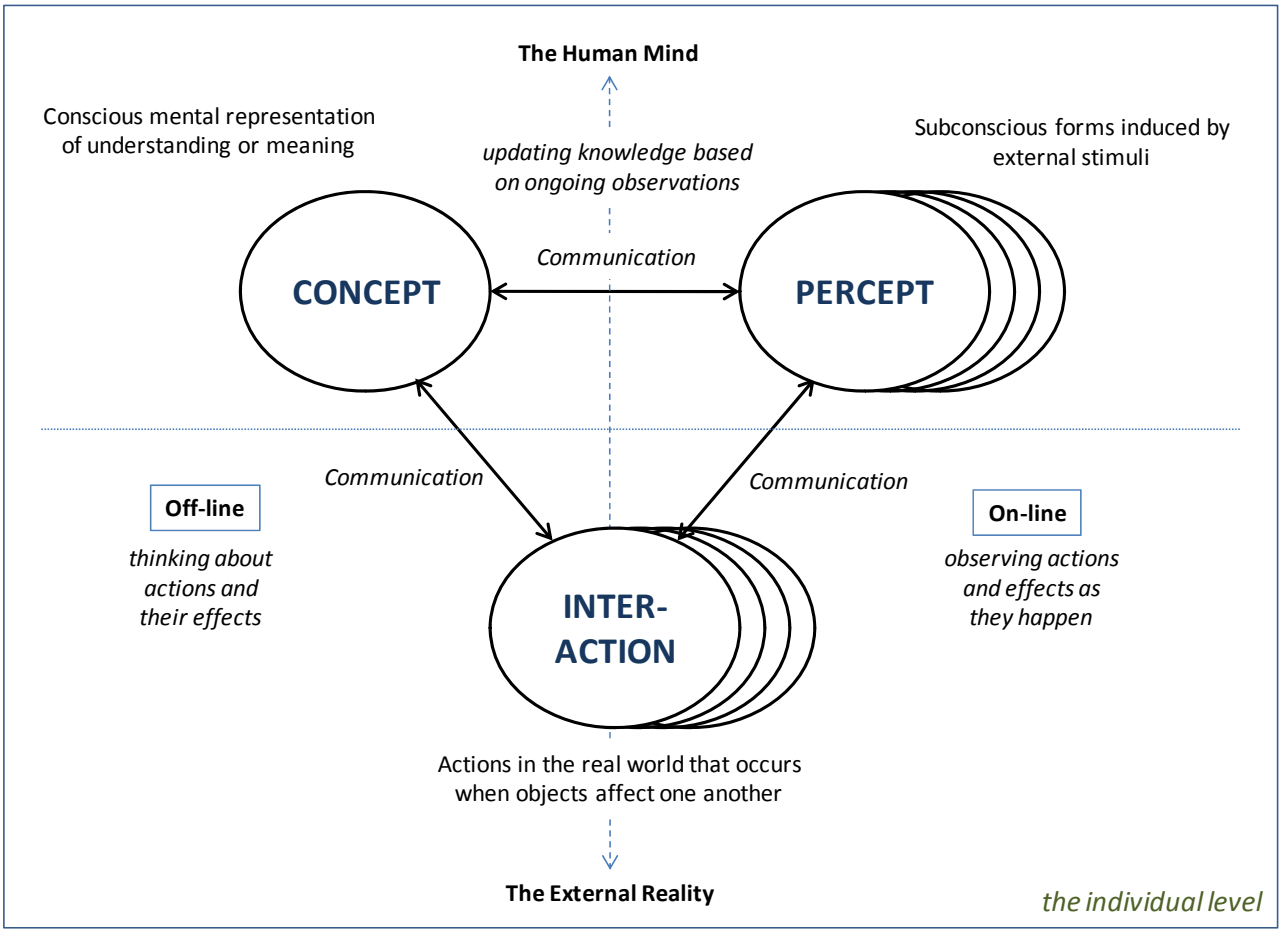

Figure 2. A compass to navigate different stages of individual emotional intelligence

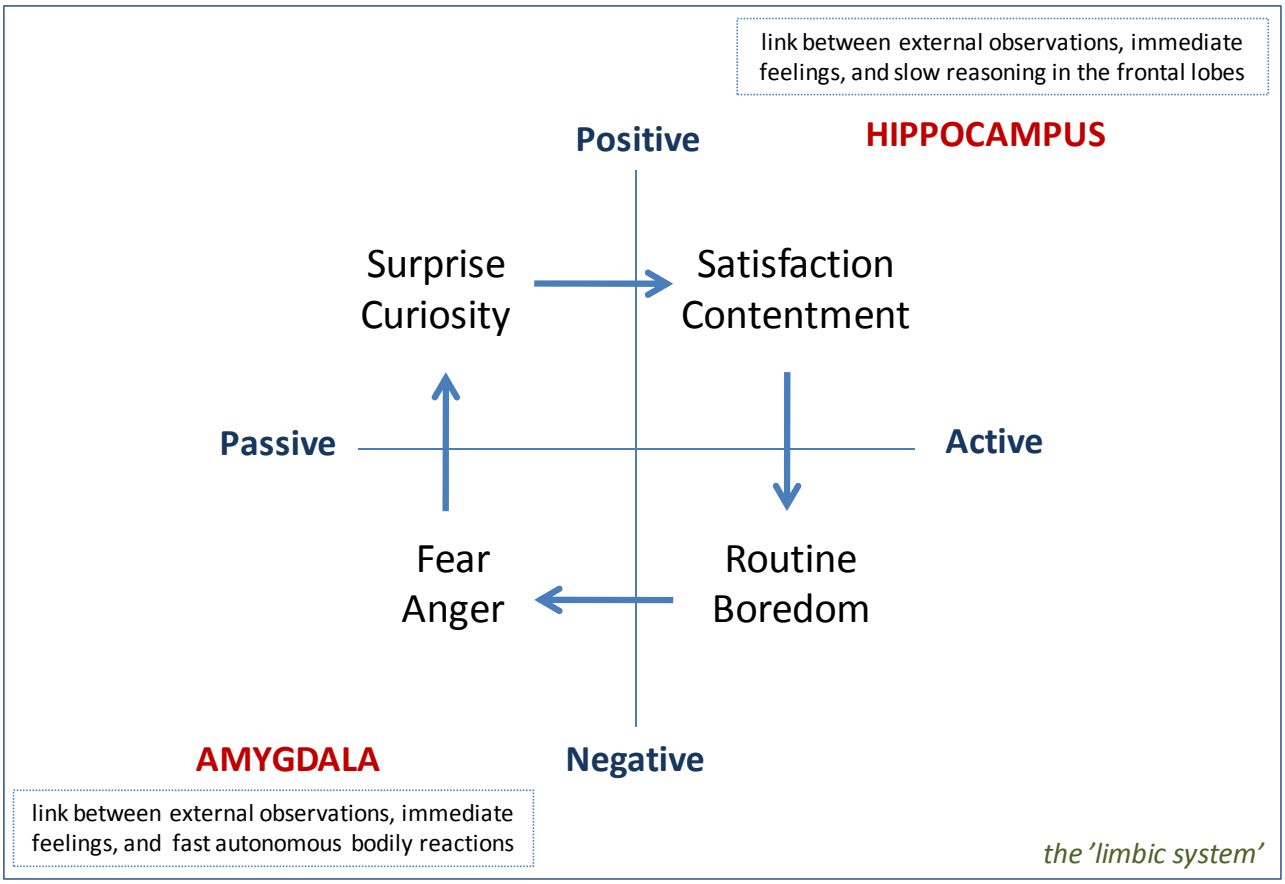

Figure 3. Interaction between responses to external stimuli and central planning in the organization