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Neuroeconomics and business psychology*

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Abstract: To determine parameters of the frontal power of executive integration for application in business, this paper reviewed neuroeconomic neuroimaging research and discussion in relation to business psychology. The results are that limbic system (L) is a centre of primary consciousness based on a mesolimbic dopamine system serving the client in the brain stem with adaptive feedback as well as generating cognition and emotions towards Neocortex in a reciprocal autonomic balance. The power of concentration (C) is a tripartite executive integrating emotions and cognition: Prefrontal analysis by semantic recollection from temporal (R) lobe is based on episodic memories. Volition in the medial prefrontal cortex (c) controls both cognitive prediction (R*c) and emotions (L/c) for a balanced integration as a neural root of economic reasoning. An intuitive visuospatial Parietal sketchpad (I) integrates hippocampal episodic memory mismatches complementary to the cognitive prediction function. Chronic stress limiting the capacity of C is indicated by baseline serum cortisol. The conclusion is that the neuroeconomic model enables (1) operation of the theorem of economic man as an economic-bio-educational complex. Other business applications comprise, (2) a neural foundation of transactional analysis (TA) to improve corporate collaboration and management, (3) a combined health promotion/human resource development program based on simple training techniques as physical exercise, medical meditation and neurolinguistic programming (NLP), i.e., for weight regulation.

Key words: neuroeconomics; limbic system; business psychology; transactional analysis; stress; NLP

1. Introduction

Since the 1970s, two alternative brain models have challenged the classical subdivision in a cortical sensory-motor integration function and a subcortical autonomic nervous system. The triune brain model by McLean (Cory, 2002) claims a “Limbic System” (L2) by which the Anterior Cingulate Cortex (ACC) is a Paleomammalian link between what was previously considered independent subsystems. Another coherent CNS-model (Luria, 1973) claims a tri-division of the brain as well. Luria subdivides neocortex in a perceptive-cognitive unit (L3) and the frontal executive integrator (L4). A combined McLean-Luria 4-level-model is illustrated in Fig. 1. New sensitive scanners as functional magnetic resonance imaging (fMRI) enable exploration of the neural correlates to the combined model. The present study aims to synthesize recent fMRI-studies to uncover how the executive integrator (L4) operates lower brain levels and to discuss how to use this new discovery in a business-oriented human resource development.

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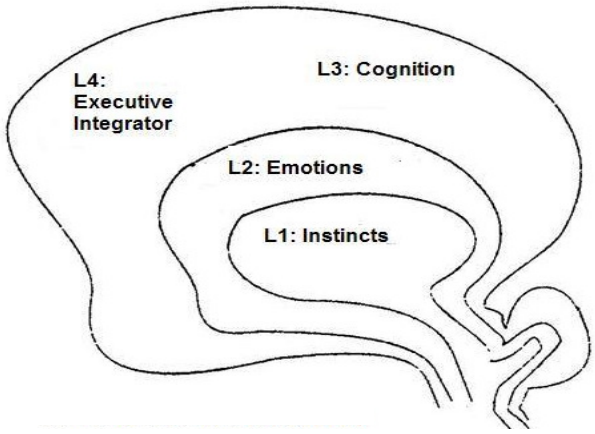

Fig. 1 Brain levels

2. Method and materials

The brain is not a machine. It is ruled by complex feedback between specialized cell groups where a "dependent" variable affects the "independent" variable (client-server-integrator systems), too. Such second ordered cybernetic systems—searching for homeostasis—rely on the range of adaptation as stated by the cybernetic law of Requisite Variety (Ashby, 1960).

The medline search strategy (MeSH terms) is updated until ultimo 2009:

L1: Step 1: "Reticular Formation"* "fMRI" * "Review" (219 items).

L2: Step 1: "Limbic"* "Dopamine" * "Review" (576 items).

Step 2: "Gyrus cinguli" * "fMRI" * "Neural pathway" (214 items).

L3: Step 1: "Working memory" AND "fMRI" AND "Review" (157 items).

Step 2: "AHA-experience" (which is not a MeSH term) (18 items).

L4: Step 1: "Frontal lobe" AND "fMRI" AND "Review" (683 items).

Step 2: "Neuroeconomics" (112 items).

3. Review results on neuroeconomic neuroimaging

3.1 L1

The brain stem is well established in neurology as the root of the brain representing the reptile instinctual base of the brain. Key structures are: The Reticular Ascending Activation System (RAS) originates a fight-or-flight-response as our most primitive survival pattern. Normal moderated task-responses back to L1 (client) are generated via the emotional system (L2) and the orbitofrontal part of L4; strong control responses back to L1 are generated directly from the medial Prefrontal part of L4 (Critschley, 2002). Sympaticus activation by RAS is indicated by bioelectrical skin conductance.

Further, Cerebellum at L1 contributes very actively to motor coordination, timing, precision and learning in both cases (Critschley, 2002).

Also at L1, the Ventral Tegmentum (VT) is the neural root of hierarchical organization which means that respect for symbols of wealth and status dominates emotions (Erk, et al., 2002).

In summary, L1 is the client of the brain to be served by higher centres.

3.2 L2

The McLeanian concept of a "limbic system" has been controversial (McLachlan, 2009). Now, the root of reward seeking emotional behaviour is evidenced to be a mesolimbic dopamine system (MLDS) which modulates instincts by reinforcing or decreasing motivation in learning as well as decision-making (Alcaro, et al., 2007): MLDS passes from VT at L1 to Accumbens and ACC at L2 towards the Frontal Cortex at L4; Hypothalamus, as centre of Homeostasis, regulates the emission of neurotransmitters counting for the modulation by MLDS; Amygdala (Am) originates fear and rage inhibiting basal vegetative centres; Hippocampus with episodic memories (Hip) adjacent to the Temporal lobe is the root of agreeable emotions adding valence to recognized inputs; other basal centres add other valences, i.e., sexual attraction (Septum) and smell (Olfactory Tractus). Thalamus centres sensory integration transmitting signals upwards the anterior cingulate cortex (ACC) and Neocortex. Insula serves ACC with expectations (Naqvi, et al., 2007).

A crucial thesis by McLean is that of a primary limbic centre of consciousness (L) in ACC which is central to optimal learning (Kennerley, et al., 2006).

L moderates primitive fight-or-flight-responses transmitting upward by "emotional" and "cognitive" pathways in a reciprocal relationship where the cognitive path is rooted in limbic detection of conflict (Mohanty, et al., 2007). A characteristic of primary consciousness is empathy as we are responding nearly as strongly observing the pain of others as to our own pain (Singer, 2007). L is indicated as the "disturbance" of the baseline EEG-α-pattern (L=1-α%) (Hanzlmayr, et al., 2007).

In summary, L2 is the neural root of emotions which is evidenced as MLDS which by ACC constitutes the dynamics of a primary consciousness as empathic reward-seeking moderating client responses.

3.3 L3

A network of Neocortical regions, including the prefrontal cortex (PFC) at L4 is critical for the active maintenance of internal representations that are necessary for goal-directed behavior (D'Esposito, 2007). At L3, the semantic structuring of episodic memories is associated with activity in the anterior Superior Temporal Sulcus (STS) while the posterior portion is recruited by the perceptual memories in the medial temporal lobes (Hein, 2008). STS is operated by the dorsolateral PFC. Linking signs to sensory perceptions is an AHA-experience correlated with increased activity in both medial PFC and temporal areas (Kounios, et al., 2006). Semantic recollection of memories (R) shows EEG-theta-waves.

Also at L3, the intraparietal sulcus (IPS) is involved in numerical calculation (Cantlon, 2007) and serves as a visuospatial sketchpad (I) integrating unrecognized perceptions (mismatch in Hippocampus (Kumaran, et al., 2007) by spontaneous AHA-experiences arising from the occipital visual association area (Cuneus/Precuneus) (Kounios, et al., 2006).

In summary, L3 serves L4 with cognition by AHA-experiences.

3.4 L4

The medial PFC (mPFC) controls both the dorsolateral (dlPFC) and orbitofrontal (OFC) parts: The OFC receiving emotional input from L serves as utility centre (U) (Stubhorn, 2005). The left lateral part of OFC is activated from mPFC (c) and controls emotions (Beer, et al., 2005). This control includes a regret function (Camille, 2004): facing consequences of a decision we may trigger emotions by relief or regret. So:

$$U=f(L/c) \quad (1)$$

The dlPFC is the most recent step of evolution. It is an analytical centre (A) served by semantic memories at L3 (R) (Robertson, et al, 2007) 'binding' or focusing related semantic memories, i.e., to a word (Canolty, 2007)

(see Fig. 2). So:

$$A=f(R*c) \quad (2)$$

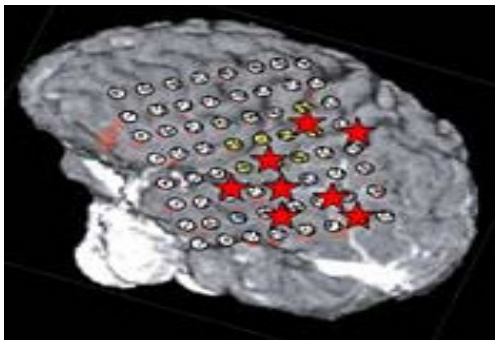

Fig. 2 Binding

In summary, at L4 the mPFC integrates the other frontal parts by volition (c) to minimize errors between preferences and cognitive predictions as indicated by a EEG α-band Event- related potential (Oya, et al., 2005).

3.5 Flowchart of key centres relevant to decision-making

Fig. 3 summarizes the review findings regarding 20 neuroeconomic centres at L1-L4:

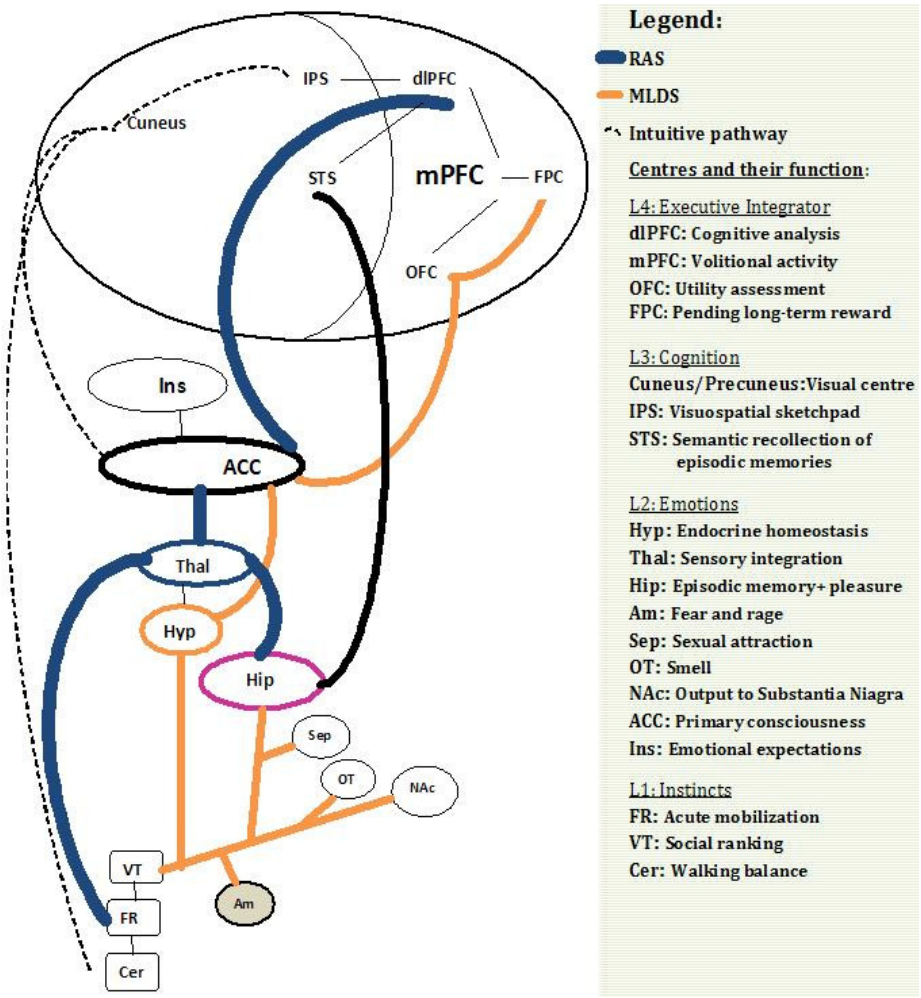

Fig. 3 Central pathways moderating instinctual responses

4. Economic man as model of executive integration

4.1 A neuroeconomic model

The Ultimatum Game (UG) illustrates frontal integration (C): the buyer can accept or reject an offer from an investor, i.e., a share of an amount of money. If the buyer rejects, both players receive nothing. The UG is correlated with a simultaneous activity in both A (dlPFC) and L (ACC/Insula) (Sanfey, 2003). L responds weakly to acceptable and strongly to unacceptable offers while A responds moderately in both cases. UG illustrates how economic choices maximize utility comparing alternative preferences (U=L/c) and related predictions (A=R*c). An indifference curve between A and U—representing minimal frontal tension represents the moderating effect on MLDA by Frontal Cortex (Meyer-Lindenberg, et al., 2005)—as indicated by the 45º—line in Fig. 4. An antagonist L-A relationship (Oldrich, et al., 2009) is indicated by a concave substitution curve in Fig. 4.

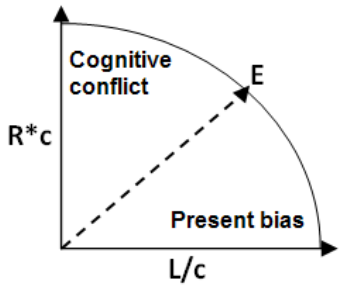

Fig. 4 Neuroeconomics

(1) The case of C=A/U<1

A neuroeconomic study of rewards finds that the relative activity of A (dlPFC) and L (Am) is crucial to the "time horizon" of decisions. C<1 is a state of risk aversion with "present bias" which is bad for long term decision making (Mclure, 2004).

(2) The case of C=A/U>1

The CNS accumulates stress when mPFC persistently suppresses emotions by hemispheric dominance (C>1) i.e., to pursue a Frontopolar long term goal (Koechlin, 2000). Suppressed emotions cause by GABA an inhibitory feedback loop for temporary stabilization decreasing MLDS activity limiting brain capacity (as indicated by BOLD) (Eggers, 2007). A review of PTSD characterizes chronic stress as a pattern of a hyperactive Am which damages Hip in a way that volition activity (mPFC) fades out (Bremner, 2007). According to Egger chronic stress in L includes besides PTSD frequent conditions as migraine, essential hypertension, depression and the metabolic syndrome and is indicated by an elevated level of cortisol. However, left Hemispheric dominance is too rigid for optimal decisions in an uncertain and changing world, even before it becomes chronic shows a study of patients with lateralized focal lesions (Goel, et al., 2006).

(3) The case of C=A/U→1

An integrated decision making mode do exist. Interviews with entrepreneurs uncover that they in addition to calculation of a knowledge-based prediction calculates a worst-case-scenario, too. This type of secured risk-taking (C=1) is a "neuroeconomic optimum" (E) combining preferences and predictions. The dynamics of E is derived from Fig. 4 adding I as a stochastic knowledge factor:

(3) $C = R*c/(L/c) + \varepsilon_I \rightarrow 1 = R*c^2/L + \varepsilon_I \rightarrow 1$

4.2 Neuroeconomic operation of "economic man"

Determining the parameters of the power of equation (3) mean that the interdisciplinary discussion between economists and psychologists whether man is ruled by rationality or emotions might be solved operating the parameters of C for ad hoc inquiry:

In general, "economic man" making choices by volitional integration (c) of preferences (L/c) and cognitive predictions (R*c) is representative to biological man with the following conditions:

(1) Man is not an isolated individual as the classical Robinson Crusoe. He is a social individual with emotional values (I) of equality, participation, justice and reputation which reach beyond the neoclassical concept of "bounded" rationality, too (Simon, 1978). This conclusion is based on neuroeconomic research in the social dimension, i.e., Sanfey (2007). In all, this supports the sociological findings that human preferences depend on the cultural context (Bowles, 2000). However, in decisions involving monetary rewards selfishness seems to be far the stronger motive as they appeal both to L1 (Status) and L2 (Personal needs).

(2) Emotions are ambivalent (pleasure/fear) as claimed by psychology which constitutes a typical present-bias in decision-making (Mclure, et al., 2004). So, in economic choices, females are more risk averse than males, i.e., do females buy significant more individual health insurances in Denmark (Kiil, 2010).

(3) Comparing stress-responses of males and females uncover an important learning: Males respond in accordance with Fig. 4 to stressors with hemispheric dominance indicating peak-mobilisation of cognitive fighting resources. However, the female risk-averse tend-to-befriend responses are better as they do not increase the level of the stresshormone (cortisol) nearly as much (Wang, et al., 2007). From a neuroeconomic point of view, a moderated (rational) choice which is better than a strong fighting spirit should not be taken for granted. The economic evaluation of smoking may illustrate the difference between dogmatic and neuroeconomic "rationality": From an economic dogmatic point of view smoking might be interpreted a risk-minimizing choice that may be priced according to Willingness-To-Pay (WTP), i.e., might the smoker prefer to continue smoking despite knowledge of the health risk because it helps him to control himself better in social interactions involving a number of other persons. From a neuroeconomic point of view (synthesizing economic, neurological and psychological approaches), this type of argument might be interpreted as a psychological defense mechanism that should be offered "psychological dialogue" for health reasons. As a consequence of the neuroeconomic approach, WTP is too heterogenous a measure to be valid as indicator of the societal consumer value of a product. The learning from advanced decision-making tools as trials of discrete choice is to be interpreted as means of market analysis on line with other methods of market analysis. Rejecting WTP as valid utility measure implicates that GDP is questioned as indicator of national wealth, too. From a neuroeconomic point of view, national life expectancy based on actual good practices for indication of health effects is a more meaningful indicator of quality of life (QoL).

The intranational life expectancy of a person is very much affected by his/her level of education besides the level of income. This is typical due to a healthier life-style. Also, prospect theory has demonstrated that our decisions are affected by our mood, i.e., as related to previous gains and losses (Kahnemann & Tversky, 1979).

In summary, the neuroeconomic prototype of a good decision maker is that of an entrepreneur while the classical/neoclassical prototype of economic man with procedural rationality is that of a consumer. The neuroeconomic approach to behavioural analysis enables a pragmatic operation of the theorem of "economic man" as an economic-bio-educational complex to be assessed ad hoc by the following questions related to L, c, R

and ε_I, respectively:

Ad c: Is the 'logic' of DM empathic, inductive or both?

Ad L: Is the usual decisions of DM biased by an optimist or a pessimist mood?

Ad R: Is the level of knowledge of the DM sufficient for a sustainable decision?

Ad ε_I: Does the DM express autogenic information to an open, final question?

In business, pragmatic knowledge of the determinants of behaviour is used by advertising to expand demand beyond autonomic decision-making levels using brands and symbols of sex and power to stimulate L and differentiating according to consumer profile (c) as claimed by behavioural economists half a Century ago (Galbraith, 1961). However, a broader understanding in the population of the neural root of the dependency of advertising may help laymen in the industrialized world to counteract over-consumption due to neuromarketing. In this indirect way neuroeconomics may in the long term contribute both to better health and protection of the environment.

5. Discussion of other neuroeconomic business applications

The models of Luria and McLean are widely used within rehabilitation and psychiatry. The combined model should apply even better and in interfaces with business psychology as well:

5.1 Neuroeconomics, transactional analysis (TA) and effective management

A modern psychology (PAC-model) based on the normal development and maturation as it is manifested in human transactions (TA) identifies three major EGO-states (Berne, 1964) (see Fig. 5). In the PAC-model, the ideal mental balance is reached when the Adult ego integrates the egos of the parent and child.

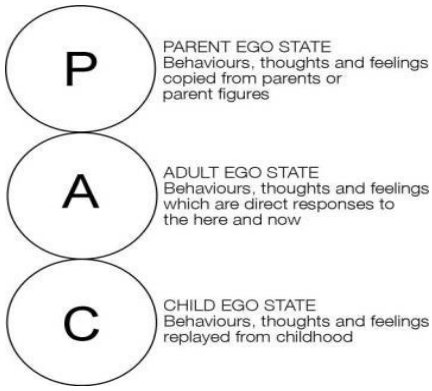

Fig. 5 Transactional PAC-model

The correspondence between the PAC-model and the neuroeconomic decision making model are evident:

- The brain stem client (L1) as neural root of the Parent ego to be served by L2-4.
- L (L2) as neural root of the Child ego (C) in a positive (C+) or negative (C-) valence depending on the state of L.
- C (L4) as root of the Adult ego (A) controlling L and served by cognition (R at L3). C might be dominant (A>) or open-ended (A).

The combined McLean/Luria 4-level brain model establishes the following 2-way correspondence between neural subsystems and the PAC-model:

- $A^>$ is a typical adult male with left hemispheric dominance/strong cognitive control (risk minimizer).

- C^+ is an adult living out his childish ego (risk lover) which in lucky circumstances may develop a good imagination.
- C^- is an adult suppressing his childish ego to gain social acceptance (risk averter).
- A is the prototype of a matured adult with a good 2-way relationship between cognition and emotion (secured risk taker).

Based on TA typical communication, patterns may be ordered in a continuum from antagonism towards synergy:

EGO relations	Interpersonal dynamics	Typical psychological transactions
(1) $C^+ \leftrightarrow C^-\rightarrow$	Antagonism	Mutual hassling
(2) $A^> \leftrightarrow C^+\rightarrow$	Mutual distrust	$A^>$: C^+ is naive; C^+: A^+ is cynical
(3) $C^+ \leftrightarrow C^+\rightarrow$	Verbal rivalry	
(4) $A^> \leftrightarrow A^>\rightarrow$	Material Rivalry	
(5) $A^> \leftrightarrow C^-\rightarrow$	Leader–subordinate relation	$A^>$: Get the job done or get sacked
(6) $A \leftrightarrow C^-\rightarrow$	Leader–follower relation	A: I'm not perfect myself and you are OK
(7) $A\leftrightarrow C^+ \rightarrow$	Complementary relations	A: We have our comparative advantages
(8) $A\leftrightarrow A^> \rightarrow$	Complementary relations	=/=
(9) $A\leftrightarrow A\rightarrow$	Synergistic relations	Assertiveness and a lot of "strokes"

In the continuum of interpersonal relations step 6 represents an evolutionary equilibrium representing a breakthrough for the establishment of synergistic relations based on the adult type A management mode. This line of modern management research based on the Hawthorne-experiments and focusing human relations management is very important in the history of human organization (Effrat, 1968). In short, this line of research has demonstrated a net gain in industrial productivity by 10-20% in a curvilinear relationship between employee satisfaction and productivity. This is very important taking into consideration a net profit of about 5% of turnover in most branches. Within healthcare with a strong level of control (RCT), this line of research has had a recent parallel as moving a patient from a clinic to his home reduces BP 5-7 mmHg (Verberk, et al., 2005): Referring to Fig. 4, relaxation (L $\downarrow$, especially Am corresponding to an upgrade from C- to C+) gives a feeling of security which facilitates cognitive executive functions (R*c). So, home rehabilitation of stroke patients is supposed to be an effective alternative to hospital rehabilitation. Effects include less hospital days and reduced risk of referral to nursing home (Langhorne, et al., 2005).

Actually, the European Commission grants completion of this line of research and dissemination of the results to EU member states (Larsen, 2009).

SOP Short for IHC:

Standard Operating Procedures (SOP) are written instructions to achieve the objective of a specific function. IHC partners should pursue the following basic standards solving specific tasks as discussed and agreed on the Kick-off meeting:

(1) Search to implement best international, interdisciplinary EBM-practice in all project aspects as they are defined by our Grant and Consortium Agreements.

(2) Distribute intellectual property in accordance with the Vancouver Rules[1] of fairness.

(3) A free, timely and collaborative internal scientific communication within and across WPs and specialties

[1] Co-authors contribute substantively to: (1) Design, data acquisition or analysis, (2) Writing and (3) Final decision.

is encouraged in search of the most sustainable task solutions!

(4) Choose task-related service levels i.e. hotels, flights and conferences in accordance with general guidelines on economic behavior.

(5) All partners are encouraged to be active in the promotion of the IHC-logo, their own contribution to IHC and IHC-networking in external relationships as long as they represent a good EBM-standard and respect the assigned intellectual properties of other consortium partners.

(6) The steering committee coordinates the development of guides and dissemination by regular meetings.

(7) Disagreements among partners that may fail to be settled by mutual professional discussion are decided by the steering committee after an impartial hearing of the involved parties.

In summary, the combination of neuroeconomics and TA identifies the most effective management style in the industrialized democracies as that of well-balanced human beings focusing on complementary and synergistic relations with their co-workers instead of hierarchical relationships. A standard operating procedure (SOP) is shown below for the international research FP7-consortium Homecare 222954 which has been confirmed by the partners as framework for the transactional relations to be pursued in a research team aiming excellent performance. This original SOP which was confirmed at the 1st General Assembly has contributed to that all consortium tasks proceeds according to schedule and in most cases the outcomes more than fulfill the targets.

5.2 Neuroeconomics, health promotion and human resource development (HRD)

With reference to Ashby (1960), mental health might be illustrated as the capacity to use as wide a range as possible of the mental capacity curve in Fig. 4 because this increases the possibility to identify and reach the neuroeconomic equilibrium *E*.

Physical exercise requires some effort (c↑) and results in a more relaxed baseline (L↓). This represents a movement towards North-West in Fig. 4. The health benefits of such expansion of flexibility is that well known and actually recommended by practical guidelines from the American College of Sports Medicine for various conditions and general health (ACSM, 2010).

Coping with stress is a most urgent challenge to modern man. Volitional relaxation procedures (c↓) are hypothesized to reinforce preferences (R*c↓ and L/c↑). Presupposing C>1, this is a mental stabilization by a South-East movement towards *C*=1 in Fig. 4. A meta-analysis confirms that relaxation procedures do reduce stress and anxiety (Manzoni, et al., 2008). According to a systematic review, meditation is an efficient relaxation procedure without significant adverse effects (Arias, et al., 2006). Medical meditation (MM) is defined as a period of 15-20 minutes combining (1) a relaxed sitting position preferably with closed eyes, (2) logical relaxation, (3) autogenic emotions and (4) anchoring of thoughts, i.e., to breathing or a sound word (Cardoso, et al., 2004) (c→0). A case study of ACEM-meditation fulfilling the criteria of MM demonstrates: (1) increased posterior α-band activity (L↓) indicating extra de-stressing/resetting and (2) increased Φ-band activity was documented in Frontal and Temporal-central regions (Lagoupolos, et al., 2009). This indicates deactivation of the Default Mode Network (Scheeringa, et al., 2009) which enables increased processing of non-integrated perceptions as a key effect of meditative de-stressing. MM is an effective Lowtech de-stressing procedure for persons with C>1.

Having identified proper tools for expansion of mental capacity both NW and SE in Fig. 4, we may investigate the potential to expand mental capacity (Shifting the curve in Fig. 4 towards NE). Neuroeconomics (see Fig. 3) represents a neural grounding of the visualization techniques which are recommended, i.e., by sports psychology as Hip represents a sensory-endocrine integration centre to be affected by visualization. This may represent a new option to improve weight regulation. Weight (fat) is regulated by the blood concentration of

glucocorticoids (GC) which trigger the mobilization hormone in Hypothalamus (CRH) (Cabanac, 2001): As GC drops below a certain level CRH motivate us to seek food for "Hoarding" in the fat deposits. However, the set point may raise and cause obesity if CRH becomes hyposensitive to GC. Also the GC remains elevated when the CRH becomes hypersensitive to GC in Anorexia Nervosa. Based on Fig. 3 the following guideline on weight regulation is derived:

(1) The conscious distinction between appetite and hunger should be "operated": Appetite is part the reinforcing motivation system (L) and as such affected by all interrelated motivators, i.e., greed, frustration or boringness while hunger refers to specific signals from the stomach. So, feeling appetite, you should check with yourself if it is due to a signal from the stomach or something else which is better served by other kind of actions. Such simple check may significantly reduce your appetite after a few trials.

(2) In order to maximize the motivation to conscious control of hunger you should identify your body identity. What is your long term ambition (FPC) regarding your body? Maybe you wish to run in an easy and comfortable way? In this case you should create an exercise program that matches this ambition and eventually motivates you for periods of volitional fasting, too.

(3) A comprehensive knowledge of the nutritional value of different foods and the process of satiety is of course useful, i.e., knowledge about the balance between your typical daily intake and consumption of calories. If you don't have sufficient knowledge yourself, some expert guidance may be useful. However, the essence of this approach is not a detailed planning of your intake and use of calories. The essence is to give priority to your body identity in your FPC and derived exercise program, to follow your eventual propensity to volitional fasting and to differentiate sharply your hunger from other appetite factors before eating. This type of visual approach to obesity is investigated for children, especially (McClafferty, 2007).

Today, stress-related health risks as Hypertension, smoking and physical inactivity counts for about half of the deaths for men in the industrialized world (WHOSIS, 2008). In summary, simple neuroeconomic tehniques of (1) exercise, (2) in-depth-relaxation and (3) neuro-visual programming is demonstrated to be effective towards this half of the causes of deaths in the industrialized world.

5.3 Comprehensive corporate evaluation of neuroeconomic applications

In short, a business corporation may have the following long term benefits from the neuroeconomic applications:

(1) The practical operation of the theorem of economic man provides a positivistic foundation of a procedure for economic behavioral analysis which should be useful for the marketing department, especially.

(2) Correspondingly, a positivistic foundation of transactional analysis (TA) is relevant to formation of good internal collaboration in general and work group management, especially.

(3) The coupling of simple health promotion activities and HRD is based on the assumption that in the long run a healthier staff is also a more productive one. Specific corporate benefits may include: a. less absenteeism, b. less need of supervision (by middle level management), c. postponed retirement due to better work satisfaction and d. more job-related creativity from employees.

(4) The listed benefits may be obtained nearly without corporate costs as they may substitute or complement other courses and fringes already financed by the Human Relation department. A barrier to the benefits is that they presuppose a longer time horizon than most existing management courses aiming an instant emotional team-building effect.

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