



REVIEW ARTICLE

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Emotional Quantum Theory

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"There are footprints along the path"

ABSTRACT

Here we present a novel Theory of Motivation based on scientific understanding of three classic Psychology concepts: temperaments (primary personality factors), secondary personality factors and the innate components of character. All three may belong to emotional anatomical systems with three different locations: brainstem and diencephalic nuclei for temperaments, limbic system for the secondary factors and frontal lobes and associative factors underpinning the character's features. Although there are fixed inherited features there are also biographical, social and cultural influences which lies outside this theoretical framework., These factors are organized along three axis: (1) time intuition (in Bergson's sense) vs. drive for actions, (2) reward vs. punishment, and (3) introversion vs. extraversion. Through the predominance of one allele in each axis we arrive to a six model of primary factors. According to Jung there are eight factors for secondary ones, and the same number are projected for characters, The psychometric work of Reyburn & Raath and the acoustic patterns of speaking individuals previously studied with psychometric Tests seems to confirm there are six predominant factors [1]. Also six vectors could be derived from neurophysiological data [2].

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Introduction

We hypothesize the biological basis of human behavior through the study of the natural dispositions of Temperament.

The work of Leone Bourdel [3] reveals three laws on emotional behavior by observing the relationship between blood types and temperaments. These laws are classified A, R, and M, in accordance with the main conceptual categories of music.

In our previous study [1] we did psychometric measurements between primary factors of personality (temperaments) and speech patterns.

Here we use the word "quantum" naming discontinuity in sensible matter, a discrete fluctuation that allows the scientist to find modules whose operation results in the functioning of nature. In physics, the quantum of motion; in biology, the gene as a quantum of the architecture of the living being; and in neurology, trans-synaptically encoded quanta of information, suggest that the quantum model transcends Planck's experiments. This notion, the quantum, may serve to explore the biological foundations of psychology.

Through emotion, the individual connects with others, feels affected by them, or simply survives. Emotion is a neurobiological operation executed by the midbrain and controlled by the

inner brain, which has repercussions on the lateral one. But it is also the pure act of feeling with its indefinable charge that possibly underlies the mechanics of thought, and the link with the totality of existence, being our inner guide a priori of all intelligent knowledge.

Theory of Emotional Quanta is an apprehension of the modules that support biopsychological types, clases and variants.

Temperamental Modules

According to this theory:

1. There are three types of sensitivity: A, in which the feelings predominate; R, in which relating to outside world predominates; and M, in which survival predominates, that is, the care of physical life. All individuals have the A, R, and M dispositions in their brain, but in a scalar quantification that determines one as the (main) sensitivity and the second as superior to the third configuring the six basic types.
2. Six types of temperaments according the sensitivity: AMR, ARM, RAM, RMA, MRA y MAR. The first letter corresponding to the principal feature and the other two in second and third gradation.
3. By splitting each of the six temperaments, twelve classes are obtained: AM-R, A-MR, A-RM, AR-M; RA-M, R-AM, R-MA, RM-A, MR-A, M-RA, M-AR and MA-R.

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There are affinities between the harmonic types (AM and AR), between complexes types (RM and MR) and between melodics and rhythmic (MA and RA). Also there are affinities between people carrying the same character (vide infra).

These six normal variants can be the substrate of six other psychopathological variants: phobias from some AM individuals, dysthymias from some AR, paranoias from some RA, explosive behaviors from some RM, obsessions from some MR and hysterical actings from some MA.

1) Each temperament is formed by three vectors: contemplation or action, learning or repetition, projection or adaptation. Let me explain the hypothetic result:

Am-r: contemplation > adaptation > learning.

A-mr: contemplation > learning > adaptation

A-rm: learning > contemplation > projection

Ar-m: learning > projection > contemplation

Ra-m: projection > learning > action

R-am: projection > action > learning

R-ma: action > projection > repetition

Rm-a: action > repetition > projection

Mr-a: repetition > action > adaptation

M-ra: repetition > adaptation > action

M-ar: adaptation > repetition > contemplation

Ma-r: adaptation > contemplation > repetition

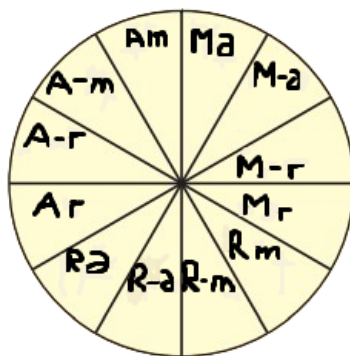


Figure 1: Temperaments distribution scheme. Each temperament being quantic transition between two neighbours.

Jung's Personality Types

According to Jung [4], personality results from the integration of feeling, intuition, perception, and thought, thus resulting in the existence of sentimental, intuitive, perceptive, and reflective psychological types (S, I, P and R) depending on which of the four psychological functions predominates. Finally, he subdivides the four types into introverts (I) and extroverts (E), resulting in eight distinct categories: feeling I and E, intuitive I and E, perceptive I and E, and reflecting I and E.

Each of our 12 temperaments would admit Jung's 4 basic personality types, so the typology rises to 48 variants*. We will call each of these variables melancholic (Si) or hypomanic (Se), affective (Ii) or obsessive (Ie), schizoid (Pi) or hysterical (Pe), and paranoid (Ri) or timid (Re); each temperament providing only one of these two alleles.

*Additional five subdivisions for each one of the 48 variants according mentality (pragmatic, rationale, idealistic, empathetic or skeptical) would include also one of three classic morphological subtypes: viscerotone, somatotone or cerebrotone.

In our concept these variants are reflecting anatomical different subsystems with three different levels, one subcortical at the temperamental level (mesodiendephalic), one at the limbic system for the personality Jung's fixed types and another one at the frontal lobe (or other cortices) which encodes fixed features at the character level.

One possible Table, mixing temperaments (primary personality factors) and fixed features of personality (secondary personality factors), can be as follows:

Temperament	Secondary Personality Factors
Am	Ri - Pi - Ii - Si
A-m	Re - Pi - Ii - Si
A-r	Ri - Pe - Ii - Si
Ar	Ri - Pe - Ie - Si
Ra	Re - Pe - Ia - Si
R-a	Re - Pi - Ia - Si
R-m	Re - Pe - Ia - Se
Rm	Ri - Pe - Ia - Se
Mr	Re - Pi - Ia - Se
M-r	Re - Pi - Ii - Se
M-a	Ri - Pi - Ii - Se
Ma	Ri - Pi - Ii - Se

Motivation and Brain Structures

Motivation explains behavior, as long as it happens in extremely simple behavior as occurs in monosynaptic reflexes.

According to Madsen [5], motivation is a generic term that includes different variables, such as: A) The Central Activation processes governed by the Brainstem Reticular Formation; B) The motivational baseline depending on subcortical processes (E Catell component, energy) [6]; C) Sensibilizing processes depending on the Hypothalamus and the Limbic Circuit (P Catell component) [6]; D) Cortical-Subcortical learning circuits induced processes; E) Variable motivational disposition depending on the individual's constitutional nerve centers (temperament) [7]; F) Acquired inducing stimuli; G) Induced impulses, leading to G Catell component, gratification [6] and H) Cognitive processing of information, both cortical and sensory.

Catell classifies Inducement Theories as: 1) Homeostatic: emphasizing the role of hypothalamus, particularly in hunger and thirst; 2) Limbic: originating wrath, fear aggression, pleasure and sexual drive; and 3) Cognitive: generating curiosity, among others, mainly of cortical origin.

Halgen & Chauvel [2] review these theories concluding that emotion originates from various substrates, those based in the brain stem are responsible for somatic or visceral automatic behavior. On the other hand, telencephalic behavior is responsible for more subtle and developed behavior.

By mean of intracranial implanted electrodes for electrical brain stimulation Halgren & Chauvel [2] describe emotional experiences as signals from subconscious to conscious neural networks in the human brain. The same authors connect emotions located in the Limbic System (a), with other five areas in the associative

multimodal cortex. Other five vectors are: b) sensations, in their basic components arising at the primary sensorial cerebral cortex; c) topographic knowledge at the perceptive unimodal cortex; d) associated sensations from gnosic associative cortex; e) working memory: conscious information for immediate use from the prefrontodorsolateral cortex; and f) declarative memory at the temporal lobe as a free flow of conscious contents. Possibly different configurations emerge according the influence or intensity of the activity of each of the six described vectors, underlying the basic concept of temperaments or in other words, primary personality factors (Figure 2).

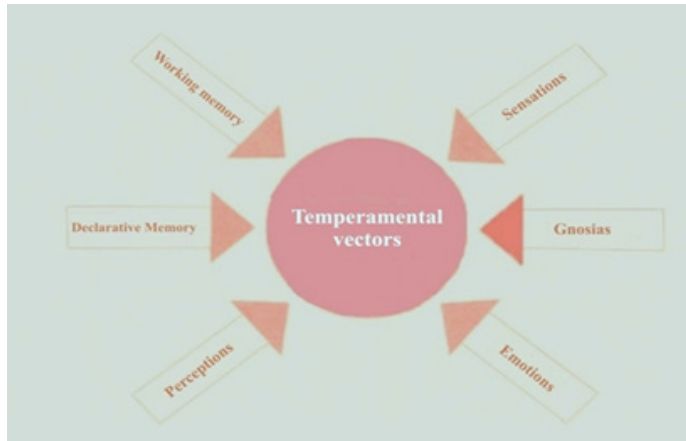


Figure 2: Theoretical model regarding the structure of temperament. Six vectors obtained from neurophysiological experiences [2].

As a matter of speculation, the primary vector (pv) perceptions is assigned to AM type (contemplative), declarative memory is attached to AR type (affective), working memory fits into RA type (paranoid), sensations with RM type (impulsive), gnosias with MR type (obsessive) and emotions with MA type (hysteroid).

Through previous studies, the following conclusions transpire:

1. Human speech has a temporal organization of its emission, segmental and suprasegmental. This function depending mainly on frontosubcortical circuits located in the dominant hemisphere for speech, usually on the left side.
2. Speech has a prosodic accent or intonation, in which variations of the fundamental frequency in time (contour) and energy variations (accentuation) are the vehicle for messages from the emotional world. Expression and perception of these messages are functions of the non-dominant hemisphere for language, usually the right one, in regions that have been speculated to mirror the control of spoken propositional language in the left hemisphere.
3. Emotional expression of speech follows acoustic patterns similar in different individuals according to the emotion currently expressed.
4. According to Reyburn and Raath [8] normal subjects interviewed showed six different primary factors in their personality (PPF). Acoustic studies complete the psychometric ones in order to differentiate individuals belonging to each one of these six groups (temperaments) [1].

Role of characters and the quantum model

Temperament is a tendency to react emotionally according an innate pattern.

Personality is the way a person socially interacts.

Character is linked with individual objectives and the efforts to make them possible.

This theory contemplates that each of twelve temperament's class has four secondary personality factors, besides eight variants are linked with each subsystems: Am, Ar, Ra, R-a, Rm, Mr, M-r and Ma which representing eight characters, with the same names of temperaments adding two extra characters: R-a (schizoid) y M-r (melancholic).

Therefore each subsystem is represented at three organic levels: 1) at the temperamental one (T level, 12 classes, Figure 1, 2) personality (P level, 48 variants, Table 1 and 3) carácter (C level, 8 for each 6 types, same 48 variants). It is possible to belong to one subsystem at T level but another one at P or C levels, or conversely to remain in the same subsystem. So there is a movement, from the brain stem to the frontal lobe (?) travelling from one, two or three different subsystems. In analogy with quantum mechanics one can perceive fluctuating transitions from one subsystem to another as a flexible not fixed architecture of processing emotions in the human brain.

Goldar [9] presented five bipolar functions in the emotional brain: 1) thymic function, which includes reward and sadness, 2) instinctive function which includes drive and satisfaction, 3) prevention including defense and attack, 4) motion including posture and movements and 5) sensibility for time ("the internal clock"). We added one more: expression vs apathy, as we can see in some neurological patients, with akinetic mutism [10]. Once again we can find the six types of human temperament, doing the correlation of 1 with AR, 2 with MR, 3 with RA, 4 with RM, 5 with AM and 6 with MA. These concepts work fine at the hypothalamic level where all the six subsystems began (primary factors) in order to project immediately to limbic system targets (secondary factors) and cortices (character's features).

Discussion

The six factors model for primary personality factors (PPF) (temperament) was first assessed by the psychometric work of Reyburn and Raath [8].

Then another research tried to connect those factors with blood groups [3].

By mean of intracranial implanted electrodes for electrical brain stimulation Halgren and Chauvel [2] describe emotional experiences as signals from subconscious to conscious neural networks in the human brain and linked emotions located in the limbic system with other five areas operating in the associative cortex, which allows us to conceive a six vectors model [11] Figure 2 applied to six different subsystems.

Jung described a psychological classification in eight categories [4]. These are the secondary personality factors (SPF) which can act as a second level in the emotional modulation. Following Halgren and Chauvel there is a third level at the associative cortices which add character, another classical notion in Psychological Typologies.

Acoustic studies can complete the psychometric ones in order to differentiate the individuals corresponding to each six PPF, since the acoustic measurement systems are easy to implement on a personal computer [1].

Now we are associating all those facts in order to build a conceptual framework to describe the processing of emotions in the human brain. Those six factors (PPF) evolving to eight different ones at SPF and character level.

Conclusion

In this paper we present a novel theory of motivation bringing to scene three levels of production, modulation and regulation of human emotions, usually known as temperament (T), personality (P) and character (C), with six types derived of T which can dimerize into twelve classes. Adding four categories derived from P typology the system reaches 48 variants, and eight categories from C to the primary six types maintaining the structure of 48 variants.

The subsystems are open modules which can allow flexible passages and transitions. functionings as quantum units unstables and subject to different superimposed possibilities.

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