

RESCUE OF THE APPROPRIATIVE “THOUGHT-ACTION-MOOD” SPACE: ANATOMY AND MAST CELLS GENERATE “MIXABLE” DIMENSIONS IN LANGUAGE AND STATISTICS

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SUMMARY

Background: The orthogonal axes of Thought (T), Action (A), and Mood (M) span a phase space which corresponds e.g. to the three medial thalamic areas related to three resonating cortico-subcortico-thalamo-cortical loops. The above three of several loops constitute an “appropriative engine”, since within that space, as hinted to via Fig. 228 by Emil Kraepelin to illustrate bipolar mixed states, circular waves of appropriative functioning - from need via action to e.g. satisfaction - reflect a spectrum of temperamental to anxio-affective signatures of sequential appropriation waves. This neo-classical “dyn4TAM”-model also posits that a prime (thalamic) motivating system of Uncertainty-orientation (R. M. Sorrentino) regulates the temperamental balance between only 4-dimensional (D)-“Thought” (G. Halford) about effort-sparing models and high-D-“Action” (G. Rizzolatti) meaningfully related to movement. In fact the exchange across this “complexity divide” - between “grasping” action-related high-D-modules and “calculating” 4D-modules of brains - even concerns the grounding of symbolic relational “concepts.” It thus expands on the Franco-Kraepelinian “TAM”-System (FKS) which suffered a distortion by Kraepelin and the eliminative eugenicist Wilhelm Weygandt, unfortunately carried on in the “bipolar spectrum” current. Because the above loops are independently segregated they generate true dimensions. Furthermore the phenomena they jointly create become patterns, i.e. independently filled slots. Now these are irremediably destroyed at acquisition by Galtonian statistics which is detrimental to conceiving dimensional topics.

Hypothesis: Here we posit that preponderantly “uncertainty-oriented”, calculating academics unless depressed, are attracted by 4D-Thought and repulsed by intuition. They thus avoid bio-psychologically the “comprehension” of patterns.

Method & Result: New research initiated by dyn4TAM confirmed, that the homologous rodent sign-tracking depends on mast cells modulating the ACC-loop for “Action.”

Conclusion: The “complexity divide” warrants more attention in clinical and pure cognitive sciences and should include a “psychology of statistics”.

Key words: neurolinguistics - bipolar mixed states - cortical-subcortical-thalamo-cortical-circuits - mast cells - psychology of mathematics

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INTRODUCTION

“It is better to plan the undertaking to wisely study observable phenomena, to posit connections between them, to install a methodological framework for them, and then to draw some general and falsifiable truths from them.”

Phillipe Pinel (1745-1826)

“Big Data” - driven science in a central sense has also led to a crisis of translation in psychiatry, which increases the long-standing denigration by “intuitive ideologues” of simple, Galilean abstract-to-concrete-and-back again-theorizing in psychopathology. Terrible, choleric, simplifications about human affairs certainly have, even before the Shoah, legitimated ethico-historical concerns. The crude divisiveness suffered by psychiatry nevertheless may be more cognitive-temperamental than legitimate: it could be caused by the fact that, what in Plato’s, pro-eugenic (Goering 2014), “Republic” (Plato 1994) the philosophical “guardians” cherish most, i. e. mastering the daily renewed uncertainties through hopefully harmonious models (in just 4 dimensions as Graeme Halford’s network has shown; Halford 2005, 2014, Cocchi 2014), elicits the strongest

aversion in “soldiers”, who like to master routines physically through high-dimensional movements and by unquestioned orders – unless depression doesn’t revert this game. Meanwhile the banasas remain the balanced normals, denigrated as being “banally bad” (Arendt 1963) thus disculpating choleric. Neglected by mainstream, Richard M. Sorrentino (Sorrentino & Roney, Sorrentino 2008) through the psychological spectrum of “Un- versus Certainty-orientation” (i.e. attractedness versus repulsion by yet unexplained topics) has posited and broadly corroborated what constitutes the strongest (also) human motivator. Crucially in depression these extremes of cognitive temperament, being proportional to mood, abruptly swap into the opposite. While in depression soldiers start to look out for argued solutions, philosophers – especially if fueled by mixed states – can be predicted to become dangerously fanatic.

Here a new convergent interdisciplinary stance is taken based on the dyn4TAM-model. Its also neuro-economical foundations (Treviranus 2017a, 2017b) here are only summarized before addressing questions of “graspability” in statistics and taxonomy (by using the example of mixed states).

AN UPDATE ON THE dyn4TAM-FRAMEWORK

The neurobiological (and linguistic) elaborations of the dyn4TAM-framework posit, that A) mixed and other affective states, including fear or anxiety, are generated along the three medial of the several cortico-subcortico-thalamo-cortical circuits (CSTCs), and similarly structured areas (Uddin 2015), of the brain; that B) these and other CSTC-loops are segregated among each other (Alexander 1986, Draganski 2008) and thus generators of orthogonal, i. e. truly dimensional phenomena (modulated by dopamine; Afonso-Oramas; Ikemoto 2015, Haber 2014, Ferré 2018); that C) these in the case of the above three "appropriative" ones can be mapped to an (also "neuro-economical") classical Thought-Action-Mood space harboring repetitive temperamental cycles attracted by mixed corner states, which correspond - Figure 1 - to "Fig. 228" (Kraepelin 1913; Fig. XXIV1904) illustrating phased sinus curves (Figure 2) and D) that these cycles map to the basic sequence of "appropriation" constituting the basic formula for behavioral sciences, complementing perception-action cycles (Fuster & Bressler 2012), which alternates between private Thought and public Action. In this E) Thought is conceived to be limited to 4 dimensions albeit with ranks of complexity up to six (Halford 2005, 2014, Cocchi

2014), to primordially conceive less effortful ways of appropriation; Action instead, F), is primordially driven by the need to re-resource for auto-sustainment by investing in "opportune appropriative movement", which is calculated (and signaled via effort to decisional Thought) in the anterior cingulate cortex (ACC; Holroyd & Umemoto), who's CSTC when lesioned results in abulia (Mega & Cummings 1994). At the same time Action must relate (Luppino 1991, Caminiti 2017,) to the high-dimensional "significant steering" of the (in the arm alone 7) degrees of freedom of articulated motor chains. Mood instead is driven by the CTCs running through the vmPFC/mOFC (Roy 2012).

Furthermore G) at these also learning interfaces, between the latter two transitions across this "complexity divide", named Intention and Perception, occur, of which H) the temperamental balance constitutes the human prime motivator "Un-/certainty-orientation" of Richard M. Sorrentino, a cognitive temperament, which swaps into the opposite in depression, whereby I) this cognitive temperament was posited to be homologous to sign-/goal-tracking behavior of rats. This, J), motivated my suggestion for the first, successful, behavioral mast cell experiment, that the mast cell stabilizer chromoglycin would cancel sign-tracking as far as it would be maintained by "manicogenic" mucosal thalamic mast cells at the periventricular thalamic nucleus

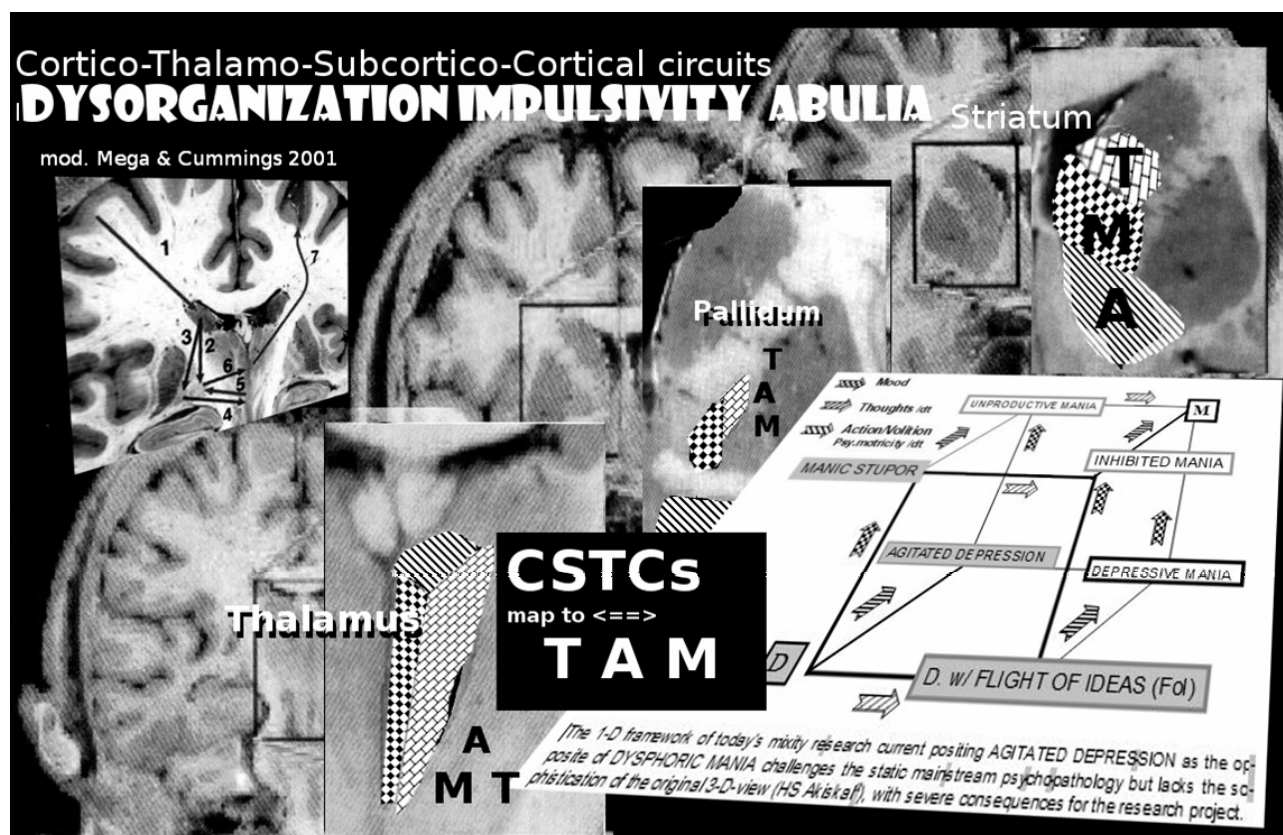


Figure 1. Three segregated cortico-thalamo-subcortico-cortical contiguous loops (Mega & Cummings 2001), located medially in the thalamus, relate to the functions of Mood, Action, and Thought provided with the ventromedial, anterior cingulate, and dorsolateral prefrontal cortex. Their interruptions cause instinctual impulsivity, abulia, or thought disorder. They map to the homonymous dimensions of the Thought-Action-Mood defining "mixed states" (Treviranus 2006)

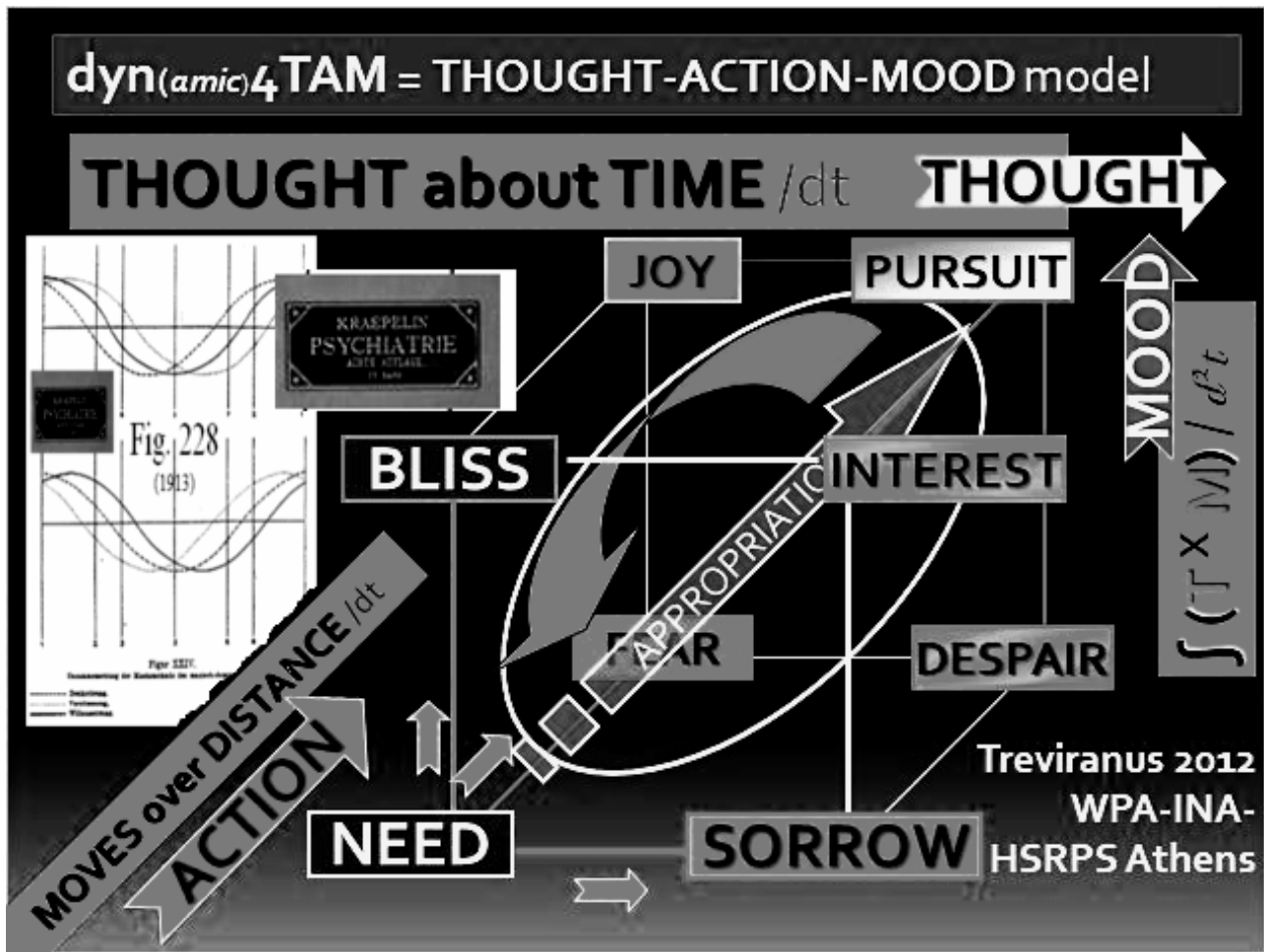


Figure 2. The dyn4TAM-model names the corners (vectors) of the “mixed” Thought-Action-Mood-cube with natural language terms. The treble phased sinus curves from Fig. XXIV or 228 (Kraepelin 1904, 1913), derivatives among themselves, determine the cycling “appropriation waves” from need to outcome

(Morrow & Fitzpatrick 2017). This prediction was generated by hypotheses of an ongoing project (Treviranus 2014, 2015) on a afferent non-canonical “highway” of often subverted mast cells (traveling from e.g. nailfolds or other germ- and toxin-accepting barriers via the lymphatics to the walls of vessels and then counter-flow along the outside of cerebral arteries) as main actors (Silver 2013) of a more “tangible” psycho-neuro-endocrino-immunology (PNEI-2.0) following the course of cerebral arteries – against the “intangible” connectionist a-neurovascular stance of RDoC (Insel 2010). Early bipolar disorder e. g. is related to white matter damage at the left anterior limb of the internal capsule (Lu 2012) supplied by the lenticulo-striate artery, which runs where the average putamen shows a groove from “arteriitis”: such could cause in bipolar disorder (Hwang 2006). Likewise average thalamic deformations in MDD-depression (Lu 2016) or schizophrenia (Coscia 2009) could be associated with supplying arteries (Schmahmann 2003) allowing e.g. for intrusion of damaging mast cells (Theoharides 1990, 2016) intruding from the periphery, where they would be variously imprinted as to destination and destiny as prefigured by György Csaba

(Csaba 1961, 2015). Interacting with mast cells especially infectious (Steinberg & Himmerich 2013, Khandaker 2015, Khandaker & Dantzer 2016) somatic processes antedate the emergence of severe mental disorders (Kraepelin 1881, Ilankovic 2014). Finally, K), the syllogistic evolutionary utility of the loop dedicated to Thought, which developed last (Treviranus 2010), consists in balancing the rigid “either-or” of approach by a syllogistic graduation from true for all, not for all, some, not even for some in a way inspired by Sydney Axinn (Axinn 1994). This syllogistic background informs subcortically generated language spoken in appropriation (as illustrated in Figure 3, a Croatian version of Table 1, with context in Treviranus 2017a), and this contributes to understand the grasp of contiguous concepts (Galetzka 2017).

As to the focus of this paper though, the orthogonal nature of the “appropriative engine” as defined by CSTCs with their indirect path providing their oscillating nature (Szirmai 2010, Bramson 2018) is essential. The recognition of the simple harmonic oscillator, familiar from alternate current circuits (Figure 2), within Kraepelin’s hint in Fig. 228 (Treviranus 2012) has been elaborated further (Koutsoukos 2014).

PRIJELAZ	Blaženstvo	Radost	Potjere	Interesa	Treba	Bojati	Očaj	Brige
Blaženstvo		uzvišenje	obraćenju	protok	razočaranje	uplašiti	fanatizam	nostalgija
Radost	uvođenje		posveta	predanost	iscrpljenosti	uhićenje	bijes	sumnje
Potjere	otkrivenje	zanemariti		rastresenost	odricanja	šok	prkos	prokletstvo
Interesa	zaglupljivanje	slavlje	aplikacija		triježan	strahopoštovanje	intriga	nerješivost
Treba	očaravanje	spasenje	majstorstvo	razmišljanje		uplašiti	tamjan	oprez
Bojati	povjerenje	pobjeći	Spasenje	suđenje	zaustaviti		sprezanje	abrazija
Očaj	valorizacija	spašavanja	otkupljenje	nada	predaju	isključivanje sebe		turobne
Brige	providnost	reljef	sanacije	razrješivo	nerazumnost	donošenja	osveta	

Figure 3. The triple permutations of increased or decreased instances of Thought, Action, and Mood subcortico-linguistically create 8 corner and 56 transition terms e. g. in Croatian (English version: Table 1 in Treviranus 2017a)

THE UNFORTUNATE SWAP CAUSING DOUBLE-SWITCH TRANSITIONS

The dyn4TAM-cube (Treviranus 2006), by taking an "orthogonal grasp" on the "cubed" (Salvatore 2002) classic model, originally clarified unfortunate errors, which led to the collapse into the bi-dimensional "admixture framework" used by the "bipolar spectrum" movement (Marneros & Goodwin 2005, Marneros 2001). Wilhelm Weygandt studying at Strasbourg had assimilated eugenism (Mucchielli 2000) and "mixed states" (plausibly) through his later mentor Wilhelm the Wundt's friend Théodule Ribot (Feuerhahn 2016). A companion paper questions the dark sides and scientific merits of this key figure of destructive eugenics (Treviranus 2019).

This path of ideas had been as follows: a) Weygandt, who from the hardly cited French Aliénistes had learned "The unique relationship between patterns of symptoms that seem to be irreconcilable." (Salvatore 2002) occurring as the occasional persistent mixed states, which "marked the whole course of the episode", practically limited these to the three thought-less states: (1) Manic Stupor ("Bliss-taM" in dyn4TAM coding for the extremes of thought, action, and mood with upper and lower case initials and with common terms for the 8 permutations), (2) Unproductive Mania with thought poverty (Joy-tAM), and (3) Agitated Depression (Fear-tAM) – mingled with the worry of Despair-TAM (Dysphoric Mania). b) the previous hypostasis of Manic Stupor (Bliss-taM) as a starting point was associated erroneously by Kraepelin (1913) with the manic group -

despite Weygandt's stance against the "predominance of the affective" (Salvatore 2002; p.259); c) the consequential persistent "swap" between Inhibited Mania (Interest-TaM) and Agitated Depression (Fear-tAM) assigned erroneously by Kraepelin to the group of Depression (Need-tam) and Mania (Pursuit-TAM) respectively - although being 2 switches (of thought and mood) away. Eugen Bleuler spoke of "Abnormal facilitation or inhibition of the centrifugal functions of deciding, acting, including the psychic parts of motility." (p. 354) . Yet (p.364) he excluded "depression with flight-of-ideas" and the subsumption of "melancholia agitata", where agitation "is nothing else but the expression of fear, and next to that the other centrifugal functions are clearly inhibited." Kraepelin started to introduce the concept in the 4th, and cited from Weygandt's dissertation in the 5th edition of his textbook (Kraepelin 1893, 1899). Unfortunately the "swaps" were carried on by the neo-kraepelinian movement (Akiskal & Benazzi 2004, Perugi & Akiskal, 2005. Fountoulakis 2015; p. 52 ff.). Wilhelm Weygandt was accredited with the introduction of mixed states (Maggini 2000, Salvatore 2002), while his case reports mention the maturing French conceptualization of mixed states (Ritti 1883) since Philippe Pinel (Pinel 1801) up to Jules Falret (1824-1902) in a footnote only up to the year 1854. Yet Jules Falret's «mixed state» as an observation evolved to a concept in 1861 (Falret 1861; Haustgen & Akiskal 2006, Haustgen 2017): "(...) the hybrid and contradictory expressions of manic melancholies or melancholic manias are the most evident

condemnation of the reigning classification." Weygandt iterated, that mixed states of opposite capital symptoms disproved all theories opposing two different principles, notably the theory of the Viennese pathology chair Theodor Meynert (1833-92). The latter held, maybe more realistically than we concede, that mania was caused by dilatation and depression by constriction of arteries (Meynert 1884, 1990). Weygandt PhD-thesis was praised for repudiating such a "cut and dried" scheme, but was considered a "bit too casuistic" by others (p.94), while he himself wrote, that it seemed "farfetched" or premature to make any theoretical use of his unsystematic remarks on aetiology. After his article (1901) on "Manic-depressive insanity" interestingly Weygandt, outside his general treatises, never returned to this topic.

UN-GRASPED DIMENSIONS: PATTERN-NEGLECTS IN THE FIELD

Not all dimensional topics in the psychiatric field can be expected to advance through pattern-preserving statistics, i.e. mainly configural frequency analysis (CFA; see below). In the genetics of relevant mutations e.g., as far as we know their primary effects, we encounter many steps along causal pathways where these are lacking thus remaining silent (missing heritability). Neutralizing interactions of linkage or epistasis (Wei 2014) are restricted to sub-samples which would show up as deviant occupancies in CFA. Also bio-models (Monir 2017, Monir & Zhu, Hall 2015) are emerging to bridge these spots.

CFA can quickly suffer from excess of configural addresses with ensuing scarcity of occupancy, but this is mitigated by increasing samples or by orderly "agglutinating" categories, dimensionality reduction - also applied by still pattern-destroying Galtonians (Grellmann 2016), or again by nesting, causality analysis, or by using any meaningful category, including such from indexes or multivariate processing. Nevertheless the need for better pattern recognition is apparent across all fields (Treviranus 2018). In the meantime e. g. a common genetic pool of bipolar versus schizophrenic disorders opens on a thus guided search of sequential common uphill causes, yet polygenic risk scores (PRS; Bogdan 2017) are used, whereby complex data is collapsed onto two dimensions: individual predictor (PRS) and e. g. predicted variance within a broadly psychotic population (Calafato 2018). Recently doubts have been voiced on population genetics' asymptotic claims, lack of combinatorial insight, and monothetic models (Verna & Ritchie 2018). Few studies struggle with the problem: one boldly uses a 3-way continuous data analysis in cutting-edge study on Alzheimer's and mast cells (Kayer 2017). Genetics also point to a protein integrating a spike-velocity divide counter-regulated by phenotype (Schork 2012, Schork 2016, Devor 2017), and finally a related network confronted the pattern problem head-on (Møllerup & Møller 2017a).

Even when patterns emerge (Costafreda 2011) they are never crossed with vascular supply. Instead a command of brain is rule (Kotkowski 2018). Nevertheless CSTCs and other micro- (Li 2016) and macro-anatomical categories are returning (Tréhout 2017, Vandeveld 2017, Avram 2018). Naturalistic animal modeling runs the risk to adapt to consensus-dimensions (Anderzhanova 2017) while other potential "tangible" anatomical or inflammatory dimensions (Lee 2015) are neglected. While massive-data and high number projects have been clinically productive, many expectations still have to be met. In parallel severe doubts on "significance" both in psychology and imaging presently are pushing for methodological pre-publication. Beyond this the increase of significance by numbers is loaded with promises which often can be expected to dry out asymptotically.

KEEP DIMENSIONAL PATTERNS SAFE WITH CONFIGURAL-FREQUENCY-ANALYSIS

The inventive idea of CFA (Configural-Frequency-Analysis, to be disambiguated from Confirmatory Factor Analysis) of Gustav Lienert (1920-2001) was a) to count the frequency of "configurations" (patterns, permutations, ordered sets) of categorically measured, mutually rather independent (and thus - what has not been explicitly notice till date - dimensionally generated) attributes (carried by persons or entities) within a n-dimensional contingency table, and then b) to compare them with the occupancies expected (following a "base model" reflecting state-of-the-art modeling or just the distribution of marginal sums) in order to discover "types" or "anti-types" where thus addressed cells (vectors) would realize more or less occupants (the author's term) from a counted sample than expected to a degree as dictated c) by, often contradicting, models of stochastic significance. Only hereby it emerges, as the main developer of CFA, Alexander von Eye underscores: that "main effects and interactions reflect local relationships among variables. (...) identified for some categories of variables, but not for others." (von Eye 2013), whereby generalizing models often do not fit the behavior of important minorities: overall or - through higher order CFA(von Eye 2002, 2016) - in respect to specific terms of such e.g. log-linear modeling equations. Thus the "person-oriented approach" could not be statistically realized beforehand, which was particularly detrimental to the field of developmental psychology Von Eye works in. He thus also contributed prediction CFA and causality-tracing techniques for longitudinal research (von Eye 2002, 2018). Today the field flourishes even more, as a handful of researchers mainly pivoting around Alexander von Eye (von Eye 2010) surprises regularly with both ergonomic (e.g. cfa in R) or fundamental new developments: "The doors for sophisticated data analysis and, more important, for analysis that exactly tests the hypotheses that researchers ask are wide open." (von Eye 2016) (Figure 4).

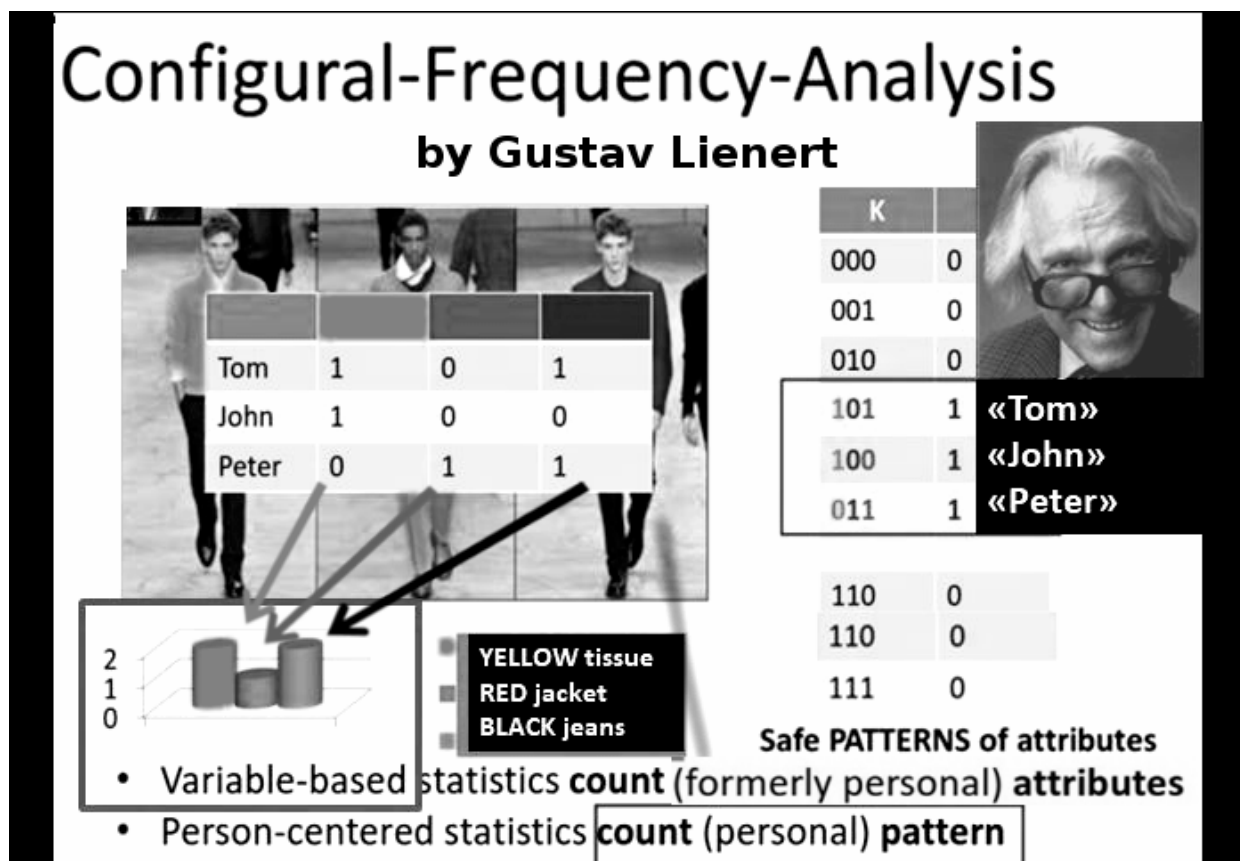


Figure 4. While by Galtonian statistics attributes (or garments) are plugged off from entities (or persons) whereby individual patterns are erased, Gustav Lienert started to count the frequency for all possible patterns

This hesitancy of researchers does not seem to be due to computational limits related e. g. to scarce occupancies, which e. g. can be mitigated by re-aggregating cells, but rather to deeper psycho-social causes, not least incredulity, which hinder also other sensible ideas, e. g. related to the related slowness in developing an epistemology for also longitudinal person-oriented research (Bergman 2014; von Eye), particularly missing in psychiatric early recognition research, without there being little awareness of the contribution of syndromes' internal, personally patterned information, leading to a state of psychopathological helplessness: "Symptoms considered alone, (...) without additional (external; ...) information are simply an insufficient evidential base on which to make a valid diagnosis." (Duffy 2018). Patterns thus only appear in the one-against-the-rest-game, e.g. depression doubling the score regarding personality (Post 2018).

While the problems from insufficient occupancies of cells fade with size and can often be circumvented by "agglutination" or "hierarchical CFA", it can become demanding in various kinds of CFA realizations to establish significance by running tests from the stochastic shadow world, and often amounts to a fair amount of skillful guessing reflected in various discrepancies in how many of types and anti-types emerge (Table 13 in van Eye 2002). Nevertheless such

results reflect the nature of at times topic-specific disequilibria within the contingency tables. Yet "CFA-informed" work is limited to a handful studies in developmental psychology (Matinez-Torteya 2009), and scattered studies in other fields. Despite these meager applications CFA excels in common sense transparency and robustness where other methods only thrive on often unmet tacit assumptions. Variances in future, after investments in simulative and other mathematical work, could be decomposed yielding dimensional and thus meaningfully mixable, partly dimensional, and intractably high- or un-dimensional components.

CONCLUSION

The pervasive „loss-of-patterns-issue“ should be advanced by numerical psychology along the translations from genes to behavior by using pattern- and thus "true dimension"- preserving CFA – Configurational Frequency Analysis – and integrated with dimensional bio-evolutionary hypotheses to prioritize bio-psycho-socially genuine dimensionalities manifested in epidemiology by „mixities.“ The burdensome conundrum of bipolar mixity (Verdolini 2010, Muneer 2017) to the benefit of many is likely to profit from a more "grasping" approach in bio-modeling and statistics.

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