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Изследване на модел за прости емоции

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Резюме. *Статията представя в детайли изследване на два аспекта от нов модел за прости емоции като част от експериментален тест върху аспекти на емоционалността. Представени са резултати от анализи, които се базират на два типа кодиране – бинарно-номинален и интервален. Въведени са неизследвани понятия като „семейство“ от емоции, „плътност“ и „усилване“ на емоциите. Представена е формула за симулирано изчисляване на „плътността“ на емоции, базираща се на емпиричните проучвания на Силван Томкинс. Работните понятия и променливите са заети и внедрени в дизайна от самата теория на Силван Томкинс. Статистическите резултати от анализ на средната стойност между променливите, степента на трудност при възприемането на айтемите емоционални категории и „семейства“ са използвани съобразно два типа кодиране и показват различия, които могат да подпомогнат усъвършенстването на модела. Три нива на симулирана плътност между „семейства“ са установени, а повечето категории от емоциите, използвани в симулацията, могат да послужат за предсказване на принадлежността им към дискретни семейства. Моделът допринася за създаването на синтетичен речник на простите емоции, който интегрира две теоретични традиции в психологията на емоциите – дименсионалния и категориалния подход. Симулацията е достъпна в интернет на https://testrain.info*

Ключови думи: емоции; плътност; усилване; описателна статистика; Теория за айтемното отговаряне; Rasch моделиране.

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Exploration of Primary Emotions Model

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Abstract. *This article exhibits in details an exploration of two aspects of a new synthetic model of simple emotion as a part of experimental enquiry in the field of emotionality. Elaborate results of analysis with two types of participants' experimental reactions coding are presented here – nominal-binary and interval scale. Some experimental concepts from Silvan Tomkins' affect theory such as "family", "density" or "amplification" of emotions is implemented. A simulated formula is introduced based on Tompkins' empirical research and its influence and correction bias on data and variables. Statistical results from analysis of means, standard deviation, level of items difficulty response models show that there are significant differences and some inferences are derived to confirm two hypotheses about how to distribute independent variables and which variable could be accepted both as a member of a dimension or category of an emotion. Three levels of emotional "density" are confirmed and which categories are predictable for each of the ten "families" of emotions. The model could be applied in different directions of further analysis. It contributes to the psychology of emotions creating a synthetic dictionary of emotions. It is also demonstrated how to build a common ground between two scientific traditions of dimensional and categorical approaches to emotions. Model is allocated at https://testrain.info*

Keywords: emotions; density; amplification; descriptive statistics; Item Response Theory; Rasch modeling.

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Contribution:
Krasen Ferdinandov – Abstract, Theoretical Background, Experimental Design, Item-response Rasch Modeling, Data Processing & Graphics, Results & Discussion, Conclusions, References.
Ivan Bardov – Methodology, Conclusions.
Zhorzh Balev – Item-response Rasch modeling, Data Processing, and Graphics, Discussion.

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The authors have read and approved the final manuscript.

Introduction

Theoretical background

The American psychologist Silvan Tomkins is from a series of researchers who consistently support the view that the basic function of simple emotional experiences in behavior is, in addition to reflective orientation (Tomkins 1995: 316), also enhancing personal motives and integrity with biological instincts and the anticipatory functions of all mental processes – so-called "amplifying co-assembly" (Tomkins 1995: 32; Ibid: 318).

In the period between the 1950s and the 1980s, this researcher developed his own simplistic two-dimensional model of emotions. The differences between emotions, according to him, came from the level of neurostimulation and are transformed into one another, depending on the threshold of the "density of neural firing". The graphic below (Figure 1) visualizes these concepts, evolving over time, accompanied by a short vocabulary representing the semantic gradation of intensity within the affective group.

Tomkins' theories undergo changes over time. Initially, he suggests that "density" depends on the number of electrical stimulations per unit of time in the autonomous nervous system, according to its strength and duration ("intensity", "duration", Arnold 1970: 108). He also adds the "frequency" of the response parameter ("frequency", Tomkins 1995: 322). "Density" of emotions plays an important role in the affective management style of those surveyed to their own experiences – to minimize, maximize, satisfy or optimize the emotional experience (Tomkins 1995: 341). This

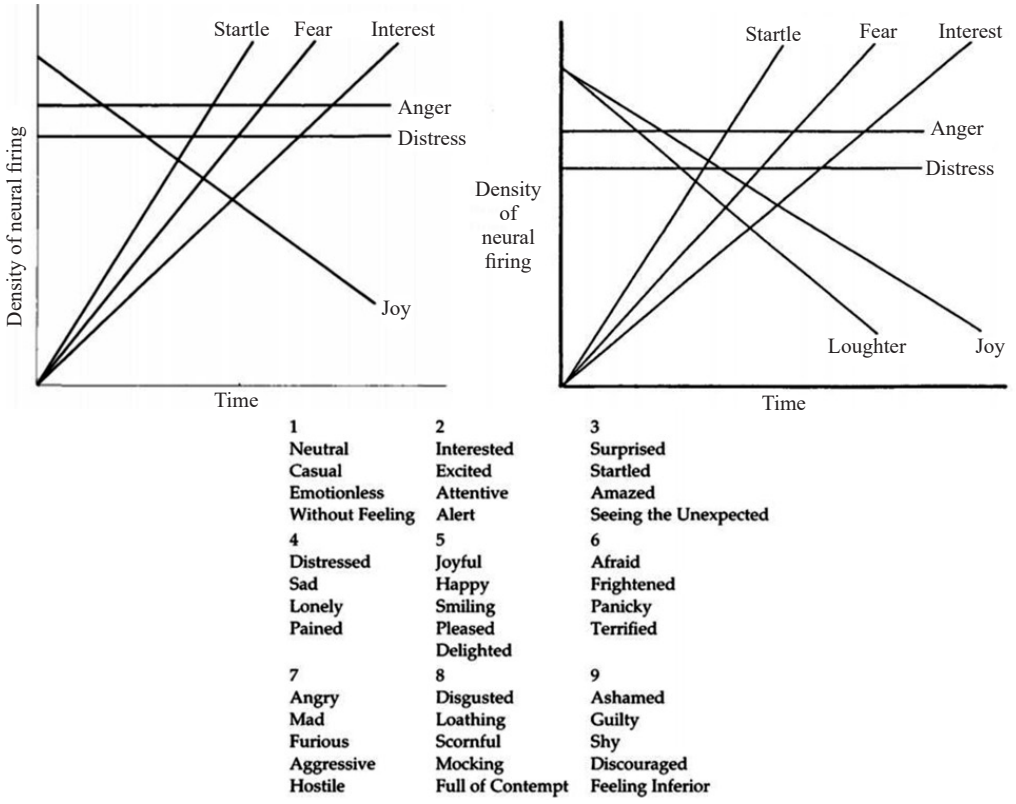

Figure 1. Tomkins model of primary emotions, from 1970 (up and left, Arnold 1970: 109) and from 1981 (up and right, Tomkins 1995: 46)

type of *emotional impact* is realized on the basis of the feedback loop and circuits in the neural cognitive-affective "co-assembly", and explains the strategies of the individual to sustain, enhance and prolong a family of related emotion-laden scenes (Tomkins 1995: 327).

According to this theoretical model, some positive and negative emotions are activated by increasing density (when "surprise", "fear" and "excitement" are elicited); only negative ones are activated by prolonged and sustained neuro-stimulation (in case of "anger" and "sadness"); when reducing the density it releases the "relief" or "joy" emotional response. The other two primary emotions, "disgust" and "shame", Tomkins sees as auxiliaries. With respect to the category of "contempt", there may also be contradictory theoretical meanings. Along with the three levels of neural activation aforementioned, Tomkins also points to the potential for indefinite association with external stimuli and internal habituation with various effects. These effects are an important basis for the development of individualized emotional experience. Tomkins made these theoretical attributions in the context of the historical development of several concurrent empirical models of emotions. For example, one of the earliest attempts to create a three-dimensional model of emotional responses is Harold Schlosberg's (Figure 2), preceding that of Tomkins by a decade. The author recreates the emotional response in three dimensions: "Tension-Sleep"; "Pleasantness-Unpleasantness" dimension (P-U); "Attention-Rejection" dimension (A-R) (Schlosberg 1954).

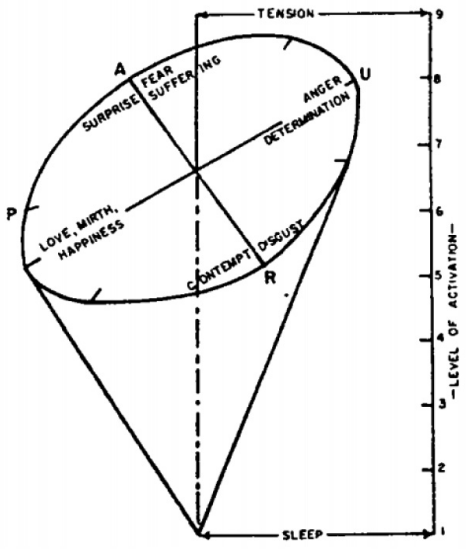

Figure 2. Harold Schlosberg's three-dimensional model (Schlosberg 1954)

Another attempt to synthesize these two strands is made by Robert Plutchik and collaborators. They try to psychologize the concepts of emotions and for that purpose combine physiological-dimensional and expressive-categorical approaches to emotions (Plutchik 1962; Arnold 1970). The summarizing model is presented in Figure 3.

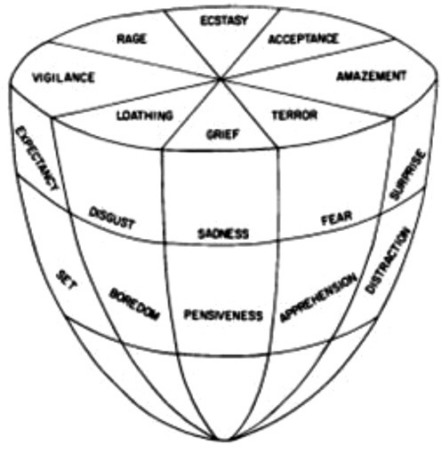

Figure 3. Robert Plutchik three-dimensional model (Arnold 1970: 10)

Through the model proposed by Plutchik and associates, which quickly gained popularity in the 1980s and 1990s, they attempt to summarize the idea of an increasing *degree of intensity* of individual emotions, the degree of *meaning similarity* and *valence polarization*. They adhere to the concept of three-dimensional representation of each of the emotions' subdivisions as the leading principle of introspective use of the language of emotions. Secondly and thirdly assumption, their prototypical, adaptive behavioral and (instinctive) functional meaning that reflects the "survival value" rewards or penalizes the "deviations" from the adaptive atti-

tude towards genetically determined instincts and motives. However, this way to model the emotions displays the fuzziness of the categories, the mixing of simple emotions, complex feelings and relationships, traits of character and cognitive processes, because the theory starts with the natural "subjective" language, least reliable, in their opinion, and applicable only to people, goes to a more general, behavioral one that can describe the conditions of animals and humans, and ends with the artificial "functional" language that is pretend to expose universals to all living beings. According to Plutchik emotion is a pattern of bodily response or a combination of patterns of "functional" type of a response caused by the different stimulus.

Study and Design

The aim of the present study is to introduce and to check some contradiction in the original theoretical corpus of concepts. The presumption is that his speculative attributions will be relatively confirmable in regard to an extended model of simple emotions' and their derivates that have been artificially developed by him and differences in cultural appraisals contributes unintendedly and inevitably. It is assumed that the constructive validity of the model of Silvan Tomkins will be confirmed partially, although the determined levels of "density" of "families" of simple emotions will be taken as intended. The second assumption is that the categories of simple emotions that are defined as belonging to "families" will be largely authenticated.

We will *test the hypothesis* that suggested attributes of the synthetic model will demonstrate some empirical potential and validate some variations in implicit concepts in Silvan Tomkins theory of emotions and that is an effect of special kind of research bias that depends on the design of the experiment.

Subjects of the study are 378 recorded participants' assets out of total 411. Some of the results were ignored because they were not confirmed by clicking the button at the end of the trial, which is an important consideration any individual report to be accepted in statistical processing. When testing the proposed simulation model, the empirical rule in statistics is satisfied for each item to have at least 6 observations per variable (at least 270 valid registrations). Responses to the test tasks were collected by random sampling, ranging in age from 5 to 85, balanced gender properties, with medium socio-economic status and no basic intellectual disorder. Gender and age are not included in the analysis. The accumulated registrations in the database are considered only as ongoing to escape the false-positive interpretations. The experiment is defined only in terms of pilot approbation and it is not meant to pursue any statistical standardization or any further inferences about the specific differences. Such conditions should be admitted in any future replication experiment.

The analyzes were scrutinized with data encoded by a nominal (binary coding, where "1" corresponds to a "click" on a variable label, "0" for lacking one) and a scale type matrix for statistical processing (each variable is coded with calculated "density" of "families" in the interval above-mentioned). Exemplary of take-and-go matrices can be viewed on internet addresses below for review or alternative statistical proceedings.

A *binary* (dichotomous, most frequently happened) coded data consisting of the reactions (selection) of the experiment participants at the internet address:

1. http://testrain.info/spss.php (including "families" and "scripts" variables)
2. http://testrain.info/spssall1.php (including "discrete categories" and "scripts" variables)

An *interval* (calculated "density advantage") coded data are available at:

1. http://testrain.info/spssm.php (including "families" and "scripts" variables)
3. http://testrain.info/spssall2.php (including "discrete categories" and "scripts" variables)

Experimental Setting

In order to confirm or deny the current hypothesis, a brand new *instrument for psychological measurement* was designed. The system of references to emotion categories was built-up. A short figurative vocabulary of emotions

was created according to models, designed by Finnish scientists and Klaus Scherer's Geneva wheel of emotions as examples of complex circumplexes (Toivonen et al. 2012; Scherer 2005, Scherer et al. 2010).

The figurative presentation at Figure 4 and 5 of the modified models, namely between different categorical and dimensional models, presents the similarities between synonyms of emotions, indicating different dimensions that can be grouped with respect to neurofiring and primary response ("high-low activation", "approach-withdrawal primary reaction" and "positive-negative valence"). These three basic dimensions emerged because they most accurately reflect established trends in investigating emotional behavior, similar to previous three-dimensional models created by 20th-century researchers.

The figurative vocabulary (Figure 4 and 5) embodied schematically the perceived meaning of nuances and the relationships between the various words of emotions and feelings (Gombrich, 1960), not only among the primary emotions, but in a sufficiently illustrative way utilizes the empirically verifiable idea for graduation in the levels of intensity within the linguistic nests of emotions.

For the purpose of the virtual experiment (Ferdinand and Bardov 2017: 337-343), ninety nouns were selected based on the similarities in two European languages (Bulgarian and English) that express the increasing power of 10 "families" of simple emotions arising from primary affects and the accepted as an equivalent of Likert scale. For this enterprise, the comparative avenue to two European languages seems to solve an old

Figure 4. Experimental simulation scale of ten "families" of emotions in Bulgarian

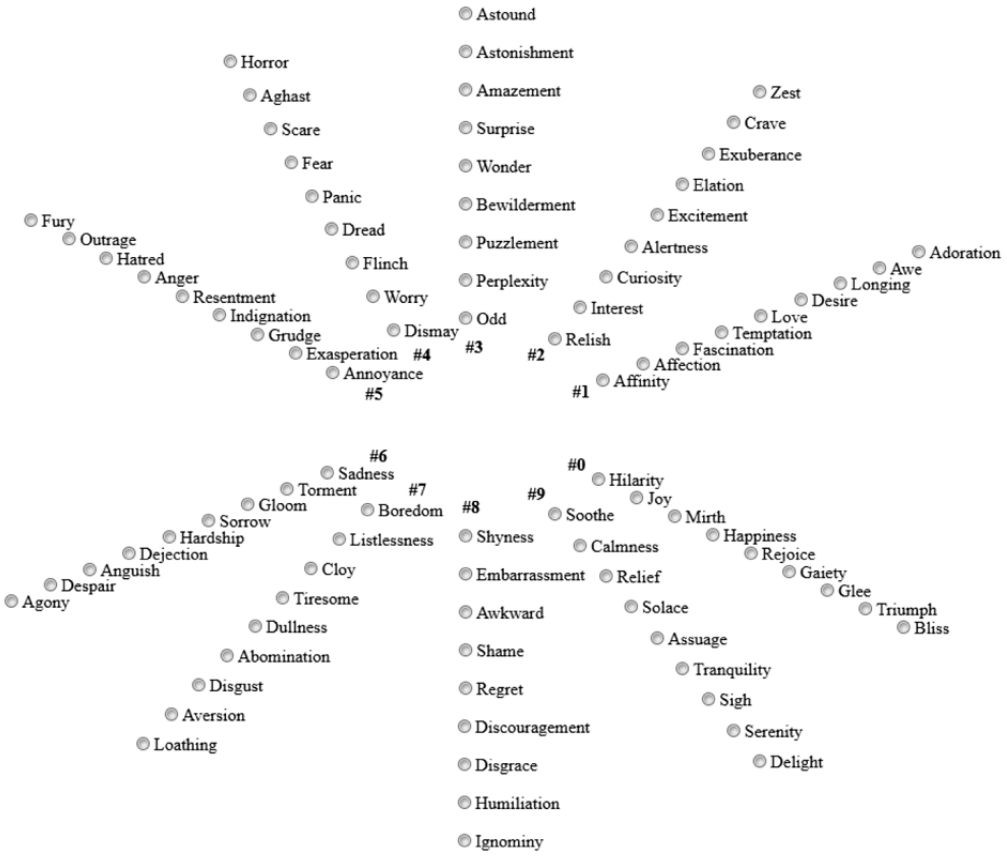

Figure 5. Experimental simulation scale of ten "families" of emotions in English

semantic problem which words would be more efficient to be adopted when subjecting emotions – adjectives or nouns. The cultivation of simple experiences within each group of categories, synonyms network of simple emotions plays a significant role in determining the degree of "density" according to the strength and intensity of an expression within every "family". Each "family" groups the labels into three levels – "light", "medium" and "strong" emotions. The selection of emotional recalls takes place according to the preference of the participants who receive the following test instruction: "*Select at least 2 the most commonly experienced emotions (for the last month, for example)*."

The other aspect of "emotional density," the "frequency" of feelings based on the emotional recall, is set as a task and selection criteria for the participant in the experiment – to indicate the most common conditions, for example covering the last month. The rate of persistent "repetition" for every emotion selected by participants is an important filter that sifters less frequently recall than most commonly experienced feelings. Potential references are used to simulate the "density" of selected states.

In the present study, the following formula is used to adjust the "density" indicator based on the memory excerpts, how long the selected state is, whether the condition is "mild", "moderate" or "strong" and what is the place in the overall picture of families occupies, according to the attribute for the simulated degree of total neurostimulation, given the

model of Tomkins. The "duration" property of feelings is determined by a self-rating scale with gradations of 1 to 10, regarding the time of recovering from the selected emotional states. Figure 6 illustrates the type of data collected for the examination of this parameter:

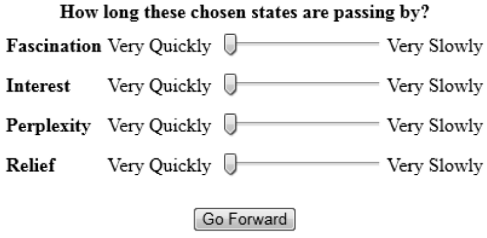

Figure 6. A self-estimated scale example of chosen emotions "durability" references

Two original heuristic formulas proposed by Tomkins about calculating "density" (Arnold 1970: 108) and "amplification" (Tomkins 1963; Tomkins 2008: 525-526) are adapted to simulate in the computer algorithm on one side the idea to account by merging generic *multiplication* between the "duration" values of a given selected state and its simulated "intensity" and on the other formula for *amplification* of emotional state and transformation into specific life experience.

The adopted "amplification" formula is $k(x) + i = h$, which is linear equation, where ***"x"*** is an experience of emotion; ***"k"*** is an operator which can transform ***"x"*** into a quantity of feeling of this emotion; ***"i"*** is a constant quantity of selected emotion and ***"h"*** is amplified feelings of such emotion experienced. The equation variables are explained in terms of the current model according to the following logic:

The "duration" self-estimated scores are represented by ***"x"*** in the equation above. "Alleviation" (#9), "Repugnance" (#7), "Coyness" (#8) families are defined as "*weak*" level of recalls. "*Moderate*" level covers the "Amusement" (#0), "Sympathy" (#1), "Rancor" (#5) and "Grief" (#6) families. The simulated condition of "*high*" neuro-stimulation is placed for "Enthusiasm" (#2), "Naïvity" (#3), and "Terror" (#4). If the level of selected emotions is defined as "*weak*", the value of the "duration" estimates in the model are corrected by multiplying "duration" scores by "*0.4*"; by "*0.6*", if it is "moderate", or by "0.8", if it is signified as "*high*" level. These coefficients are represented as ***"k"*** in the amplification equation.

Every "family" is divided into three groups consisting "light", "average" or "strong" states. Then the algorithm adds 0, 1 or 2 to ***"k(x)"***, which represents ***"i"*** in equation, when selected state belongs to first three "light" states in every "ray", second group is defined as "average" or the third group which is the "strong" one in the family. The minimum value of simulated "density" that can be obtained with this correction formula is 0.4 and a maximum is 10 (Fig. 7).

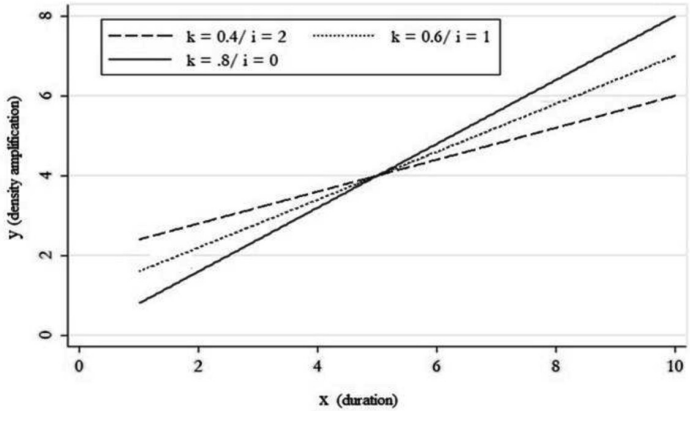

Figure 7. An exemplary graphic of "amplification density" depends on the variance of ***"k"*** and ***"i"*** values

The corrected values for simulated amplified emotional "density" of the "families" will be operated in the subsequent interval coding of the data in order to compare the results of the statistical analysis with two types of database presentation.

Results and discussion

Families of emotions are analyzed in terms of their degree of self-affirmation, i.e. how these emotional units occur in the experiences of the tested persons. An appropriate statistical approach, in this case, is the Item Response Theory (Baker 2001) which will operationalize the analysis in terms of the difficulty parameter of "family" emotions that are treated as a mandatory presumption for the correct application of IRT, where the unity of the items are analyzed. Verification of the main component method reveals a relatively clear one-dimensional structure that outlines the latent dimension of the affinity to each of them.

A Rasch model was chosen, suited for the binary scaling of family responses to emotions and the simplicity of interpretation (Bond at al. 2007). In this model, the differences between the different families of emotions will be indicated only by the parameter "difficulty", which is to be understood as the level of the *latent characteristic*, whereby the probability of acceptance of the respective line is 0.5. The rank of difficulty is from -∞ to + ∞. The zero point on this continuum can be considered as the population average in a normal distribution. Negative values are an indicator of 'easy' commands that demonstrate lower than mean values for the latent characteristic, whereas positive values are associated with a high latency requirement (Table 1).

A further test of constructive or also known as *theoretical validity* has been carried out to check the Pygmalion effect (self-validating) of the test trial, namely that each "family" belongs to a certain level of density as indicated in the synthetic model of "families" of emotions, and false-positive psychology to be excluded. The synthetic model is a summary of earlier emotional patterns but mostly based on the prototype, categorical approach created by Silvan Tomkins. A method of matching is used to compare data from descriptive statistical analysis that will reflect the differences between simulated "family" distributional model based on 3 levels of "density" and the results of statistical analyzes of scale coded data from a statistical matrix containing 10 variables, as well as values for those variables obtained before (raw "density" points) and after the correction (corrected "density" score).

Table 1
Range of emotions "families" scores according to Rasch-model

"Families" of emotions	Degree of difficulty (easy to difficult points)	Std. error
"Sympathy"	-0,598	0,126
"Enthusiasm"	-0,475	0,125
"Amusement"	-0,348	0,125
"Rancor"	-0,292	0,125
"Repugnance"	0	0,124
"Alleviation"	0,197	0,125
"Terror"	0,254	0,126
"Naïvity"	0,268	0,126
"Coyness"	0,471	0,127
"Grief"	0,561	0, 128

The indicators before calculating the "density" reflect the choice of 1 to 10 for the "duration" of the emotion recalls selected by the participants in the experiment. The indicators, after calculating the "density", reflect the corrected values of the "duration" to the predicted difference in intensity of each of the 90 labels grouped figuratively in 10 families of emotions ranging from 0.4 to 10 as "families" who are not selected at all, are coded at 0. This is done to verify the Silvan Tomkins' concept setting by mathematical simulation, whether there are differences in the power of influence between individual "families" of simple emotions, and the degree of strength within each of the groups of emotions and the way they convert to one another.

To check for such differences in "density", their means values, standard deviation and variance will be used and a comparison between the two types of data encoding will be calculated according to the "duration" selected raw scores and the calculated "density" points. When comparing the values, the differences between the two theoretical models will be reflected according to the Silvan Tomkins' two-dimensional model containing 7 emotions and the proposed synthetic model consisting of 10 "families" of emotions as well as the differences between two models and the statistical results. Three of "families" mentioned in the artificial synthetic model is not attended in Tomkins' original model. This is done in view of the overall purpose of the study – to check whether the "families" of emotions adopted as independent variables have the structure as stated in the original source. One of the research tasks is to verify whether the original model, from which the extended synthetic model is derived in a phenomenological and comparative-linguistic way, is self-evident and self-validating (Table 2).

It was stated that one of the affective groups in Tomkins model, that of the "Excitement", would be divided into two artificial "families" that of "Sympathy" and "Enthusiasm". Two more "families" will be used that are not mentioned in the original model; "Repugnance" and "Coyness", and the connotations will be expanded within the synonymous "family" of categories, i.e. its perceptual property in order to present the increasing intensity of emotions in four of the "families". When comparing the output models and the results obtained (N in the tables denotes the number of confirmed registrations), according to the values of the standard deviation and the variations, small but significant differences were found. The boundaries between the levels in the tables shown below are indicated by a line and reflect an increase of the indicators in the families according to the simulated "density":

From the data shown in Table 3, which contains descriptive statistics with standard deviation and variance indicators, three significantly distinct levels are established which can be reproduced in a new comparative table.

Different conclusions can be drawn from the established statistical differences. A first summary that can be made is that the simulated values for "density" and the obtained distances between the variation and standard deviation values do not fully match the two models proposed, but there is still a significant overlap between results and predetermined

Table 2

Hypothetic arrangement of emotions relating their "density" level

Degree of "density"	Silvan Tomkins' model of prototypical affects	Synthetic model of emotions "families"
High	Surprise, Fear, Excitement	"Enthusiasm", "Naïvity", "Terror"
Moderate	Anger, Anguish	"Rancor", "Grief", "Sympathy", "Amusement"
Weak	Joy	"Repugnance", "Coyness", "Alleviation"

Table 3
Results from descriptive statistic analysis with applied correction formula

	Mean	Std. Error	Std. Deviation	Variance
F2 “Enthusiasm”	3,638	,1647	3,2012	10,248
F1 “Sympathy”	3,450	,1461	2,8404	8,068
F4 “Terror”	2,595	,1538	2,9903	8,942
F0 “Amusement”	2,405	,1191	2,3154	5,361
F3 “Naïvity”	2,341	,1420	2,7605	7,621
F5 “Rancor”	2,328	,1173	2,2809	5,202
F6 “Grief”	1,987	,1304	2,5351	6,427
F9 “Alleviation”	1,619	,0965	1,8762	3,520
F7 “Repugnance”	1,698	,0941	1,8293	3,346
F8 “Coyness”	1,384	,0882	1,7154	2,943

Table 4
Distribution of affects and families according to the descriptive analysis results

Degree of “density	New distribution in Silvan Tomkins’ model of prototypical affects	Synthetic model of emotions “families”
High	Excitement	“Enthusiasm”, “Sympathy”
Moderate	Surprise, Fear, Anger, Anguish, Joy	“Terror”, „“Amusement”, “Naïvity”, “Rancor”, “Grief”
Weak		“Repugnance”, “Coyness”, “Alleviation”

patterns. Approximately 85% the original model of Tomkins and approximately 90% estimated match is confirmed with respect to the proposed extended synthetic model. Deviations are noted in two affective groups (“families”):

- ✓ The family of “Sympathy” tends to be more convenient towards families with high simulated “densities” rather than predetermined “moderate” level.
- ✓ Sentient group of “Joy” in Silvan Tomkins model deviates from the preliminary experimental expectations and its values coincide with those of simulated “moderate” level of “density”.

Another direction of interpretation based on the differences between results and patterns could be taken. Some “families” are artificially separated to provide indirect evidence and to check their self-evidency. Tomkins’ assumption that the “families” of “Enthusiasm” and the “Sympathy” categories may form a common group, perhaps there are some grounds in the current results. In order to definitively determine this interconnection, not only in the sense but also in the simulated “density”, additional correlation and exploratory factor analysis will be performed, as well as hierarchical cluster analysis of collected data. One can account for the level of confirmation in favor of the synthetic model, which is composed of different levels of simulated “density” of emotions “families”.

The distance between means, variance, and standard deviation indicators suggests that the “families” “Alleviation”, “Repugnance” and “Coyness” probably refer to a level of “density,” which indirectly complements Silvan Tomkins’s generalized linear logistic model. The identified differences between models

and results may also be due to a research bias too. In order to study the impact of the formula for calculating the "density" parameter of the emotions recall, additional descriptive statistics containing the same standard deviation and dispersion indices are produced as outlined in Table 4. On the other hand, Table 5 shows lack of contrasts in the increase of values and the whole set of indicators when measures of standard deviation and variance are listed, according to the simulated "duration" of the selected emotions.

When comparing variations and standard deviations between "families", significant distances are neither found between the mean values, nor there any significant differences and variances between the predefined models and the results obtained. From this, it can be inferred that the correction formula set in the model can be considered as a reliable algorithm in simulating differences in "densities", as well as the theoretical framework from which they are perceived (Tomkins model) or the (synthetic model) variables.

A further comparison between the data obtained from the two types of statistical analysis could add to the general idea of how empirical data form a new picture of the spatial relationships between the variable "families" in the experimental model (Figure 8).

Table 5
Results from descriptive statistic analysis with raw scores of "duration"

	Mean	Std. Error	Std. Deviation	Variance
F1 "Sympathy"	3,783	,1761	3,4234	11,719
F2 "Enthusiasm"	3,508	,1740	3,3821	11,439
F0 „Amusement"	3,413	,1752	3,4068	11,606
F5 "Rancor"	3,304	,1730	3,3631	11,310
F7 "Repugnance"	3,037	,1722	3,3487	11,213
F9 "Alleviation"	2,844	,1711	3,3265	11,066
F3 "Naïvity"	2,807	,1760	3,4221	11,711
F4 "Terror"	2,778	,1730	3,3628	11,309
F8 "Coyness"	2,712	,1750	3,4029	11,580
F6 "Grief"	2,548	,1664	3,2351	10,466

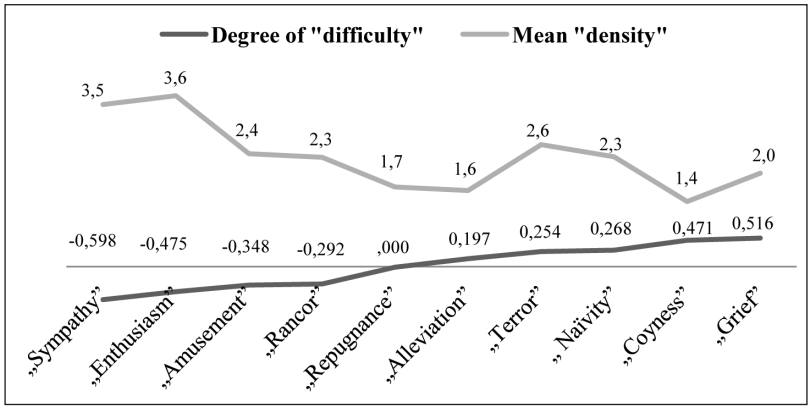

Figure 8. Comparison between mean "density" scores and Rasch model

An abstract one-dimensional model consisting of two parallels – the latent variable performs a level of the measured means value of the simulated "density" of each "family" as a mathematical function of the stated "duration" in subjective self-assessment and the reference level as a function of the self-esteemed "frequency" of chosen categories of simple emotions from any of "families". When measuring the degree of correlation between mean "density" scores and Rasch-modeling "preference" (*flooring/ceiling* effects) indicators, a very strong and significant correlation linkage has been found ($r = -.742$, $p = ,014$). It can be assumed that when increasing the "preference" to given "family", it is likely that "density" will also increase. Some discrepancies between models and results may at least due to a successfully applied formula that simulates corrections in the indicators of individual emotions, but it can also a result of influence due to the interpretation of the results obtained by summing up the descriptive statistical results. This provides a prerequisite for correcting the model only in the presence of other additional established statistical processing of the data obtained with the experiment.

Conclusions

All the results demonstrated in the take-up analysis could be a representation of the significant distortion in the experimental design or of the fuzziness of theoretical models estimated. First of all these biases depends on the validity of the participants' choices which are predetermined by the three levels of interdependence between discrete categories organized artificially into "families". Secondly, all of the ninth words for emotions used in the synthetic model are biased by the commonality of "frequency" in the participants' life experience and the recollections made by them in the outlined sense of cultural preferences. Another research bias is due to the subsequent transformation into simulated "density" of the recalled emotions, depending on the estimate of the simulated duration and intensity of the emotion as a source of confirmed intermodal difference (Pribram 1970: 45) and belonging to the same "family" of emotions.

However, according to the aggregated and relevant sampling "frequency" of the selected "families" of simple emotion categories, "density" was successfully transformed through the simulation formula of "amplification" into a "strong", "moderate" or "weak" degrees and obvious thresholds between them were demonstrated. This artificially generated behavior of the variables can be interpreted as a consequence of the flexibility of choices implied in the experimental design. In the process of personal choice, the participant is allowed to combine categories of emotions from different "families" and there is a subjective freedom provided to the participants to make a self-evaluation of "durability" of the selected states.

Another statistical evaluation is made from the difficulty metrics measured by the Rasch model that has been applied to the units of analysis. It can be concluded that some emotions are *more expressive* (easier to select, therefore a reason for agitation), while others are *more inhibited* (more difficult to select, therefore asthenic). It is also important to note that only some of the easier ones (taken by more people) overlap with the emotional "families" associated with increased activation or simulated density of families of "Sympathy" and "Enthusiasm", while the "Terror" and the "Naïvity" domains show that they are more difficult (fewer people to accept) and although they show a "moderate" simulated density. An analogous mismatch occurs in some "families" that are close to the average population boundary of zero difficulties. "Repugnance" and "Alleviation" "families" are estimated with a "low" simulated density but take the "middle" position with respect to other denser "families". The "family" of "Grief" shows the "highest" difficulty values, although an "average" level of simulated density has been found. This gives a clear example of some inconsistencies between the Item Response Theory and the Classical Psychometric Theory. A strong reverse-proportional interconnection between the level of family simulated "density" measured by classical frequency analysis and the degree of prefer-

ence to experimental variables with the Rasch model was established.

Future analysis with Rasch modeling combined with frequency distribution analysis between all discrete categories used in the aggregation of artificial "family" labels could help to decrease the number of categories in the synthetic vocabulary and reduce to 4 or 5 etiquette labels in every "family" measuring their "density amplification" and "attractiveness" potential. This could help to create a new short and optimal synthetic model to minimize some negative consequences caused by the already applied formula for "density amplification".

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