

## ABSTRACT

In 1995, as a student of psychology inspired by natural science, I defined a logical model of personality explaining psychosis. I created (for my MA thesis, 1998 and grant research, 1999) new kind of tests assessing intelligence, creativity, prejudices, expectations to show more exact methods in psychology. During my Phd study in economics, I developed 'Maximization of Uniqueness (Originality)' model enhancing the classic utility to explain irrational motivations linking economics and psychology. Later I became computer programmer developing functional programming. According to Personality model (and my experience in [chess composition](#)), I've built server and client logic of information system [www.each.co.uk](http://www.each.co.uk), and produced visual art. I presented the excerpts of 'Personality Model' in a few articles, and later as part of my art exhibitions: [From Animation](#) (Oct 2013, Holland Park, London), [Parallax 12](#) (Feb 2015, Chelsea Town Hall, London), [Fading Memory](#) (Sep 2015, Weißenohe / Nuremberg, Germany). Another work: [The Science is a subset of the Art](#) extends Personality Model to art, society. At the end I add example and explanation of a special problem, when the higher intelligence leads to a wrong solution. It was published in Japanese Journal Problem Paradise in 1999. All presented results can be repeated. Computer testing would enable to acquire more data and more exact analysis.



## INTRODUCTION

**Reality** consists of **unique units**: If 'p' occurs with probability  $1/a$ , next 'p' has probability  $1/a^2$ . Identical units can't exist, not due to manufacture limit (Heisenberg's uncertainty) to produce identical things, but because they differ by probabilities (positions, creation times).

**Intellect** links unique units in given time to **logical series** of 'identical' change (add, rotate, sum, etc). The more linked units, the higher **intelligence**. The more different logic, the higher **flexibility**. The less likely logic, the higher **originality**.

**Personality** is sum of **logical series** linked by intellect in given environment, time. The intelligence is distributed in personalities' series (changing in time). The core series is **self-identity** of 'ME's in various times, spaces (I am same now, yesterday, last year, tomorrow. My hand, leg, head, eye is ME..).

**Psychosis** (schizophrenia, manic-depression) captures intellect in one series (**vicious circle** of self-refutations) absorbing all intelligence of all series(es) including self-identify. Intelligence is captured, not necessarily deteriorated as [E. Kraepelin \(1865-1926\)](#) thought. The form of vicious circle: p, p, p, p... defines psychosis. The content is secondary, which corresponds to [K. Jaspers' General Psychopathology \(1913\)](#). But Jaspers never defined the psychosis, his work is just description. As I'll show later: the higher intelligence, the lower chance of psychosis. And the more opportunities, the lower chance of psychosis. So Kraepelin was statistically right, but psychosis can occur with a high intelligence too. On the other hand, a popular belief - a high intelligence or genius increases the risk of psychosis (or mental disease), is untrue. It may be partially true, only due to long-term lack of opportunities, or (intentional) social exclusion.

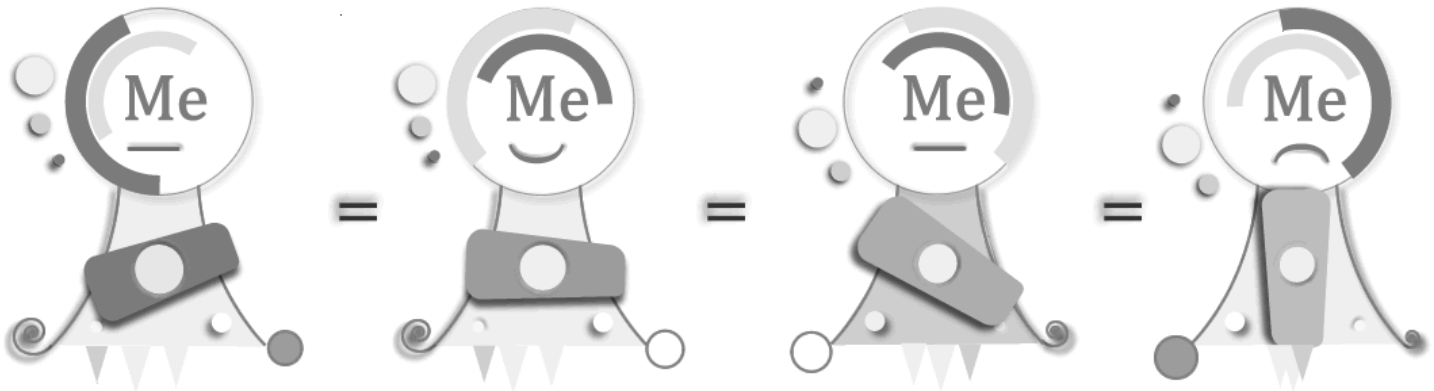
Analogy to Personality is computer with multiple processes (series(es)) occupying a memory and processor time (intelligence). The core process (BIOS) is a must for other processes. Psychosis is a process out of control (memory leak) occupying all memory, processor's time.

Intelligence is one. 'Social', 'emotional', 'xy' intelligence is illusion. E.g. **empathy** needs certain intelligence to understand others. It doesn't guarantee empathy (pro-social behaviour), but probability of empathy (and less **prejudices**) raises with the level of intelligence.

Personality's typology (e.g. extrovert-introvert) is illusion: attractive woman can be 'extrovert' having many opportunities to socialize because of her beauty, not her 'extrovercy'. Special conditions (lack or abundance) with certain intelligence, lead to certain behaviour. Change of conditions may change the behaviour, but not always: special period (imprinting) or e.g. intensive frustration may contribute to (more or less) permanent attributes (logical series) of self-identity.

Frustration (lack of opportunities) limits empathy regardless of intelligence captured by intricate justification of prejudices (very high intelligence uncovers the falsehood of such justification). Deficient intelligence or lasting frustration may evolve to: **neurosis** (unaware of prejudices: unconscious control), **psychopathy** (aware of prejudices: lying, pretending) or **psychosis** (ceaseless self-refutations). Personality **disorders** can overlap: neurosis can accompany psychopathy and vice-versa, and can disappear or reappear (only) in certain conditions enforcing disorders. E.g. **enforced psychopathy** occurs if a lie is necessary to survive. Everyone is sometimes neurotic (small obsessions), psychopathic (small lies).

Self identity:  $\sum_{i=1}^N a_i^2$

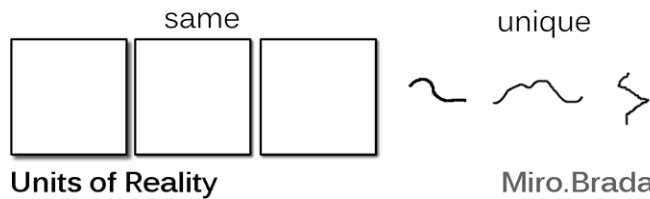


Personality Model

Miro.Brada.1996

**Questionnaire of Unbiased Judgement: Logic of Prejudices**

Prejudice (biased judgement) is a self-defence mechanism to preserve wishful self-image based on identification with permanent or changing attributes: sex, talent, minority, success, illness etc. Some attributes are same e.g. adults, dolphins, artists are mammals, have 2 eyes, 1 head etc, the other are unique: fingerprints, number of corpuscles etc.



Self-identity consists of various - same and unique units (attributes). The bias is in (a) favour or (b) against own identity's unit. E.g. (a) a minority person underrates majority, rich blame poor, etc, or (b) a minority person idealizes majority, poor blame poor etc. The higher intelligence and less frustration, the less biases. Questionnaire has 10 sentences with 6 answers: 1 right, 1 evasive ('it is too complex'), 2 underrating other identities, 2 overrating. Instruction is: "mark just ONE judgement that appears to you the most truthful." Here are 4 examples:

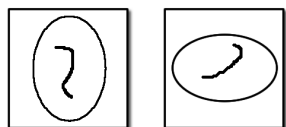
As for physical attractiveness people differ in a way that:

- a) more attractive people are also more intelligent
- b) they do not differ at all
- c) some are more, other less attractive
- d) everybody has an attractive feature
- e) they differ a lot
- f) it is hard to compare

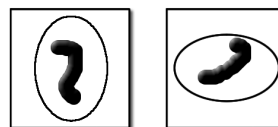
Assessment: c) some are prettier than others (0), d) and b) underrate beauty (-2, -4), e) and a) overrate (2, 4), f) avoids to judge (\*)

- c) Acceptance of difference (0)
- f) Overrating uniqueness (\*)

attractive unattractive

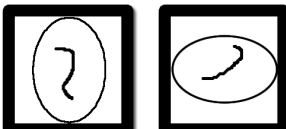


attractive unattractive



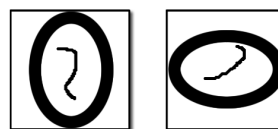
- e) Underrating difference (-2)

attractive unattractive



- d) Overrating difference (2)

attractive unattractive



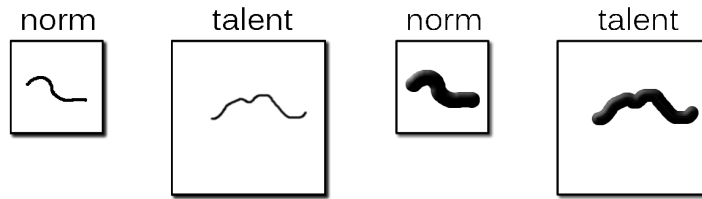
Being a mathematical genius:

- a) has a detrimental effect
- b) does not need to have any detrimental effect
- c) has positive influence on the whole personality
- d) is accompanied by mental disorders
- e) it is difficult to assess its influence on a human being
- f) leads to a better adaptability

Assessment: b) unbiased in all cases (=0), a) and d) underrate genius (-2,-4), f) and c) overrate (2, 4), e) evasion (\*).

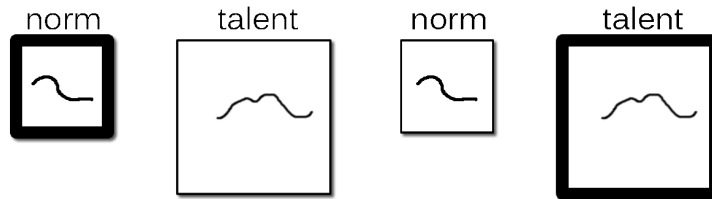
b) Acceptance of talent (0)

e) Overrating uniqueness (\*)



a) Underrating talent (-2)

f) Overrating talent (+2)



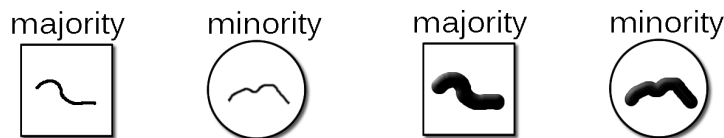
A minority living in a state:

- a) has its own specifics
- b) is more peculiar than majority
- c) is less adaptable than majority
- d) is more tolerant than majority
- e) is not comparable with majority
- f) is more provocative

Assessment: Minorities have own specifics (language), but a minority person does not need to be worse or better than a majority person.

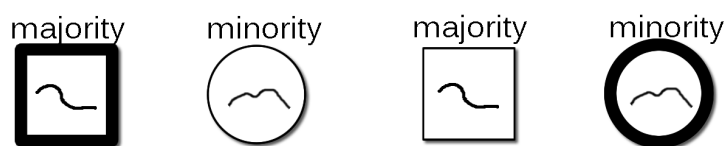
a) Acceptance of minority (0)

e) Overrating uniqueness (\*)



c) Underrating specifics (-2)

d) Overrating specifics (2)

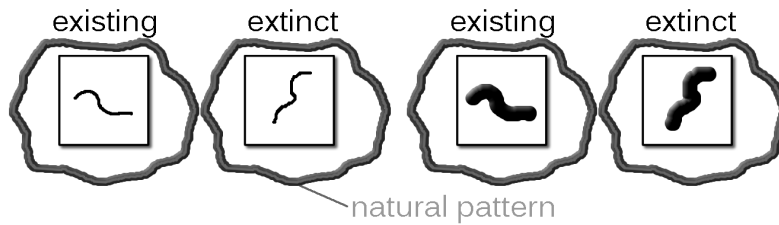


Extinct plants:

- a) were more important than today's plants
- b) were useless
- c) disappeared because of various causes
- d) had the same value as alive plants
- e) were not able to survive
- f) were much more useful than present plants

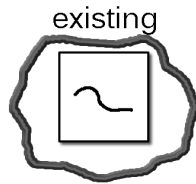
Assessment: Survival depends on environment, if it is different some existing plants would not survived and some extinct ones would

d) Accurate view (0)

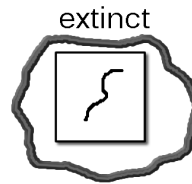


c) Overrating uniqueness (\*)

e) Underrating extinct (-2)



a) Overrating extinct(2)



### Overall assessment

Prejudices =  $\Sigma$  absolute values, Tolerance =  $\Sigma$  - / + values, Indifference =  $\Sigma$  evasions

Over 500 tested people were rather slightly hostile than tolerant, less biased toward external signs (sex, minority) than excellence (talent, beauty). Comparing with the results of intelligence tests, I confirmed intelligence statistically reduces prejudices. I found 4 symptoms: (1) unreal discernment (= too many prejudices), (2) submission (= high tolerance), (3) hostility (= low tolerance), and (4) indifference (= many evasions). E.g. people in psychotherapy were more biased and submissive. Or computer programmers were a bit more hostile (maybe because of their increasing importance). I found some other correlations, e.g. students of theology showed a similar pattern as people in psychotherapy, which could indicate a psychotherapeutic effect of religion. Or students from Yugoslavia having an experience with a war at that time, had above average variance, i.e.: some had too many prejudices with respect to their intelligence. It could be interpreted as a result of trauma from the war - lack of opportunities pushing intelligence to prejudices (with sophisticated justifications). During testing I also asked people to assess their own sociability by {-2, -1, 0, 1, 2} in comparison with others. Overall sociability (summing all values) should be 0, but it was 0.5: people tend to think they are above-average. It documents 'Are we all above average?' phenomenon: people overrate their sociability (or other qualities) for the sake of their self-image to look better. Not surprisingly, this overrating correlates with amount of prejudices and intelligence.

$$r(P) = \frac{\sum \text{biased answers}}{\sum \text{all answers}} \approx .5 \text{ (statistically expected ratio)}$$

$$r(P) = .5^{1+IQ \cdot \text{Environment}}$$

For  $IQ = \infty$ ,  $r(P) = 0$ ; for  $IQ = 0$ ,  $r(P) = .5$ .

### Bias of Classic IQ method

Intelligence identifies repeated signs: logic. Classic IQ tests exclude rarer logic, and tests of creativity assess associations without logic. Synthesis of both methods betters reliability. Graduate Record Examinations test (1994) has this task:

Choose one of the five options:

- a) geyser : water
- b) fault : tremor
- c) glacier : fissure
- d) avalanche : snow
- e) cavern : limestone

to expresses the same relation as the pair:

**volcano : lava**

The right answer is:

**a) geyser : water**

In fact, there are more correct answers...

E.g. e) cavern : limestone, could be solution, based on the formal analogy, when cavern has one v (as volcano), and limestone has one l (like lava)

**volcano : lava e) cavern : limestone**

High intelligence finds more options, leading to uncertainty, which one is right. GRE test as other IQ method, reflects intelligence, but its construction is biased. My research (1999) confirmed this BIAS of the classic IQ test. I asked 600 people to invent (not solve) analogies: life : death = laugh : cry for: fire : ..... = darkness : .....

There were 2 kinds of inventions:

a) analogy of the meaning:  
 fire : red = darkness : black  
 fire : water = darkens : light  
 fire : pleasure = darkness : melancholy

b) formal analogy  
 fire : fire = darkness : darkness  
 fire : darkness = darkness : fire  
 fire : fired = darkness : dark  
 fire : erif = darkness : ssenkrad

All invented an analogy with a meaning. Only 5% invented a formal analogy, and they achieved above average intelligence: people discovering original logic are on average more intelligent. The less frequent sign discovered, the higher intelligence: IQ methods excluding rare signs, can't reliably assess high intellect.

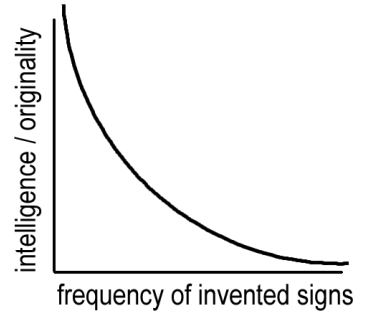
Another task was to invent categories. For 1. swam 2. chop 3. cut category 'past tense' links 'swam', 'cut' to exclude 'chop' category 'work with wood' links 'chop', 'cut', to exclude 'swam' etc...

Then I asked people to invent such categories (grouping just 2 words) for:

1. rifles 2. revolver 3. pebble chopper

Some answers were:

- a) gun (1+2, 3)
- b) singular (2+3, -1)
- c) letter r at the beginning (1+2, -3)
- d) letter o (2+3, -1)
- e) more than six letters (2+3, -1)
- f) one word (1+2, -3)
- g) metal, iron, steel (1+2, 3)
- h) modern era, prehistoric tools (1+2, 3)



### Expectation and cognition

Psychology, sociology, economics assume conventional logic (average intelligence) in their models. In economics, bounded rationality imposes cognitive limits, but doesn't differentiate between levels of intelligence. Also asymmetries focus on information, rather than differences in intelligence. Test of Expectations links intelligence and expectations (guess of other guess) to show unreliability of average intelligence assumption. I asked tested persons to fill four patterns with 0-16 circles in 2 ways:

Example

Task A

Nobody would do

Task B

Everybody would do

The best strategy of Task A, is the worst of Task B, and vice-versa. For Task A, the optimal strategy is to fill 8 circles randomly having the most different options. The random 8 filled circles, really occurred with the higher intelligence. The breaking rules' strategies: 'cheating' (e.g. adding something extra or semi-fill circle), or 'meaning' (e.g. drawing a face), also occurred with higher intelligence. But they are less optimal than 8 random circles. Although cheating can easily lead to a unique shape, 'incentive to cheat' is already less unique (9% cases of cheating).

Task A, 568 tested people

frequency / intelligence (scores from creation of logical series)

optimal strategy

example of 8 random circles

3.8% / 127

worst strategy

16 circles

3.7% / 99

Nothing

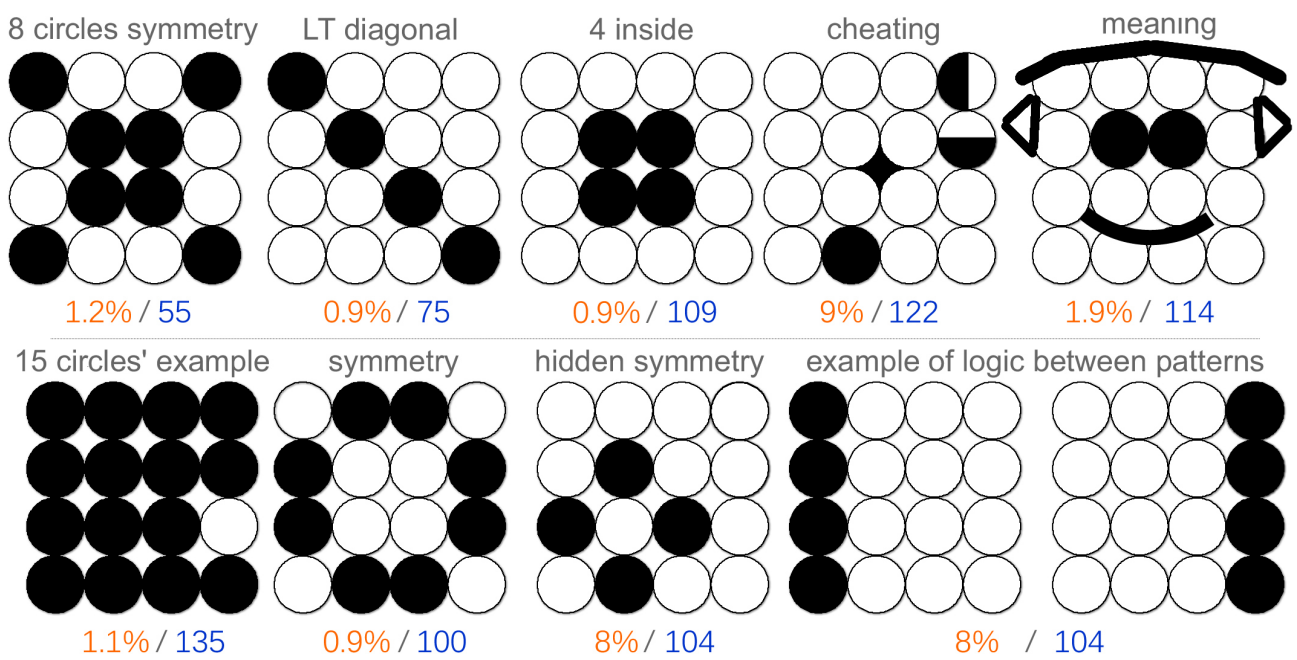
6.3% / 100

repeating into example

0.9% / 73

example of 1 circle

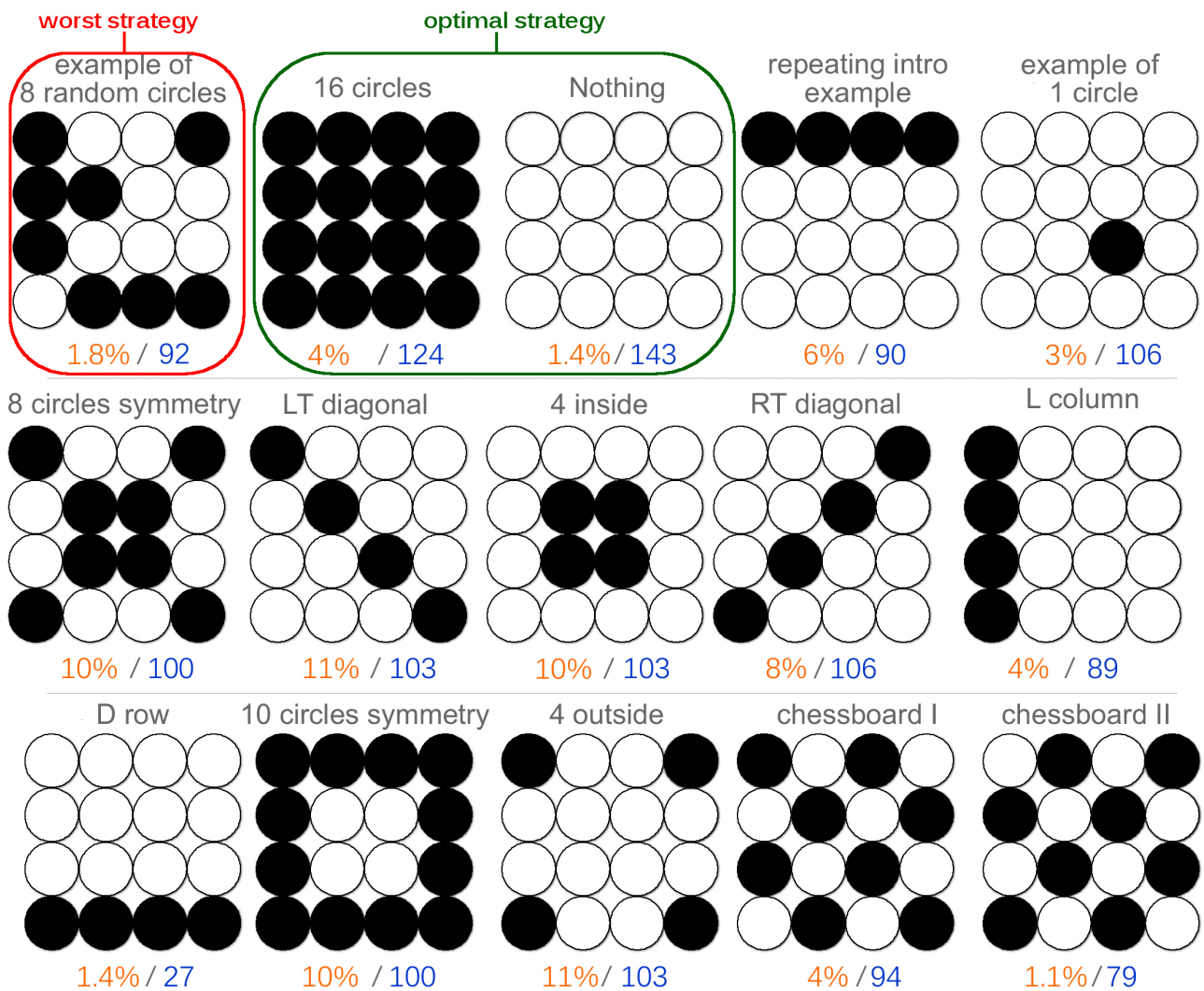
8.5% / 93



Task B, the most repeated patterns occur with the average intelligence, the optimal strategy (0 or 16 circles) correlate with higher intelligence, but was chosen by merely 4% or 2%. So average intelligence leads to better estimate than higher intelligence. On the other hand, the worst strategy (asymmetry) occur with low intelligence. So the most popular choices are not optimal but at least partially rational (aware that asymmetry is wrong leading to too many different outcomes).

Task B, 568 tested people

frequency / intelligence (scores from creation of logical series)



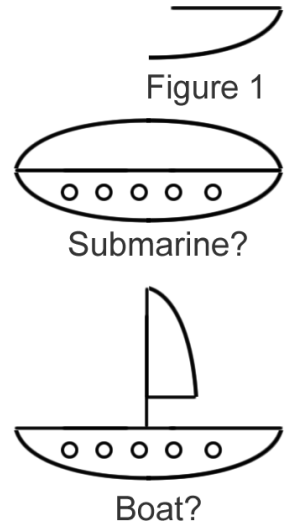
The higher intelligence, the more optimal objective choice, which paradoxically does not need to be 'right' - if its optimality exceeds average intelligence. Theoretically infinity intelligence adjusts to majority's guess... But it can't always recognize the majority's non-optimal choice, as there is no objective criterion. Non-optimal collective choices could shed some light on inefficiency in societies: crises, wars, as kind of 'collective neurosis' or 'collective psychopathy', outvoting optimal choices because of misunderstanding, or intention to exclude clever (as too efficient competitors). I found other correlations too. E.g. the higher intelligence, the more independence of intro example (and of using 4 circles patterns). Various instructions (guess how less / more smart would guess other's guess, etc..) could be used in testing too to differentiate the results.

Classic prisoner's dilemma is also 'guess other guess' task, requiring to guess what other would do, to make optimal decision. If both prisoners (A, B) betray each other they get 2 years, if both are silent they get 1 year. If A betrays and B is silent, A is free, B get 3 years (and vice-verse). The assumption is that game is finite (does not repeat), and no external punishment / reward is possible. The rational result is: they betray, even though the best outcome for both would be if both are silent. We can look at the problem from different intelligence level. If both are 'dumb', they may naively guess the other would be silent, so they would be silent too. That's why lower intelligence, not able to calculate 'optimal guess', may theoretically lead to more optimal solution, in some special cases.

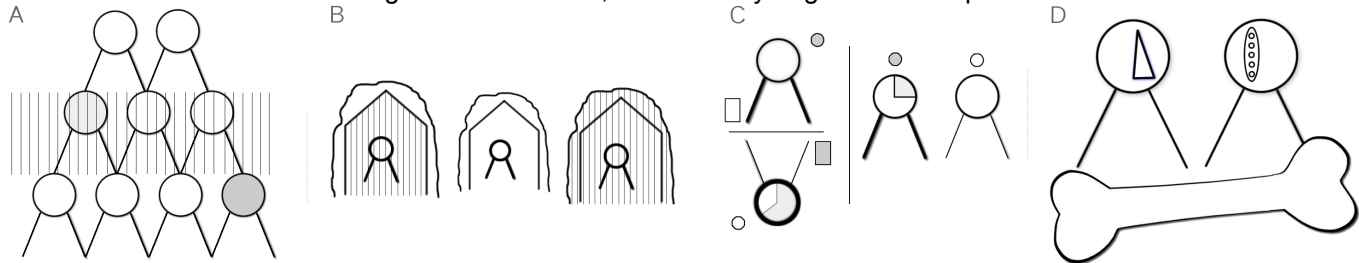
**Association Tests: classification problem**

Galton (1822-1911) used word-associations to assess mental qualities. Rorschach (1921) analyses responds to ink blots, to uncover hidden characteristics projected to the blots. Torrance (1957) asks to complete unfinished figures (what associate) to reveal originality, flexibility. Lie detection explores associations (respond time, physiological changes) related to a crime (e.g. bribery: day, amount, place) to reveal deception (= long respond time, sweating, ...). Galton though associations reflected intelligence. Rorschach's 'Oligophrenic detail' confirms it: children or mentally handicapped more often interpret ink-boat as a part of something (human, animal). The problem solving (IQ test) can be interpreted as 'controlled association' - a solution is actually a verified (if it is right) association - the first association (try) is usually not a solution, especially the harder task is.

Analysis of associations requires other criteria (accuracy, respond time) to have meaningful interpretation. Otherwise they have diverging interpretations. Torrance's figural test (1957) ask to finish Figure 1 as nobody would do:



Boat is one of the least original responses, while submarine is relatively original. Pictured submarine has the same hull of 5 circles. Is a submarine same, half same, or entirely different, as a boat? It shows a problem to classify associations, without logical context. Quantitative analyses of associations or variables (factor analysis, econometrics) create pseudo-knowledge or 'reveal' something trivial, evident already before. Qualitative methods using associations to confirm concepts, theories (e.g. psychoanalysis) create only one of many views, without warranty that the constructed view is right (or to what extent it is right). I made Test of Abstract pictures of ambiguous contexts, to reveal perception of society. I use category like: subjects, objects, cooperation, entropy, nature, mechanism, activity, abstraction etc, to explore their ratios (supposed to be 1). Significant deviations from the supposed ratios could indicate symptoms e.g. subjects / objects < 1 (= social deficit). I found some similarities when artists, programmers, theologians overused entropy (disagreement, explosion...), or chess composers overused cooperation (friendship, communication). There were some differences by gender: males' associated more technical objects, than women - that is however trivial. I faced the same problem with classification, and multiple interpretations impossible to overcome by quantity of collected data. The other criterion - sorting the associations, is necessary to get valid interpretations.



Excerpts from Test of Abstract Pictures

**Intelligence and intricacy: Thinking**

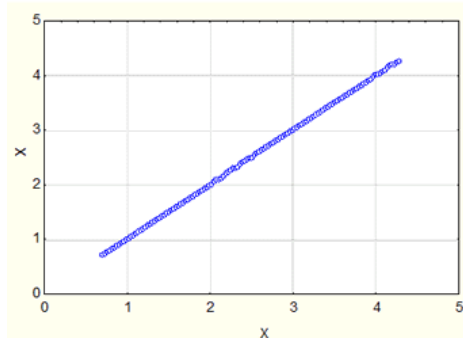
Intelligence links unique units of reality to logical series, e.g: 1, 2, 3... defined by the same change +1: 1, 2, 3, 4, or other justifications. Series 1, 2, 3, 4 can result from:

- a)  $y = x$ , returns 1, 2, 3, 4, 5
- b)  $y = x^4 - 10x^3 + 35x^2 - 49x + 24$ , returns 1, 2, 3, 4, 29
- c) other logic.

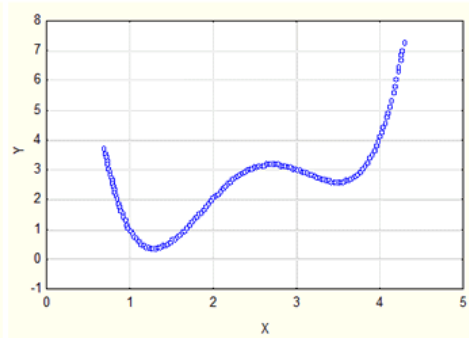
Different justifications can return, for some parameters, same results: 1, 2, 3, 4, but then the results diverge (5 versus 29). Classic IQ method based on 1 correct answer excludes rarer justifications.

**2 different justification of logical series: 1, 2, 3, 4**

Miro.Brada.1998



$y = x$   
justifies 1, 2, 3, 4, 5, etc

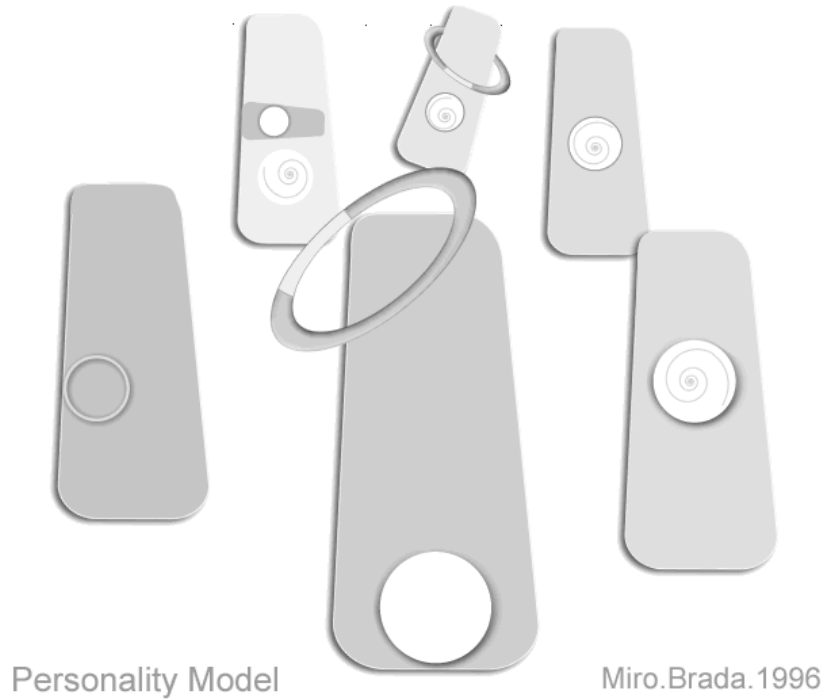


$y = x^4 - 10x^3 + 35x^2 - 49x + 24$   
justifies 1, 2, 3, 4, 29, etc

The identity doesn't exist: 'p' differs from next 'p' by its position, time:  $p \neq p$  (Heraclitus Panta rhei 525-475 BCE). If  $1/a$  is probability of occurrence of 'p', probability of next 'p' is  $1/a^2$ . Like likelihood to throw 6 with dice is  $1/6$ , to throw 6 again is  $1/36$ . Intelligence linking 'identical' changes to logical series, can be defined by probability: the lower probability of logical series per unit of time in given environment, the higher intelligence. The intelligence is inverted probability of logical series having discrete intricacies (combined logics): 1, 2, 3, ...

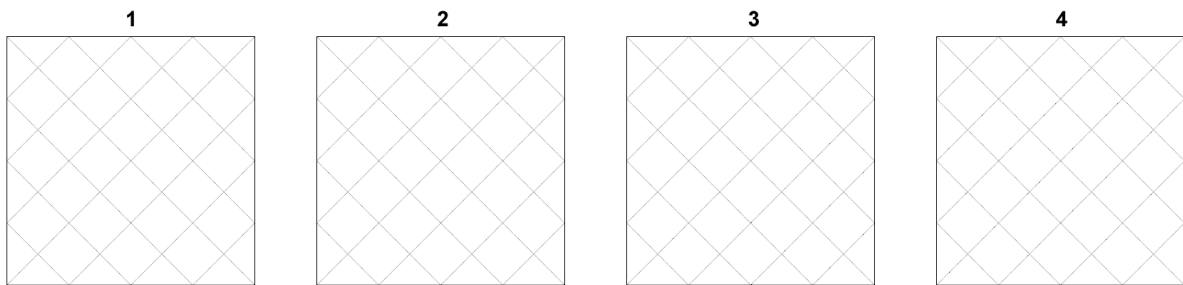
'Intricacy 1' has 1 logic e.g. adding, 'intricacy 2' combines 2 logics e.g. adding & rotating & sum, etc. The intelligence (as inverted probability) of series with 'intricacy 1' = 1, 'intricacy 2' = 2 \* 2, 'intricacy 3' = 3 \* 3, etc. So intelligence of every series = intricacy <sup>2</sup>, and thinking is a sum of every intricacy <sup>2</sup> of all series per unit of time. At glance thinking look as a linear process. In fact all elements building a logic, are linked exponentially - through multiplication of their probabilities. In general, assumptions of linearity - e.g. economic growth or political ideologies, don't capture the underlying dynamics (multiplication of probabilities), which may result to unexpected outcomes (e.g. collapse of Roman Empire, Soviet Union...).

Thinking:  $a_1^2 + a_2^2 + a_3^2 + a_4^2 + a_n^2$

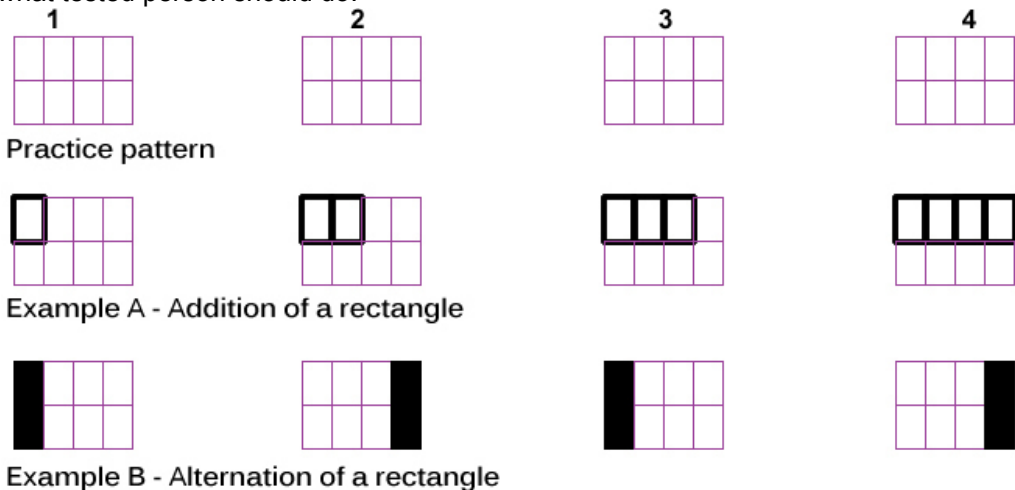


**Test of Intelligence and Creativity (TIC)**

In 1996 I developed TIC to asses intelligence, flexibility, originality from drawn logical series on printed patterns, which was a synthesis of [Torrance Test of Creativity](#) (1984) and IQ tests like [Amthauer](#) (1953), [Raven](#) (1936), [Wechsler](#) (1955). TIC and theory of intelligence was my Master thesis in 1998 highly appreciated by [O. Kondáš](#) - expert in clinic psychology. TIC consists of 4 different patterns, and every pattern repeated 4 times in one row. Every row of the same pattern repeats 4 times, so there are 16 rows, where tested persons can create logical series. Instruction is 'draw a logical series on 4 printed patterns':

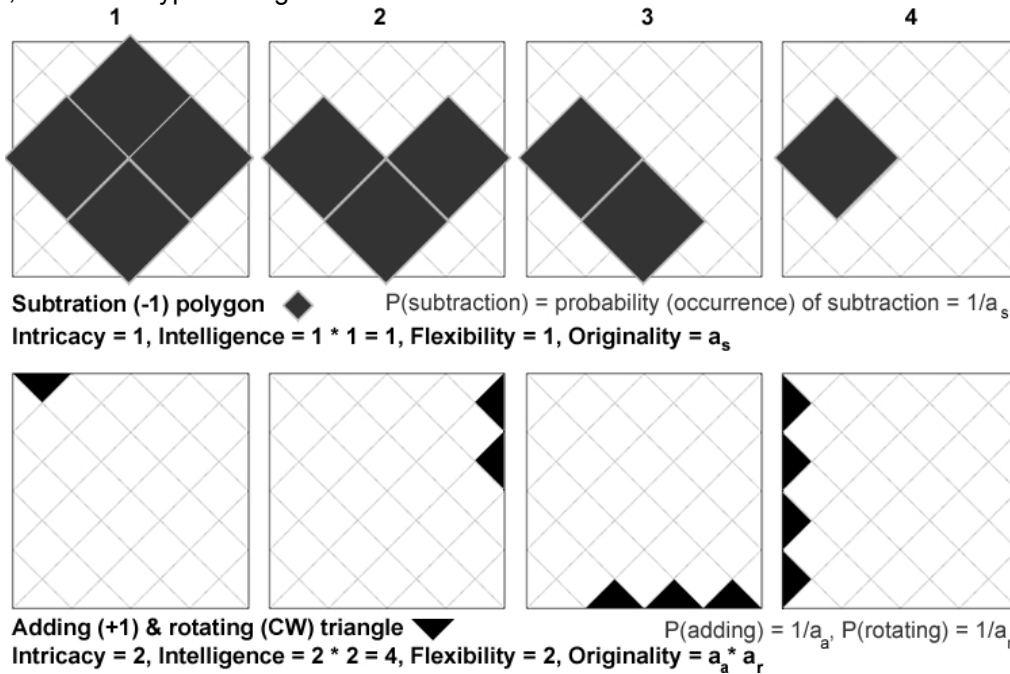


To find solution (classic IQ test) is much easier than creating logic. It requires certain intelligence, and so some created nothing (it does not mean 0 IQ). Before starting the test, I showed 2 examples: adding and alternation, with practice pattern, to explain what tested person should do.

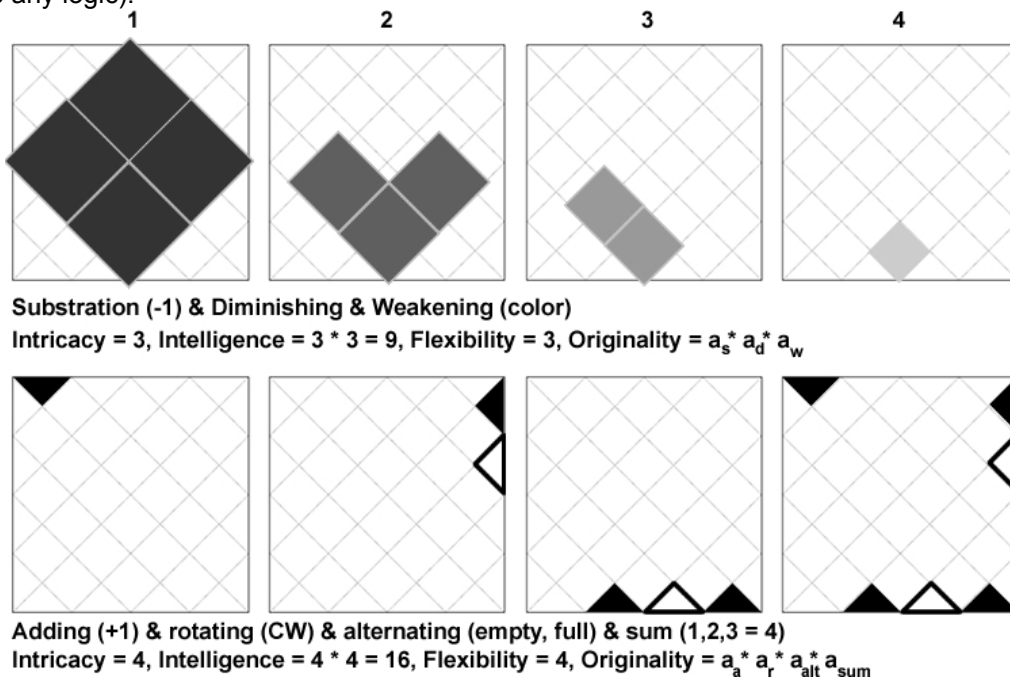




Testing 600 people, I found 24 types of logic - some were combined.



Creation of logic always enables to add new logic to series to increase its intricacy. E.g. subtraction of a polygon can be enriched by weakening colour (it is very original logic), and diminishing size. Alternating (empty, full) triangle can enrich adding and rotating triangle, plus summing the first 3 patterns to the 4, adds 'sum' logic. Then the triangle could be moving, diminishing etc... Theoretically infinity logics may be mutually combined. The results of TIC allows higher differences than classic IQ tests. In my research the highest score (of one musicologist) corresponded to 250 IQ, while some achieved 0 (unable to produce any logic).



Intelligence (of series) is intricacy<sup>2</sup>, which was explained before, and should be now clearer from examples of logical series. Total intelligence is sum of intelligence of all N logical series in given time:

$$\text{Intelligence} = \sum_i^N \text{intricacy}_i^2$$

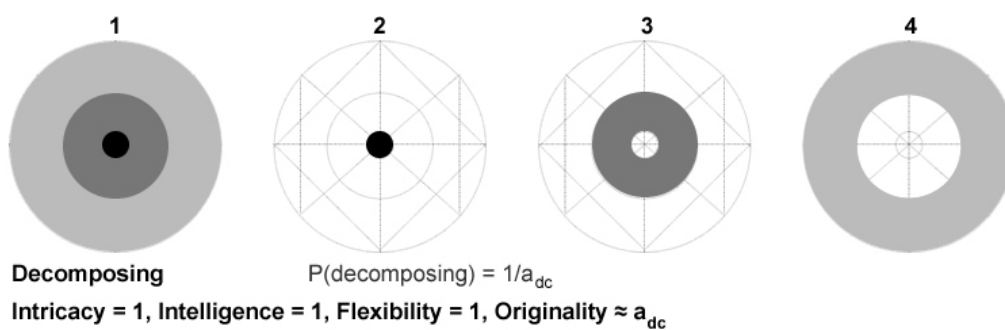
$$\text{Flexibility} = \sum_i^N \text{different logic}_i$$

Originality is inverted probability of logic, if probability of rotating is  $1/a_r$ , its originality is  $a_r$ . Probabilities of intricate series are multiplied, originality of rotating & adding =  $a_r * a_a$ .

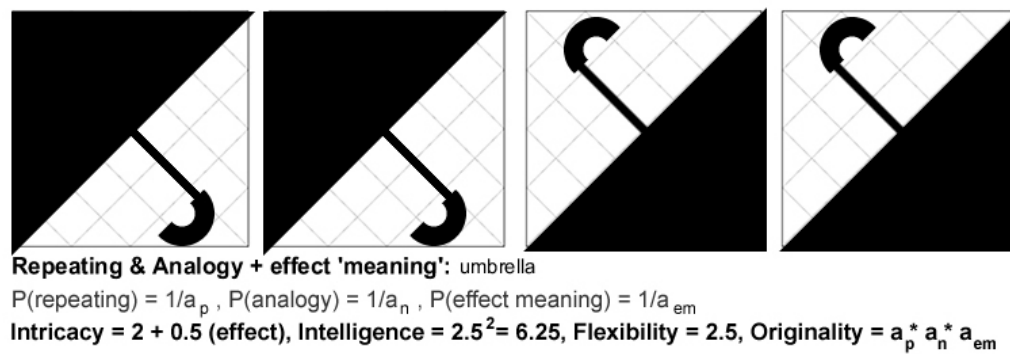
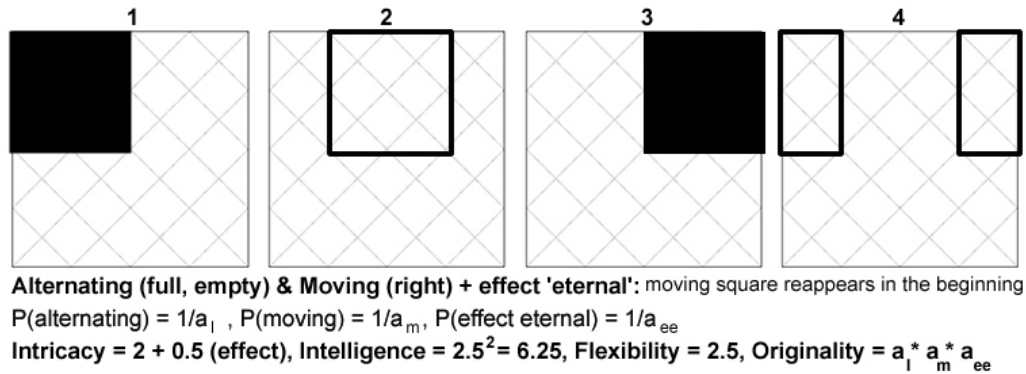
$$\text{Originality} = \sum_i^N O_i$$

where originality of series  $O_i = \prod_x^{\text{intricacy}} a_x$ , where  $a_x$  is inverted probability of logic x

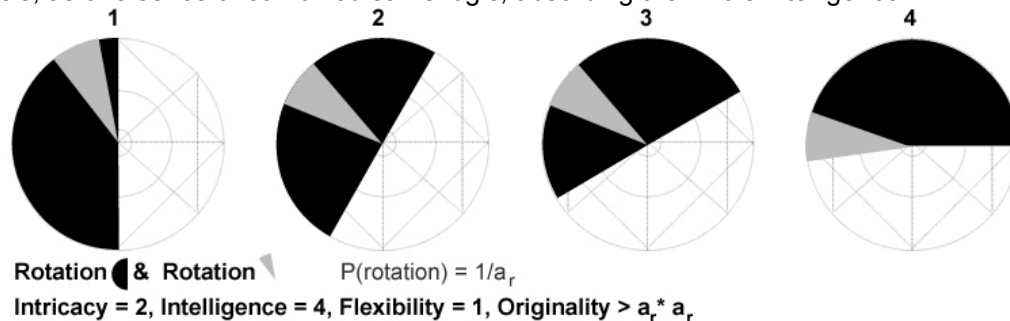
Environment influences originality - logic original for most people, can be banal for a special group, e.g. technicians overuse 'decomposing', because in technical fields the problems are broken down to be resolved like integration by parts: [Riemann–Stieltjes integral](#).



From the above definitions it is clear that intelligence, originality, creativity are statistically correlated. Together with logic, there were sometimes various effects: drawing meanings e.g. rotating umbrella, moving square bouncing or reappearing, etc. These effects increase intricacy, flexibility, originality, so each one has 0.5 point. Crucial is to classify the intention, which is not always easy, because logic can be drawn imperfectly, mistaken, or psychologist can see non-existing intention. Also interpretation may be ambiguous e.g. alternating left / right may be rotation of 180. Or are rotations CW, CCW, 45, 90 equivalent? Assessment could be more elaborated e.g. people could explain their logic to better understand their intention.



Theoretically, Rotating & Rotating should have smaller originality  $a_r^* a_r$ , than e.g. Rotating & Summing because Summing is rarer than Rotating. Unlike machines, for humans repeating the same logic in one series is less likely i.e. Rotating & Rotating has higher originality than  $a_r^* a_r$ . So the probability of the combined series does not need to be exactly same as expected. Humans don't tend to combine same logic e.g. adding & adding & adding & adding. The exception is paranoia, or psychosis (they spy me, and I know they spy me, and they know that I know...). New concept of intelligence can so explain the psychosis, as one series of combined same logic, absorbing the whole intelligence.



### Psychosis

Personality is determined by certain level of intelligence  $a^2$  distributed in various logical series, with core self-identity series. Psychoses are of 2 types: a) schizophrenia with 1 logic, b) bipolar disorders (manic-depression) with 2 logics (bipolar can be understood as 'weak' psychosis).

Example of 1 logic in schizophrenia is: they know 'what I know', but I know that 'they know 'what I know'', but they know that 'I know that 'they know 'what I know''... etc It can continue infinitely till absorbing the whole intelligence, capturing the 'self-identity'. The higher intelligence, the more repetition (higher intricacy) of the same logic. For personality with intelligence  $a^2$ , the intricacy of one logic is 'a'. For 2 logics in manic-depression, one logic's intricacy is: ' $a/\sqrt{2}$ ' (because  $(a/\sqrt{2})^2 + (a/\sqrt{2})^2 = a^2$ )

Let's assume each number of a dice represents one logic (opportunity), so there are 6 logics: 1, 2, 3, 4, 5, 6 Then intelligence is a number of throws M: the higher intelligence, the more throws (M).

Possible personalities =  $N^M$ , where N = number of opportunities, and M is intelligence, in our example it is:  $6^M$

Possible Schizophrenia(s) = N, in our example it is: 6

Possible bipolar disorders =  $N * (N-1) / 2$ , in our example it is: 15

While number of personalities exponentially raises with M (intelligence), for 6 logics there are still just 6 possible schizophrenias, and 15 possible bipolars. So:

The higher intelligence, the lower probability of psychosis and bipolars - probability decreases geometrically.

The more opportunities, the lower probability of psychosis and bipolars - probability decreases arithmetically.

The more opportunities, the higher ratio of bipolars to schizophrenia - the ratio increases arithmetically.

To minimize a chance of psychosis, intelligence is more important than opportunities, but at least some opportunities are necessary (extreme situations may trigger psychosis regardless of intelligence, as one logic always results in a repetition of the same: psychosis). The importance of intelligence was documented by many studies, e.g here is a study from [The American Journal of Psychiatry, 2015, by Dr. Kendler](#).

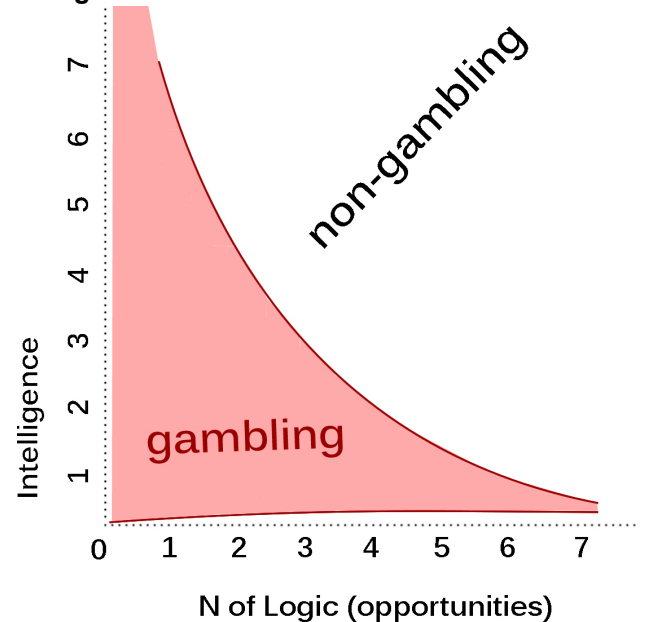
Ratio of bipolar to schizophrenia is  $(N - 1) / 2$ , does not depend on intelligence. According to WHO, there are 21 millions of schizophrenia, and 60 millions of bipolar disorders. Ratio of bipolar disorders to schizophrenia  $(N - 1) / 2$  suggests: the more developed societies (more opportunities), the higher ratio of bipolar to schizophrenia. E.g. some studies show that [bipolar disorders in USA is 4.4%, while in India only 0.1%](#). And according to [WHO's 2000 statistics, there are 1.45 times higher rate of schizophrenia in India than USA](#). The environment (opportunities) influences the number of psychoses / bipolar disorders, as well as their ratio. So genetics can't explain everything.

The reality is more complex than a dice, with possible heterogeneity in logics (e.g. some logics cannot be for some reason always combined), and the accessibility of logics may differ by time. However the formula for possible distributions (personalities) across logics (opportunities) in dependence on intelligence, remains true, which opens a possibility to study Personality mathematically.

### Special tasks and levels of intelligence

Too high intelligence can lead to irrational choice. Some temptations require certain intelligence to be noticed, people below it are protected. To discover that a temptation is wrong may require higher intelligence. People between these 2 intelligence's levels are trapped... E.g. gambling is irrational, as expected gain is smaller than fee to play (and it costs time too). It is enough to notice the owners of lotteries make money, not gamblers. They are smart enough to gamble, but not smart enough to understand its irrationality. Preferences to take risk don't explain gambling, because there are many other even riskier activities e.g. extreme sports. Opportunities matter too: their lack makes more intelligent people to gamble. The upper level of intelligence for gambling (or other irrational choice), moves with a number of opportunities.

An article with a special chess problem (other kind of problems could be constructed too) published in Japanese Journal Problem Paradise, experimentally confirms a higher intelligence can lead to a wrong solution.



Intelligence and special problems Miroslav Brada

(This work was supported by the Research Support Scheme of the Open Society Support Foundation, grant: 287/1999)

To discover a solution of a puzzle involves certain level of intelligence. But, too bright people may be misdirected by solving special problems comprising more solutions. First, look at two-mover A containing 6 easy solutions: 1.Qb2/b3!, 1.Kc6/c8!, 1.Rb5!, and 1.Bb5! Then, try to solve two-mover B that has again more solutions. Table 1 lists all solutions and tries together with the average value of the IQ for the people that discovered the solutions or misled by the tries. Strangely, the solvers that were misled by the try 1.Bxc4? have the higher IQ (on average) than the solvers not misled by this try. Further on, the solvers discovering the right solution 1.Kc8! achieve the lower IQ (on average) than those who do not discover this solution. Although the discrepancy in IQs between the groups is not huge, it seems irrational that a person succumbing

知性と特殊なプロブレム

パズルの解を発見することはある種の知性を必要とする。しかしながら、パズルが多くの解からなる特殊なものであるとき、賢すぎる人を混乱させることもありえる。まず2手詰めAを見てほしい。6つの易しい解: 1.Qb2/b3!, 1.Kc6/c8!, 1.Rd5!, 1.Bb5! がある。それを見た後、より多くの解を持つBに挑戦してほしい。Table 1はそれぞれの解または誤解した解答者たちの平均IQを並べたもの

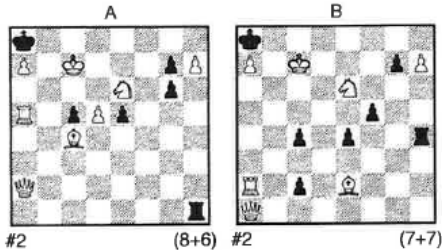


Table 1 The average IQ for the solvers that discovered the solution or were misled by the tries. 正解またはトライを誤解した人数とその平均IQ (yes= 正解/誤解した人)

first move (初手)	threat (スレット)	refutat. (反駁)	number		IQ	
			yes	no	yes	no
Qb2!	Qb7/b8	-	49	13	112	94
Rb2!	Rb8	-	52	10	108	111
Kc8!	Sc7	-	47	15	105	120
Qd4!	Qd5/d8	-	33	29	108	108
Qe5!	Qd5	-	22	40	107	110
Qg7?	Qf8/g8/h8	Rh7!	26	36	110	108
Bc4?	Bd5	c1!	27	35	113	105
Kc6?	Sc7	Rh6!	11	51	103	110
Kb6?	Sc7	Rh6!	13	49	104	110
Qb1?	Qb7/b8	b1!	11	51	90	113

to the try can be more intelligent than a person not misled by this try. The simple trick resides in the try that is more hidden than the solution, and, at the same time, the refutation to this try is even more obscure than the try itself. There are 3 cases: 1) the solvers under particular level of the IQ do not notice the try, 2) the solvers with the IQ within the certain domain notice the try, but do not discover the proper refutation, and 3) the super-intelligent solvers discover also the proper refutation. While the first and the third possibility give the correct answer, the second one leads to the incorrect result.

The IQ domain leading to the incorrect result depends on the intricacy of every problem, e.g. a super-obscure refutation to the try would lead astray even a genius. Similar problems exist in many fields. As an example, one of the tasks excerpted from the GRE test of 1994 asks a person to choose one of the five possibilities, a) geyser : water, b) fault : tremor, c) glacier : fissure, d) avalanche : snow, e) cavern : limestone, expressing a similar relationship to the pair volcano : lava. The right answer is the geyser : water as it shows the same relationship as the volcano : lava. But, the cavern : limestone can be also the solution based on the formal analogy, i.e. the cavern contains exactly one V (like volcano) and the limestone contains exactly one L (like lava).

In general, most problems induce several independent possibilities of various difficulties. Some of them result in solutions, others are only tries. However, the outcome of the solving and the quality of the thinking do not need to overlap. In chess compositions, there are two dominant criteria: 1) the traditional one with not-probable solution (perfected by Sam Loyd), and 2) the modern one with shifts of mates (promoted by Alberto Mari). Problems with super-obscure try and super-super obscure refutation to this try present one of the other possible criteria.

である。奇妙なことにトライ1.Bxc5?を誤解した人の(平均)IQはそうでない人より高い。さらに、1.Kc8!を正解した人のIQはそうでない人より低くなっている。このような食い違いはそう多く見られるものではないが、前記トライにひっかかった人の方がそうでない人より知性が高いというのは不合理に思える。それに対する簡単な説明は、トライが正解に比べより見つけにくいと同時にそれに対する逃れ筋が、さらに見つけにくいというものだ。すなわち次の3つのケースが考えられるだろう。1) 一定レベルまでの解答者はトライを発見できない。2) ある程度のレベルの解答者はトライを発見できるが、それに対する正しい反駁を発見できない。3) 最高レベルの解答者は正しい答えを導き出せなくなるというわけだ。

どの範囲のレベルの解答者が誤った答えを導き出すかは問題の複雑さに依存する。似たような問題は様々な分野で見られる。例えば、1994年のGREテスト(訳注: 大学入学適正試験)からの抜粋だが—volcano : lavaと同様な関係を持つものは次のうちどれか? a) geyser : water, b) fault : tremor, c) glacier : fissure, d) avalanche : snow, e) cavern : limestone—正解はgeyser : water(間欠泉: 水)であり、volcano : lava(火山: 溶岩)と同様な関係になっている。しかし、cavern : limestoneも形式的な類似性から正解となりえる。すなわち、cavernはvolcanoと同様に文字“V”をただ一つ含む、limestoneはlavaと同様に文字“L”をただ一つ含む。

一般にほとんどのプロブレムは多様な難易性を持ついくつかの互いに無関係な解の可能性を持っている。一部は正解で、残りは紛れである。しかしながら、解いた結果と思考の質が一致するとは限らないものだ。プロブレムの創作においては、2つの支配的な指標がある—1) 伝統的な、一見ありそうにない答えを持つもの(Sam Loydにより完成された)、2) 現代的なハターンプレイ(Alberto Mariが発展させた)—一加えて、うまく隠されたトライとそれに対する更に見え難い逃れ筋を持つこともまた別の指標となりえる。