MEASUREMENT OF HAPPINESS – SEASONAL DETERMINATION

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Abstract. More than 30 years ago, a method of measurement was derived in the framework of the systemic-informational approach, permitting to estimate quantitatively the degree of subject's happiness on the basis of a specific visual illusioin. Recently an idea appeared to connect this method with the concept of the seasonal determination of subject's activity (Giovanni Marzullo, 1996). To prove this idea empirically, a series of psychological experiments were organized: months of birth of 74 students and post-graduates of the University of Cassino and the Academy of Fine Arts in Sassari, occurred to be influencing upon the degree of the subjects' happiness, this impact being different for males and females. The explanation of such phenomena deals with the intensity of solar radiation while the most important prenatal phases determining the child's hemispheric features. Despite the preliminary character of the obtained results, they do supply evidence of the practical significance of such measurements.

Keywords: perception illusion, information theory, measurements, happiness, pregnancy, hemisphericity, cross-cultural investigations.

1. Measurement techniques

A basic measurement procedure was used (see in detail: [1, 2]) to quantitatively estimate the degree of subject's *happiness* (or well-being). In order to achieve such a task, one resorted to the help of a *visual illusion*. When comparing the lengths of two bars, a thin one and a thick one, – the thin one usually appears to be longer, even if their lengths are actually equal. This phenomenon is supposed to be caused by the subject's "*need to compensate*" his/her unhappy life by means of a certain "harmony", this inclination penetrating all aspects of the subject's mental life. So, the lesser the happiness, the more pronounced the illusion discussed. This phenomenon was empirically discovered more than 30 years ago and was theoretically deduced in the framework of the systemic-informational approach (about which see, e.g., [3-5]).

However, over the last decades, this phenomenon has not been applied in practice, neither in sociological nor cultural investigations, in spite of its quite evident advantages. The first one of these advantages being its non-verbal character , which means it can easily be used in cross-cultural studies. Only in 2014 this method was successfully proved in several countries: Russia, U.S.A., Israel, and Italy. In each country a certain aspect of this phenomenon was examined. The 'zest' of the experiment realized in Italy and described in the given paper, was *seasonal determination* of happiness.

To measure the degree of happiness, a set of 12 pictures was prepared, each presenting *two bars:* thin and thick, with lengths l_1 and l_2 , respectively. The pictures differed in the relations of the lengths of the two bars, ranging from $l_2 / l_1 = .92$ to $l_2 / l_1 = 1.36,$ using a step of .04. Dimensions of each picture were $205 \cdot 415$ mm, all of them being mounted (in a random order) in three horizontal rows (4 pictures in the row) on a large sheet. The sheet was placed at a distance of 3 meters from a participant. One of the pictures used in the experiment, is shown in Figure 1.

Figure 1. One of the stimuli used for measurements: $l_2 / l_1 = .92.$

Participants were 38 students of the University of Cassino (Department of Psychology) – 8 males and 30 females, and 36 students and post-graduates of the Academy of Fine Arts of Sassari (Department of Fine Arts) – 19 males and 17 females.

Each participant was asked about his/her *birthday*, and then he/she was proposed to *compare* the length of the bars: is the thick bar longer than the thin one, or shorter, or do their lengths seem to be equal? One of these three versions (concerning the

participant's opinion about each picture) was fixed in a special blank. The entire testing procedure for each participant, lasted about 3-4 minutes.

All the participants revealed a quite similar *general character of responses.* In full agreement with theoretical predictions, when perceiving stimuli with rather low values of the relation l_2/l_1, the participant estimates the thick bar as shorter than the thin one, whereas when dealing with high values of l_2/l_1, estimations occur quite opposite. Between these two '*stable zones,*' there exists an *intermediate zone,* which can be also named the '*zone of uncertainty*' where the participant perceives both bars as equal; the width of this zone Δ can be measured as the number of steps (gradations) between the stable zones. The middle of this intermediate zone is usually treated as the estimation for the *effect of illusion* studied; this effect is fixed in the form of the **index**

$x = (l_2/l_1) – 1.$

[For instance, a participant showed the first stable zone from l_2/l_1 = *.92* to *1.04*, and the second stable zone from *1.20* to *1.36,* so the zone of uncertainty covers three steps, $\Delta = 3$, and the middle of this zone $l_2/l_1 = 1.12$, hence, the effect of the illusion for the given participant equals $x = 1.12 – 1 = .12.$]

2. Results of the experiment

Before all calculations and considerations, it is desirable to compare participants belonging to the above regional universities. The matter is in that these two samples could reveal difference in age, social status, and possibly some other parameters. While in Cassino we dealt only with students of the same age group, in Sassari we also measured 7 people with age exceeding 35 years, among which were 3 colleagues and 4 students. To eliminate such influences (at least at the step of the first approximation), the distributions of participants (from both places) over the values of the index x were built, but these distributions showed no significant differences. Thus, if to resort to the help of medial dividing of each massif, the median point falls on $x = .08$ for Cassino participants, and less than $x = .10$ for Sassari participants. As for the distributions over the width of the zone of uncertainty, their median points respond to $\Delta = 3$ and $\Delta = 4$ for Cassino and Sassari participants, respectively. [Those 'old persons' in Sassari showed no featured peculiarities concerning both parameters considered.] Therefore, in our further analysis, both samples are considered together without taking into account the 'geographical factor.'

Fig. 2 presents the distribution of the entire mas-

sif (74 participants) over the values of index x (in the aggregated form).Here the median point is between $x = .08$ and $x = .10$ (there were 30 subjects with $x \leq .08$ and 44 subjects with $x \geq .10$). The distribution of the entire massif over the width of the zone of uncertainty Δ is shown in Figure 3. We see no specific features, except rather long 'tail' of large values of Δ. [We tried to exclude those 22 participants which showed $\Delta \geq 6$ (i.e., subjects with low 'exactness of reaction'); however, the final results, to be discussed later, didn't show any significant difference after such exclusion.]

3. Principal results: Seasonal dependence of happiness

Turning to our main, 'seasonal' problem, we should proceed from contemporary views on *temporal determination of human activity.* Here the pioneer was Giovanni Marzullo, which started his investigations from the features of activity of very *famous persons:* eminent composers, painters, writers, outstanding administrators, bankers, surgeons, presidents and so forth [6].
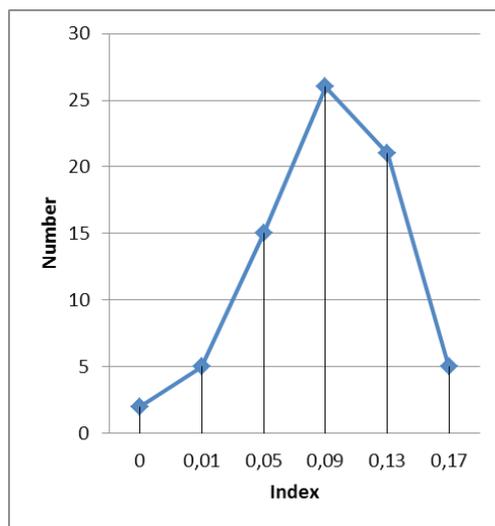

Figure 2. Distribution of participants over the values of the index x

It occurred that the character of their activity is strongly dependent on the *month of* their *birth*, and the most probable explanation of this phenomenon should be the *hemispheric lateralization* which starts at the first *two weeks* of pregnancy, i.e., "around the time a mother just learns she is pregnant" [6, p. 216). Exactly "the two-week stage of human devel-

opment coincides with a time when the blastodisk becomes committed to a plan of differentiation between the right side and the left side of the embryo" (ibid., p. 217).
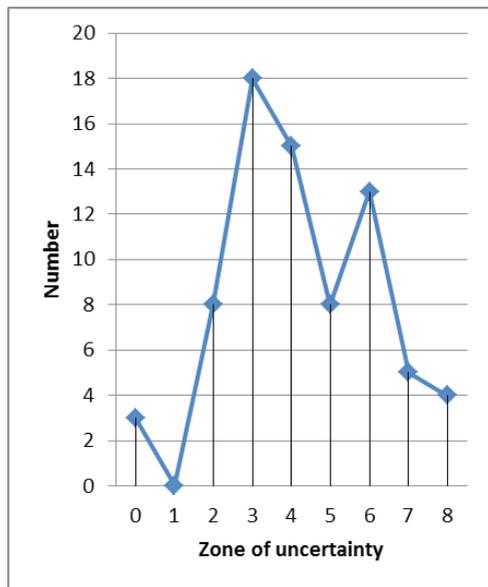

Figure 3. Distribution of participants over the width of the zone of uncertainty Δ.

In turn, this process of forming *brain asymmetry*, strongly depends on the intensity of sunlight (especially ultraviolet radiation) which is low in Winter (minimal on December 22) and high in Summer (maximal on June 22). Numerous statistical data confirm the such "*seasonal determination*," including the creativity of outstanding artists, scientists, Nobel winners, etc. [6, 7].

However, as far as this temporal phenomenon deals with sunlight, – certain aspects of appropriate determination should be valid not only for outstanding persons, – but also for *ordinary people*. And first of all, this determination is expected to be valid for subjects' *feeling of happiness*. According to Marzullo (ibid., p. 213), "**Sunny embryo, dark child, – Dark embryo, sunny child.**" In fact, the persons born in Winter, should show the predisposition to right-hemispheric prevalence which is accompanied with *pessimistic mood,* – whereas those born in *Summer*, should possess the inclination to left-hemisphericity characterized by *optimism*.

Our results support this standpoint. Fig. 4 presents the "*seasonal behavior of happiness*" for the entire massif of 74 participants, separately for males and females. Here the criterion was used: the subjects with $x \leq .08$ were considered as "happy," others being "unhappy" (division close to medial), and a *percentage of "happy" subjects* was analyzed as the function of the season of their birth. The last one was considered to consist of *four trimesters:* I (January-March), II (April-June), III (July-September), and IV (October-December).
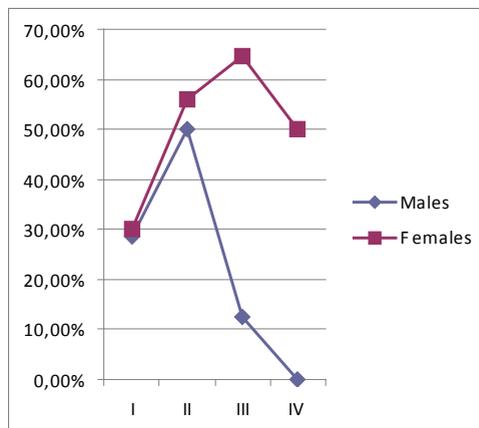

Figure 4. Share of happy subjects – seasonal dependence (males and females)

The curve for *males* shows a rather sharp maximum, though falling on the second trimester, the difference between this maximum and minimum (the fourth trimester) being statistically significant at 5%-level (chi-square 3.96). For *females* a quite analogous cupola-like maximum responds to the third trimester, though the difference between it and minimum (the first trimester) is statistically significant only at a 10%-level (chi-square 2.77). So, both males and females *feel themselves* in agreement with our seasonal theoretical predictions!

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Our main conclusion is mostly methodological, concerning the *combination of two concepts:* illusion-based model to measure happiness, together with seasonal determination of optimism/pessimism – occurred supported by empirical observations. Hence, both concepts seem to be valid, so the measurements of such delicate matters as happiness, are not very complicated. *A propos,* such combination illustrates the fruitfulness of the "associative" model of creativity. But aside from theoretical implications, there are plenty of practical applications of the regularities observed, as well as the measurement procedures derived.

The authors are very grateful to Prof. Rosella

Tomassoni (University of Cassino, Italy) for her help in the organization of the experiment.

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ИЗМЕРЕНИЯ СЧАСТЬЯ – СЕЗОННАЯ ДЕТЕРМИНАЦИЯ

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Резюме: - Более 30 лет назад в рамках системно информационного подхода был разработан метод, позволяющий количественно оценивать степенпь счастья индивида – на базе специфической визуальной иллюзии. Недавно появилась идея связать этот метод с концепцией сезонной детерминации индивидуальной деятельности (Джованни Марцулло, 1996). Для эмпирической проверки этой идеи, была организована серия психологических экспериментов: оказщалось, что месяц рождения 74 студентов и аспирантов Университета Кассино и Академии изобразительных искусств Сассари – влияет на степень счастья индивидов, причем этот эффект различен для мужчин и женщин. Данный феномен объясняется воздействием интенсивного солнечного облучения во время наиболее важных пренатальных фаз, детоерминирующих полушарную деятельность ребенка. Несмотря на предварительный характер полученных результатов, они свидетельствуют о практической важности подобных измерений.

Ключевые слова: восприятие, иллюзия, теория информации, имерения, счастье, беременность, асимме рия полушарий, кроссз-культурные исследования.

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ИЗМЕРВАНЕ НА ЩАСТИЕТО – СЕЗОННА ОПРЕДЕЛЕНОСТ

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Резюме: Преди повече от 30 години, на основата на системноинформационния подход е разработен метод, позволяващ количественото оценяване на степента на щастието на индивида – на базата на специфичната визуална илюзия. Наскоро се появи идея, да се свърже този метод с концепцията за сезонното определяне на индивидуалната дейност (Giovanni Marzullo, 1996). За да се докаже тази идея емпирично, беше организирана серия от психологически експерименти: оказа се, че месецът на раждането на 74 студенти и докторанти от университета в Касино и Академията на изобразителните изкуства в Сасари – влияе на степента на щастието на индивидите, при което този ефект е различен при мъжете и жените. Този феномен се обяснява с въздействието на интензивното слънчево облъчване по време на най-важните фази на бременността, определящи мозъчната дейност на полукълбата на детето. Въпреки предварителния характер на получените резултати, те свидетелстват за практическата важност на подобни измервания.

Ключови думи: възприятие, илюзия, теория на информацията, измервания, щастие, бременност, асиметрия на полукълбата, междукултурни изследвания.