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Seasonal aspect of creativity, scientific and artistic (Highest levels of achievements)

Till now there is no answer to the greatest puzzle of psychology (Simonton, 1994, p. 144): *are geniuses born or made*? Numerous researchers try to clear up the nature of this phenomenon: what are the distinctive features of persons with high creative achievements, where is the borderline between talent and genius, and so forth. Hans Eysenck (1995, pp. 7-8) determines genius as a result of *many constituents* which act *synergistically*; hence, they should not be subdued to the operation of "summarizing" – their constituents should be "*multiplied*". That is why if even *only one* rather small constituent is *absent*, – the phenomenon of genius cannot take place.

Two poles of creativity and the season of birth

Eysenck (1995, p. 145) also wrote about very misterious regularity dealing with such a feature of genius as the *season of birth*. Many years ago it was found (Huntington, 1938; Kaulins, 1979) that the majority of *outstanding persons* included in *Encyclopedia Britannica*, reveal a trend to be born in months between *Winter Solstice* (December 22) and *Spring Equinox* (March 22), with a peak in February. Besides, the same trend is typical for some mental deseases, including schizophrenia (peak in February).

Tight connection between high probability of outstanding creativity, schizophrenia, and conceiving in May-June – is still a puzzle. One of possible explanations deals with season-dependent viruses which influence upon the embryo's cortex, resulting either in creativity or psychosis, in dependence of the magnitude of the changes produced (O'Callaghan, Gham, & Takis, 1991).

Eysenck named this field of research "cosmobiology." According to Simonton (1994, p. 49), such "scientific horoscopes" might contribute, however modestly, to a well-rounded psychobiological psychobiography. Whatever the fate of this cosmobiological application, my main point remains: At least a part of what makes a person pre-eminent may be governed by events occuring before his or her birth.

Psychobiographers must document this birthright if they wish to explain an individual's greatness. Some important personalities are indeed '***born great'***."

Giovanni Marzullo was a pioneer in empirical studies of links between the *season of birth and the features of psychic activity*. He started his investigations in 1970's in the framework of biology (Marzullo, 1996). .

Observing (in his laboratory) the behavior of *new-born chicks*, he discovered the influence of *light* while the stage of the early embryo. He incubated a number of fertile eggs under the usual dark conditions and a similar number in an incubator fitted with an artificial sources of light (a laboratory lamp emulating the spectrum of daylight). The chiks born out of the 'light' eggs behaved like Don Quixotes, while those born out of the 'dark' eggs behaved like Sancho Panzas. The first group assumed a tall and defiant-looking posture, stomped furiously around the test cage, and 'attacked' the Plexiglas walls of the cage by vigorously and incessantly pecking away at black dots drawn on the walls at the animals' eye level. The second group, on the other hand, kept a low and balled-up profile, moved only slowly and hesitantly around the cage, seldom peckied at the dots of the walls, but pecked instead, after pondering, at real food particles found mixed with other debris on the cage floor.

The second motive which stimulated Marzullo's attention to the phenomenon of season of birth, dealt with *human children*: those ones which afterwards occurred subjected to schizophrenia, possesses a trend to be born during late Fall (with a peak in February).

Marzullo connected these two regularities with each other, and then he devoted all his further life to the problem of *influence of the seasonal sunlight* upon various kinds of human behavior. In 1987 he began to analyze the seasons of birth of outstanding persons included in issues "*Who's Who in America*."

It occurred that most *creative persons* (painters, musicians, dancers, composers, poets, *etc*.) possessed a tendency to be born during *Winter*: in January – February – March, – whereas most representatives of *'pragmatic' professions* (bankers, administrators, and so on) were born mainly at the end of *Summer* (July – August – September).

Very interesting results were obtained when investigation of *Presidents of the U.S.A.* (and candidates to this position). It occurred that Presidents also reveal the tendency to be *born in Winter* (with February peak) – like most creative persons, and very seldom in Summer! As for the nature of this rather non-trivial similarity, Marzullo (1996, p. 65) supposed something like a *passion* which directs the great politician not to the improvement of existing situation – but to creating *new reality*, quite similar to a romantic artist which follows certain abstract vision of the world.

Duality of mental processes: hemisphericity

It was long ago that the researchers discovered the *specialization of two brain hemispheres*. In most cases, *left hemisphere* deals with *speech activity* and analytic mental processes, whereas *right hemisphere* controls the *activity connected with space*, including visual processes and intuition (see, e.g., Arshavsky, 1999, pp. 29-30). In general, – if to resort to the help of computer analogy – it is possible to consider left-hemispheric mechanisms as *'consequent' and linear*; on the contrary, right-hemispheric mechanisms can be characterised as *'parallel' and holistic*. In other words, the *creative activity* is associated mainly with right half of the brain, though its left half controls various kinds of logical processes.

Therefore, it is possible to conclude that those persons which were born in *Summer* (July – August – September) possess inclination to rational, logic, analytic, left-hemispheric style of thinking, and pragmatic activity. Meanwhile, those born during *Winter* (January – February – March) are characterized by emotionality, holistic thinking, right-hemisphericity, and inclination to romanticism (Marzullo, 1996).

It might seem to be paradoxical that *mathematical thinking* – though it operates with *symbolic language* (Bertrand Russell), – possesses not left-hemispheric orientation (similar to speech one), – but is primarily right-hemispheric phenomenon (Annett & Manning, 1990; Brown, 1979). According to Marzullo, the overwhelming majority of famous mathematicians and book-keepers were born in Winter (January, February, March). So, what is common for mathematicians, book-keepers, painters, and poets? – They are united by Winter birthdays and holistic, right-hemispheric mentality.

So, on the basis of numerous statistical data, Marzullo concluded that those

outstanding persons which were born in Winter, reveal mainly right-hemispheric features, whereas those born in Summer possess inclination to left-hemisphericity. However, this phenomenon is inherent only to the *highest levels* of activity (level of geniuses) – it is *not typical for the majority* of professionals. Only when narrowing the sample of bankers, actors, and historians – to several hundreds outstanding persons, – the phenomenon in question becomes observable. As for painters and sculptors, the phenomenon was measured only for a sample of twenty or thirty most eminent persons. Why?

The heart of the matter is in that the season of birth can influence upon the person's *ability* to be successful in the given field – but not upon the *choice* of the sphere (i.e., profession). Hence, the knowledge concerning this phenomenon, may occur useful for better understanding by each person, his/her abilities, i.e., for optimization of his/her *professional choice*. For instance, in the sphere of art, persons born in Winter, may reach results higher than those born in Summer. Thus, comparison of birthdates of artists and art critics, showed that a child born in Winter, has 30% more chances to become eminent artist that eminent critic. Meanwhile, a child born in Summer, possesses 50% more chances to become eminent critic, than artist (Marzullo, 1996, p. 81).

Two poles of mental activity and two classes of men

Newsome in his book "*Two classes of men*" (1974) compared two contrastive systems of thinking: Plato's and Aristotle's. Appropriate two classes of men can be easily identified with persons born in Winter ('Februarians,' according to Marzullo) and Summer ('Augustians'); the first ones show romantic feelings and mathematical thinking, the second ones can be characterized by features of progmatism. It was in 1830 that great English poet Samuel Coleridge wrote: "*Every man is born an Aristotelian or Platonist. I do not think it possible that anyone born an Aristotelian can become a Platonist; and I am sure no born Platonist can change into an Aristotelian. They are two classes of men, besides which it is next to impossible to conceive a third*."

So, these two classes of men respond to two opposite poles of mentality. "*The Februarians stand with Plato in representing the 'thinking mind,' or that* lamp *capable*

of projecting a light of its own. The Augustians stand with Aristotle in representing the 'tabula rasa,' or that mirror *whose function it is to reflect the truth of reality without preconceptions*" (Marzullo, 1996, p. 164).

Moreover, within some spheres of activity we can observe certain '*splitting*' resulting in two classes of mental inclination. Thus, within mathematical thinking, we can single out *two branches*: the first is *romantic* (conneted with abstraction and intuitivity, following Kant's tradition), the second being more *realistic* (Leibniz's tradition). Personages of the first branch are mainly Februarians (its founders Kant and Brouwer were born in April and February, respectively), whereas the second branch is represented by Augustians (Leibniz was born in July). This contraposition was supported by Russian mathematician Jaglom (1983) who wrote about two styles of mathematical thinking, one of them being physical and geometrical, i.e., right-hemispheric (e.g., Newton hated formulae), another being algebraic, left-hemispheric (Leibniz). It is interesting to note that each of most important mathematical discoveries was realized practically simultaneously – by representatives of lef and right creative styles.

Annual cycle of sunlight, embriogenesis, and hemispheric specialization

According to Marzullo, the most probable reason of the phenomenon discussed, is left/right differentiation in the brain. This specialization starts before the birth, and there exist many experimental evidences in favor of the fact that exactly the annual cycle of sunlight serves as a *zeitgeber* ('time setter') in a variety of seasonal phenomena.

Embriological studies showed that the embrio's differentiation (specialization of left and right halves) begins during two weeks after conceving. "*Such timing makes it possible that the birth-month phenomenon could represent nothing more – and nothing else – than an influence on the establishment of the left-right axis of polarity in the embrio*" (Marzullo, 1996, p. 218). That is why we should cite Lewis Wolpert (1992): "*It is not birth, marriage, or death, but* ***gastrulation****, that is truely most important time in your life*."

According to Marzullo (1996, p. 216, 224), "*at two weeks after fertilization the*

human 'conceptus' is, strictly speaking, not even yet an embrio. It is in a preembrionic stage known as the blastodisk. <…> The various items are all consistent with the thesis that a parallel exists between the degree of left-right differentiation in the embrio and the degree of lateralization in the adult brain. <…> Under the December condition of minimal sunlight, the blastodisk would reach its maximal degree of lateral polarization. While raising the risk of an embrionis split, this hyperpolarized state would normally give rise to healthy individuals endowed with a pronounced level of left-hemispheric activity. Under the June condition of maximal sunlight, the blastodisk would reach its minimal degree of polarization. This state would result in a lower incidence of embrionic splits and in individuals prone to a greater representation of the right hemisphere in the normal activities of the brain." Appropriate chemical reactions are controlled not by visible light, but by the *ultraviolet radiation* from the sun. "*The final picture is one in which the Romantic-Platonist path of brain development follows from a more oxidezed chemical state of the embrio, while the Realist-Aristotelian path follows from a more reduced state*" (ibid. p. 229-230).

The phenomenon discussed should reveal itself mainly in creative activity of *outstanding persons*: in order to come to highest results in any field, rather 'cheerful combination' of various factors is needed, including the favorable (for the given field of activity) season of birth. Let us look at this phenomenon using such a basis as *highest mental achievements* materialized in the creative activity of Nobel winners which were functioning in different fields.

Nobel winners: seasonal determination

We investigated distributions of Nobel winners (prizes received in various fields during 1901 – 2012) over their birthdays.

First of all, we studied the distribution of the winners (in each nomination) over countries. Appropriate data for *physics* are presented by Fig. 1. Here the maximal share of winners – out of the entire massif of 194 physicists – belong to the U.S.A. (47%), followed by Great Britain (12%), Germany (11%) and other European countries. As far as almost half of the winners are Americans, we built seasonable distributions separately for the U.S.A. and Europe.

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Insert Figure 1

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The data below are presented in an aggregated form, each empirical point denoting the number of winners born in two months: January-February, March-April, May-June, July-August, September-October, and November-December.

Fig. 2 presents seasonable distributions of Nobel winners in *physics*. For the totality of winners, we see a peak falling on July – August. And really, according to theoretical predictions, persons born in Summer, possess rational, logical, *left-hemispheric style* of thinking, which responds to this profession. The peak exceeds the average level on 12.5%. [As far as most winners in physics were Americans, the deviations from the average level were calculated on the basis of the seasonal distribution of new-borns in U.S.A. which showed month fluctuations less than 6%. Hence, our result obtained (12.5%) seems to be rather high.].

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Insert Figure 2

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The seasonal curve for Europe reveals more broad peak, approximately in the same zone, i.e., evidencing in favor of logical, left-hemispheric thinking (though with slight shift towards more balanced relations between left- and right-hemispheric activity). However, the winners from the U.S.A. don't reveal more or less pronounced peak (appropriate distribution reminds that one for the totality of winners). These results require further consideration.

Turning to *chemistry*, we again start the analysis from the distribution of the winners over countries (Fig. 3). Here again maximal share – out of 161 chemists in the the entire massif – responds to U.S.A. (40%), then follow Germany (18%) and Great Brirain (14%), and then other European countries. That is why we build separate curves for the above two regions.

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Insert Figure 3

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Seasonal distribution of all Nobel winners in *chemistry* (Fig. 4) has a peak slightly shifted towards September – October. Its value exceeds the average level on 26%, its position also evidences in favor of rational, logical, *left-hemispheric style* of thinking. As it is easily seen, the peak for European chemists coincides with the peak for all chemists, i.e., it shows dominance of logical thinking, with typical zone of born in Summer (early Autumn). Meanwhile, American chemists possess a peak shifted to more balanced hemispheric relationships – towards persons which are characterized not only by logical thinking, but also by intuition (right-hemispheric features).

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Insert Figure 4

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In the field of *physiology and medicine* the total number of winners is 201; they are distributed over countries (Fig. 5) quite similar to their distribution for physicists: U.S.A. (49%), Great Britain (16%), Germany (7%), and other European countries.

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Insert Figure 5

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However, the entire massif of Nobel laureats in *physiology and medicine* shows seasonal distribution (Fig. 6) *split into two peaks*: May – June and September – October. Meanwhile, according to Marzullo, persons born in May and June, possess *intermediate style* of thinking (between left and right), whereas the second peak (born in September and October) responds to ‘genuine’ *left-hemisphericity*. [The first peak exceeds the avarage level on 25%, the second on more than 16%.] As for the very fact of splitting, it seems to be not surprising: here we deal with a ‘mixture’ of two kinds of researchers – molecular biologists and physiologists, together with physicians. European laureats possess the same first peak as one for the total massif, evidencing in favor of “intermediate” style of thinking. Meanwhile, American winners occurred divided into two peaks, the first responding to rather “balanced” style (as it was in case of European

researchers), the second being slightly shifted in relation to logical, left-hemispheric position.

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Insert Figure 6

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The distribution of Nobel winners in *literature* (in total 108 persons) over countries sharply differs from the distributions in all previous cases – it occurs to be rather homogenious (Fig. 7): France (12%), Great Britain (9%), U.S.A. (8%), followed by other countries (mainly European). Here it is senseless to single out the U.S.A. (as it was in previous cases) – it seems reasonable to build seasonal curves only for the entire massif – and for Europe. [It is interesting to note that many countries are represented only by one winner – in total 38 countries are represented, though most of them are not shown at Fig. 7).

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Insert Figure 7

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Seasonal curve for the entire massif of Nobel winners in *literature* (Fig. 8) shows *sharp maximum* in May – June, which is analogous to the first peak for physiology and medicine. This maximum exceeds the average level on more than 27%. Hence, writers possess ‘intermediate’ style of thinking: between left-hemispheric pragmatism (peak in July-August-September) and right-hemispheric Romanticism (January-February-March).

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Insert Figure 8

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As far as 70% of winners in literature were born in Europe, we built a separate distribution for European writers. It showed cupola-like form, possessing very interesting peculiarity – homogenious distribution over all months, except *sharp decreasing* in January-February. In other words, nor Romantic persons (responding to births in January and February) – but primarily representatives of realistic style (and

intermediate styles) usually receive Nobel prize in literature. This phenomenon requires special investigation.

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Our investigation, though of its rather preliminary character, confirms the theoretical model concerning *seasonal determination* of highest-level achievements. However, this model can be practically applicable not only for high-level activity, but also for 'ordinary' persons – meaning their optimal choice of professional activity.

References

Arshavsky, V.V. Population mechanisms of forming polymorphism of human brain asymmetry // Mir Psikhologii (World of Psychology), 1999, No. 1 (in Russian). .

Annett M, & Manning, M. Arithmetic and laterality // Neuropsychologia, 1990, vol. 28, pp. 61-69.

Brown, M. Left-handed: right-hamded. London: David and Charles, 1979.

Eysenck, H.J. Genius: The natural history of creativity. Cambridge: Cambridge University Press, 1995.

Huntington,E. Season of birth: the relation to human abilities. NY: Wiley, 1938.

Kaulins,A. Cycles in the birth of eminent humans. Cycles, 1979, 30, p. 9-15.

Marzullo, G. Month of birth, creativity, and the "two classes of men". Princeton: Academic Press, 1996.

Newsome, D. Two classes of men: Platonism and English romantic thought. New York: St Martin's Press: 1974.

O'Callaghan,E., Gham,P. and Takis,N. Schizophrenia after prenatal exposure to 1951 A2 influenza epidemic. Lancet, 1991, 337, p. 1248-50.

Simonton, D.K. Greatness: who makes history and why. NY: Guilford Press, 1994.

Wolpert, L. Gastrulation and the evolution of development // Development, Suppl., 1992, p. 7-13.

Yaglom, I.M. Why higher mathematics was discovered simultaneously by Newton and Leibniz? (Thoughts about mathematical thinking and ways of understanding the Universe) // Chislo i Mysl (Number and Thought), issue 6. Moscow: Znaniye, 1983, p. 99-125 (in Russian).

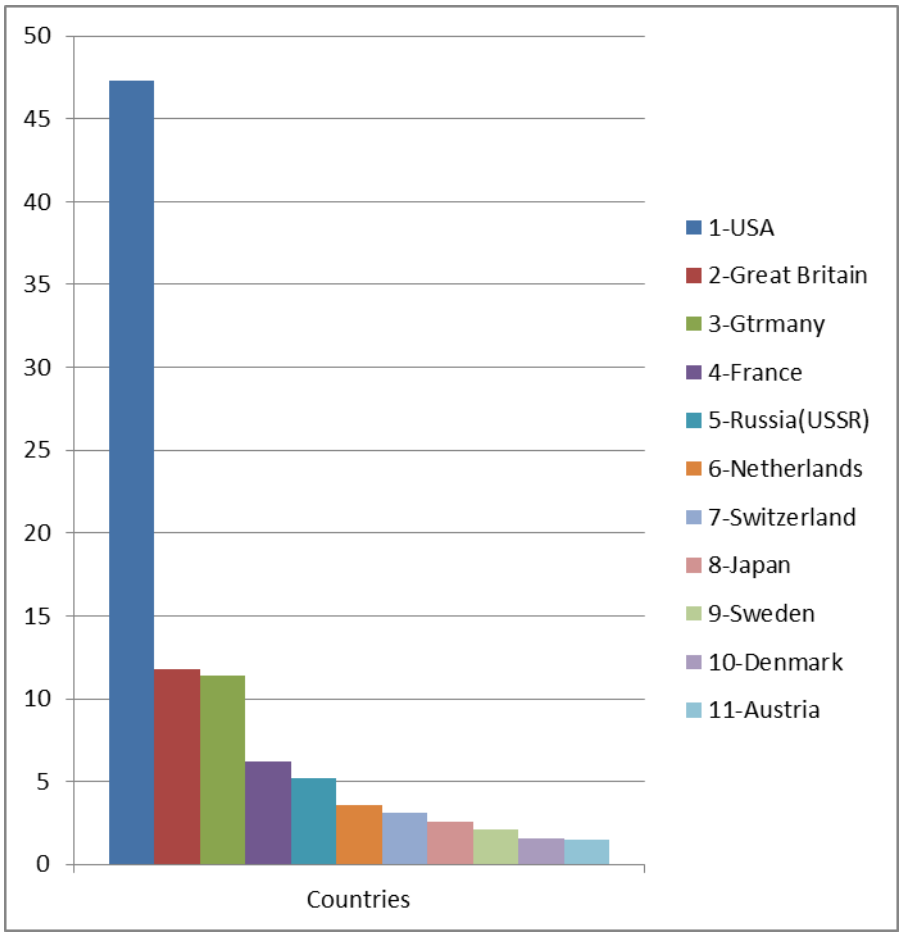

Figure 1. Distribution of Nobel winners over countries: physics.

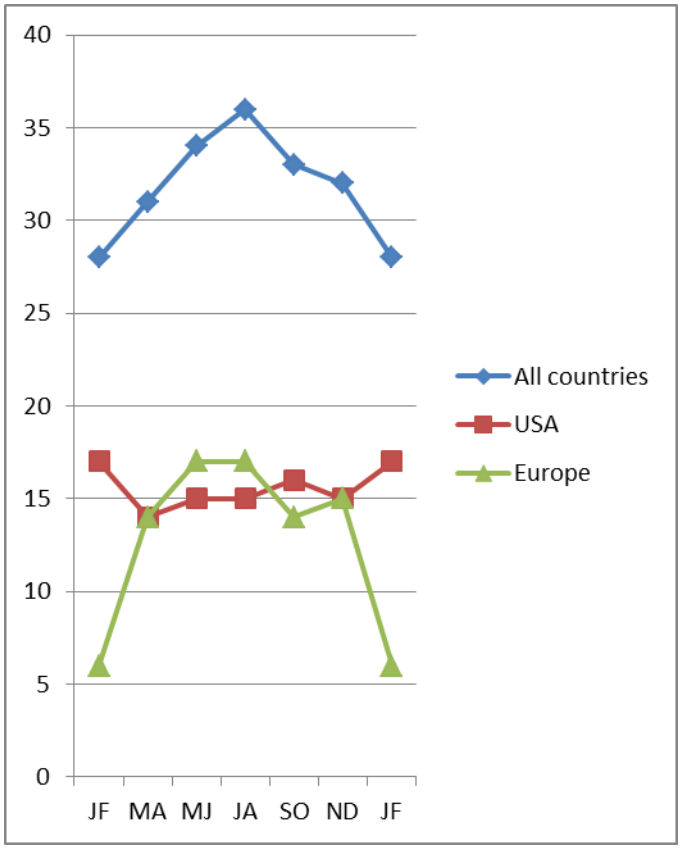

Figure 2. Seasons of birth of Nobel winners in physics

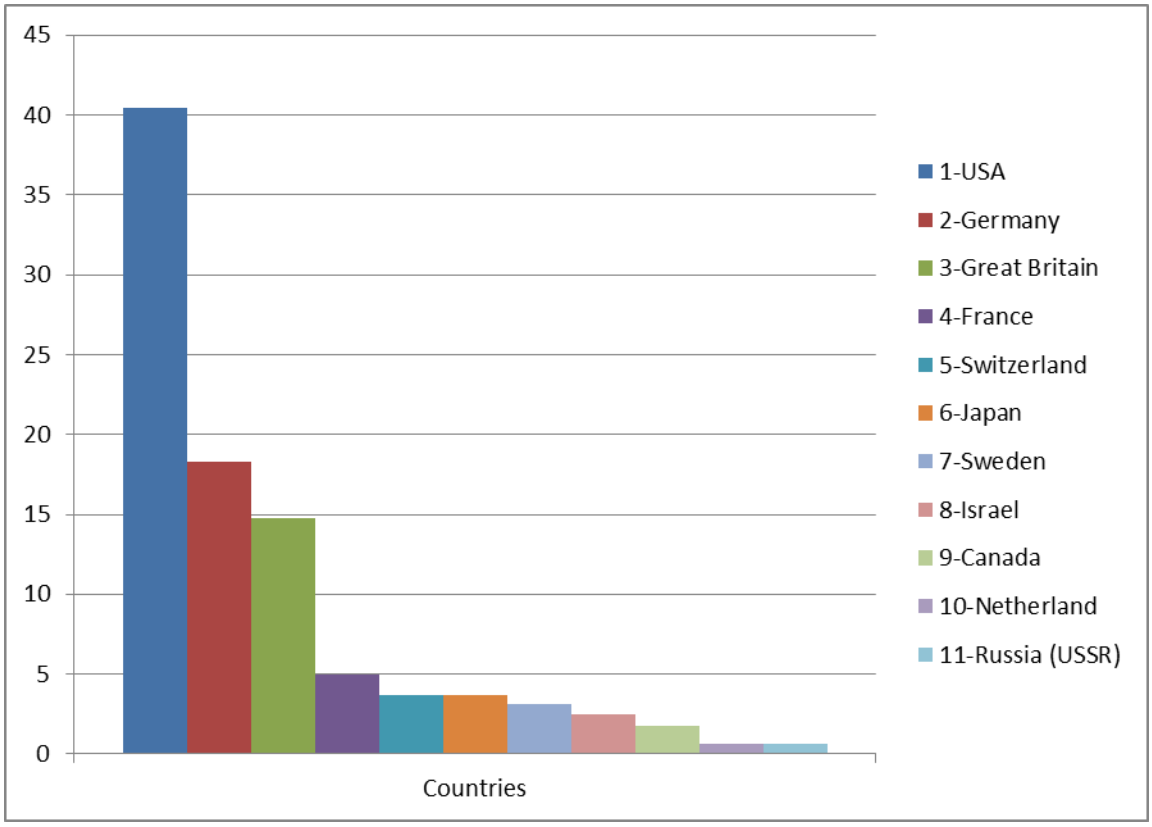

Figure 3. Distribution of Nobel winners over countries: chemistry.

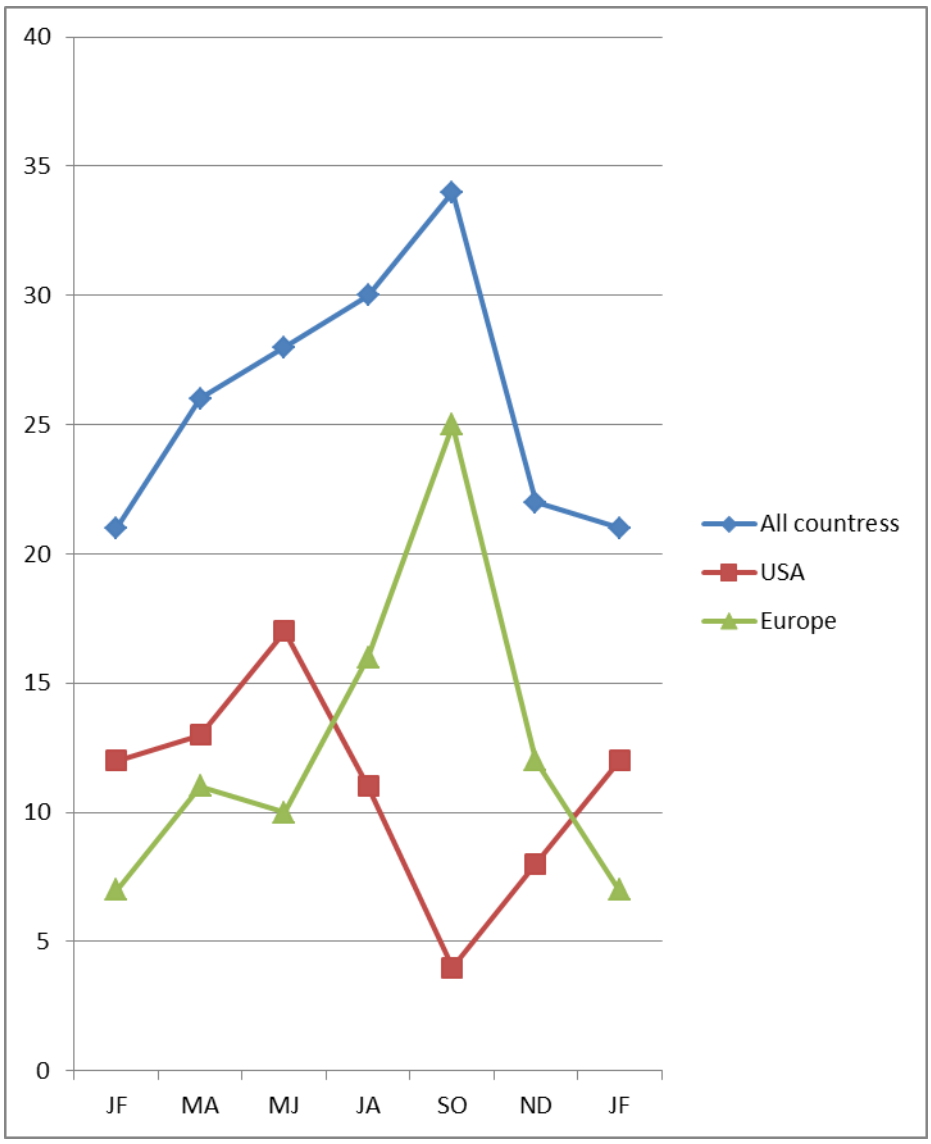

Figure 4. Seasons of birth of Nobel winners in chemistry

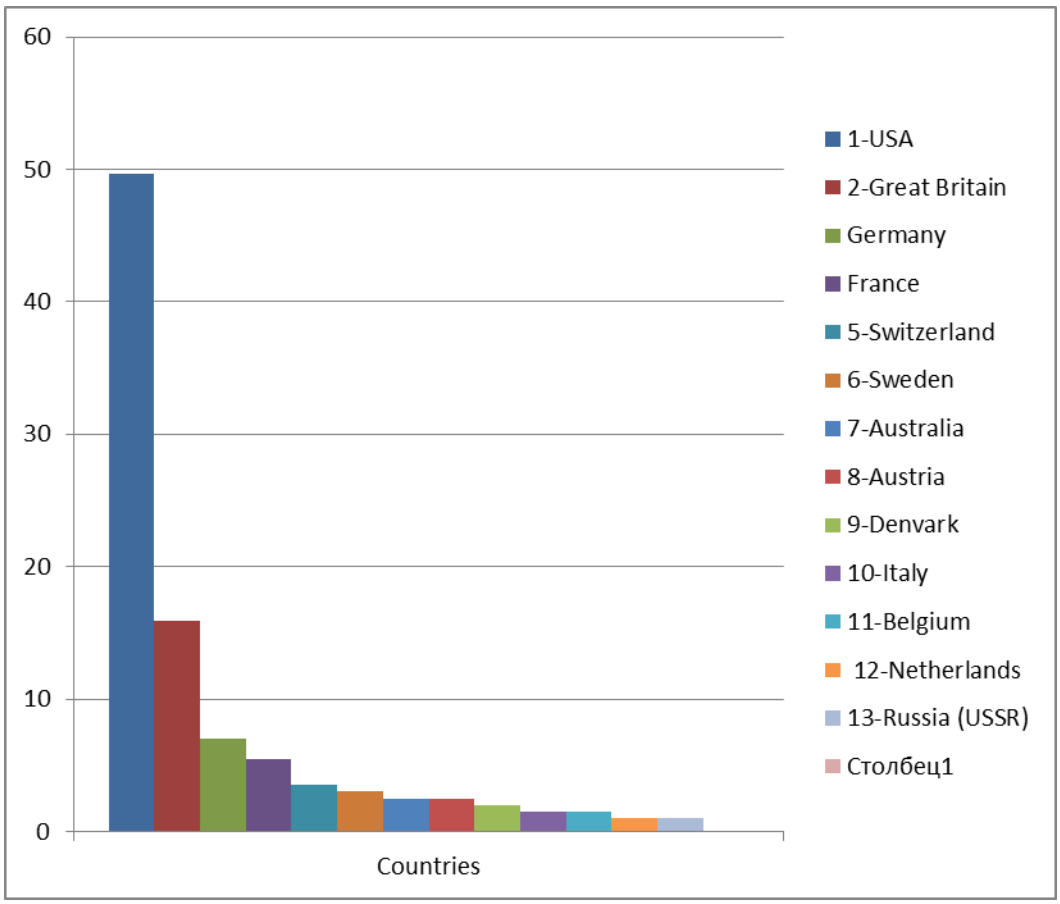

Figure 5. Distribution of Nobel winners over countries: physiology and medicine.

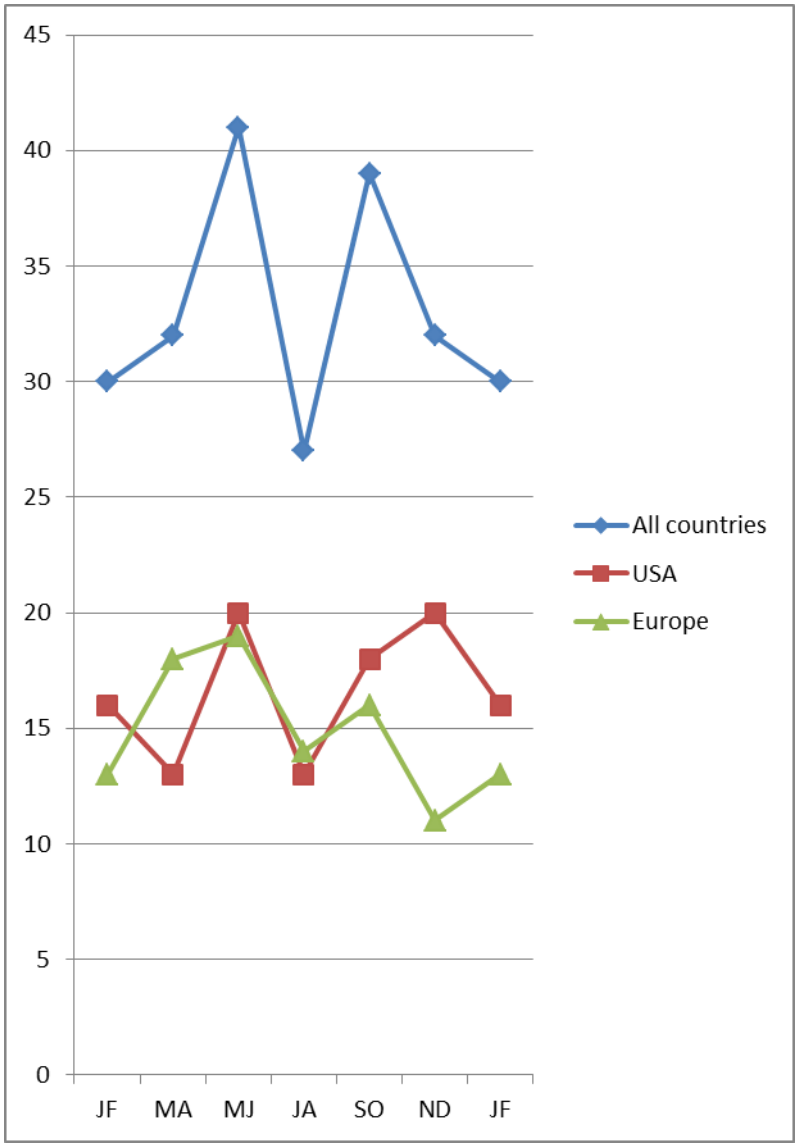

Figure 6. Seasons of birth of Nobel winners in physiology and medicine.

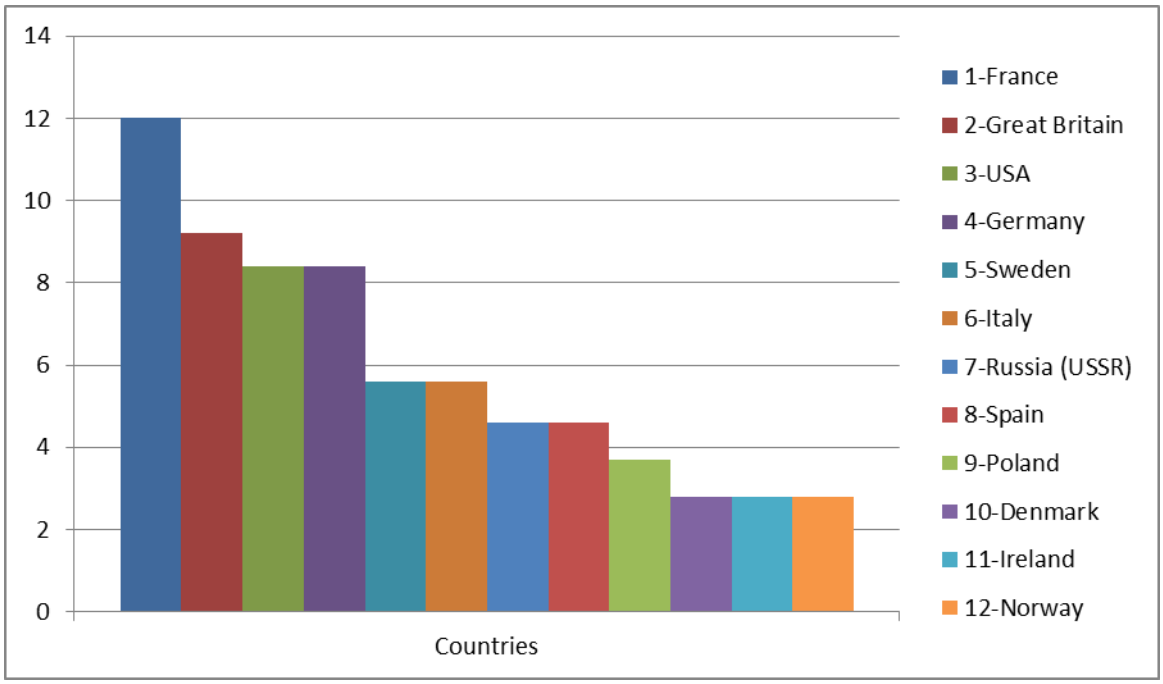

Figure 7. Distribution of Nobel winners over countries: literature.

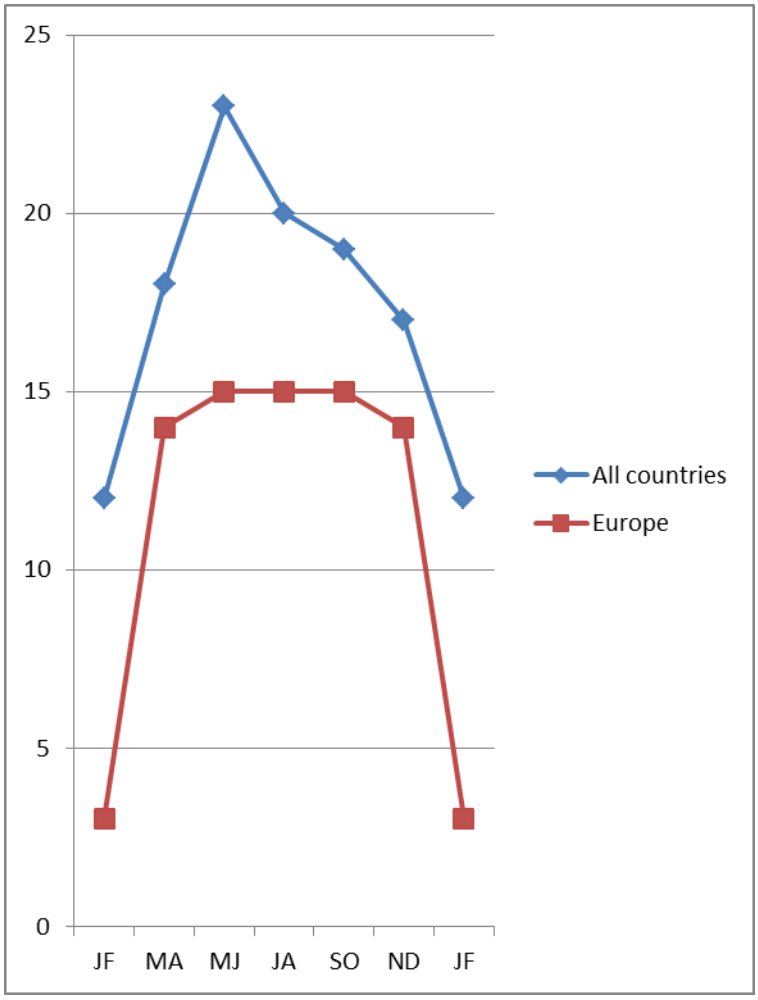

Figure 8. Seasons of birth of Nobel winners in literature.