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NASH AND THE IRRATIONAL

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ABSTRACT

Ten years ago, John Nash, the mathematician who revolutionized game theory and winner of the 1994 Nobel Prize in Economics, passed away. Throughout his career, from Princeton University to MIT (Massachusetts Institute of Technology), and including a consultancy for the Rand Corporation, Nash lived through a turbulent period marked by the beginning of the Cold War and McCarthyism, which attributed the country's defeats in the arms race to internal subversion, accusing scientists and intellectuals who were mobilizing for global unification. This scenario provided elements for Nash to undertake numerous trips to Europe in a frustrated attempt to renounce his citizenship. Amidst this movement, the mathematician was overcome by intense delusional activity, leading to a diagnosis of paranoid schizophrenia and subsequent institutionalization in mental asylums, most of which involved the use of ineffective and, nowadays, reprehensible methods. Despite all the adverse circumstances, John Nash continued his work and developed a principle that would become the basis for Game Theory and contradict the classical economic assumption that the pursuit of personal interests benefits society: the principle of collaboration. Back in Princeton, the mathematician's recovery was noticed in the early 1990s. Despite the use of cutting-edge medication, Nash attributes his recovery to developing the ability to reject certain delusional lines of his own thinking, thus allowing him to emerge from irrationality.

Keywords: John Nash. Mathematics. Schizophrenia. Game Theory. Economics. Nobel Prize.

RESUMO

Há dez anos morria John Nash, o matemático que revolucionou a teoria dos jogos e vencedor do prêmio Nobel de Economia de 1994. Em sua trajetória, da Universidade de Princeton ao MIT (Massachussets Institute of Technology), passando por uma consultoria para a Rand Corporation, Nash viveu uma época turbulenta, marcada pelo início da Guerra Fria e pelo macarthismo, que atribuía as derrotas sofridas pelo país na corrida armamentista a subversões internas, acusando cientistas e intelectuais que se mobilizavam por uma unificação mundial. Tal cenário forneceu elementos para que Nash empreendesse numerosas viagens à Europa na tentativa frustrada de renunciar à sua cidadania. Em meio

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a esse movimento, o matemático foi tomado por intensa atividade delirante, o que o levaria a receber o diagnóstico de esquizofrenia paranoide e a submeter-se a internações em manicômios, a maioria delas com a utilização de métodos ineficazes e, atualmente, reprováveis. Apesar de todo o cenário adverso, John Nash continuou o seu trabalho e desenvolveu um princípio que se tornaria base para a Teoria dos Jogos e contrariaria a suposição econômica clássica de que a busca por interesses pessoais beneficia a sociedade: o princípio de colaboração. De volta a Princeton, a recuperação do matemático foi percebida no início dos anos 90. Apesar do uso de medicação de última geração, Nash atribui sua recuperação ao desenvolvimento da capacidade de rejeitar certas linhas delirantes de seu próprio pensamento, permitindo-lhe assim, emergir do irracional.

Palavras-chave: John Nash. Matemática. Esquizofrenia. Teoria dos Jogos. Economia. Nobel.

RESUMEN

Hace diez años falleció John Nash, el matemático que revolucionó la teoría de juegos y ganador del Premio Nobel de Economía en 1994. A lo largo de su carrera, desde la Universidad de Princeton hasta el MIT (Instituto Tecnológico de Massachusetts), incluyendo una consultoría para la Corporación Rand, Nash vivió un período turbulento marcado por el inicio de la Guerra Fría y el macartismo, que atribuía las derrotas del país en la carrera armamentística a la subversión interna, acusando a los científicos e intelectuales que se movilizaban por la unificación global. Este escenario le brindó elementos para emprender numerosos viajes a Europa en un intento frustrado de renunciar a su ciudadanía. En medio de este movimiento, el matemático se vio dominado por una intensa actividad delirante, lo que le llevó a un diagnóstico de esquizofrenia paranoide y a su posterior internamiento en manicomios, la mayoría de los cuales implicaban el uso de métodos ineficaces y, hoy en día, reprobables. A pesar de todas las circunstancias adversas, John Nash continuó su trabajo y desarrolló un principio que se convertiría en la base de la Teoría de Juegos y contradiría el supuesto económico clásico de que la búsqueda de intereses personales beneficia a la sociedad: el principio de colaboración. De regreso en Princeton, la recuperación del matemático se hizo evidente a principios de la década de 1990. A pesar del uso de medicamentos de vanguardia, Nash atribuye su recuperación al desarrollo de la capacidad de rechazar ciertas líneas de pensamiento delirantes, lo que le permitió superar la irracionalidad.

Palabras clave: John Nash. Matemáticas. Esquizofrenia. Teoría de Juegos. Economía. Premio Nobel.

“... I write the invisible".
J. Jordan
(Space 8, S. S. Dr. Cândido Ferreira)

1 THE GENIUS AND HIS TIME

Ten years ago, the world lost one of the greatest geniuses of the twentieth century: John Nash. The mathematician who revolutionized game theory and who became known worldwide through the novelized film of his biography, "A Beautiful Mind", died in a car accident.

Intellectually independent, John Nash arrived at Princeton in 1948, a time when his country was still experiencing the consequences of World War II, the beginning of the Cold War and the mobilization of scientists and intellectuals for world unification, an idea ardently defended by physicist Albert Einstein. It was in this atmosphere that Nash would attend his graduate studies.

In 1950, Nash would accept a consulting job for the *Rand Corporation*, a company whose formation had been driven by a single fact: Russia had the atomic bomb. Rand's goal was to apply rational analysis to the problem of how to use powerful nuclear weaponry to prevent a war against Russia, or to win the war, if the means of intimidation failed. Although Nash had gone on to MIT (*Massachusetts Institute of Technology*) at the end of June 1951, his association with Rand, at the height of the Cold War, and his ties to Princeton would mark his life forever.

Although no one at Princeton doubted the Soviets' ability to develop nuclear weapons, the news, made public by President Truman under the pressure of McCarthyism, attributed the defeats suffered by the United States during the Cold War to sinister conspiracies and internal subversion. Suspicions would fall squarely on the Academy and its scientists, many of whom were on McCarthy's list of communists in February 1950.

In this way, the entire scientific community became vulnerable. In the midst of academic activities, federal investigators burst through the halls of MIT, searching garbage cans, keeping individuals under surveillance, interrogating neighbors, colleagues, students and even children. There was a lot of pressure to nominate names. Among his targets were Nash's friends and Norman Levinson, a first-rate mathematician, whom Nash considered a true surrogate father. In 1953, MIT experienced periods of extreme tension: Levinson, a former communist, was summoned to appear before the House of Representatives Committee on Un-American Activities, as were other professors. The situation did not become dramatic only because the president of the University hired the best lawyers in Boston to defend his professors.

Any sign of nonconformity, political or personal, no matter how small, came to be considered a potential breach in national security. The climate of mistrust took over the national scene, to the point that, in April 1954, President Eisenhower declared Oppenheimer, the most famous scientist in the United States, a risk to national security.

The reality in which Nash found himself immersed would provide enough elements for him to later want to replace it with another scenario. In the years that followed, Nash would try to undertake a dizzying escape, making part of his life an echo of the movement for world unification, defended by Einstein.

2 GAME THEORY AND THE ROAD TO THE NOBEL PRIZE

Nash became aware of a new branch of mathematics when he came into contact with *The Theory of Games and Economic Behavior*, by von Neumann and Oskar Morgenstern, in 1944, and wrote his first paper, one of the great classics of modern economics, during his second period at Princeton.

The mathematician took an entirely new approach to the problem of predicting how two rational parties involved in a bargain would interact. His theory was based on the assumption that the expectations of each party in relation to the behavior of the other are based on the intrinsic characteristics of the exchange situation itself. The essence of a situation that results in an agreement is that of two individuals who have the opportunity to collaborate for mutual benefit in more ways than one. How they will split the gain, he reasoned, reflects how much the deal is worth to each individual.

This principle of collaboration by Nash inspired the solution of one of the most famous strategy games, called "The Prisoners' Dilemma".

The apparent paradox of this game refers to the situation in which two prisoners, who have committed a crime together and have been captured, are unable to communicate with each other. The following question arises: if both confess to the crime, they will go to prison for three years; if they keep silent, collaborating with each other, they will go to prison for a year, because the police will only prove that they have committed other petty crimes; but if one confesses and the other does not, the one who confessed will be released and the one who cooperated in keeping his silence will be sentenced to a sentence of five years.

Will each prisoner be able to trust his partner in crime? If he does not trust it, he could reduce his sentence from five to three years. Moreover, if the other does not denounce him, he will obtain immediate liberation. Therefore, each prisoner, individually, will come to the conclusion that the best option is confession, which will result in sentences of three years for both. The irony is that the two prisoners (taken together) would be better off if neither of them

confessed—that is, if they cooperated with each other. In this way, rational strategies that result in self-benefit lead to irrational results from a collective point of view.

The principle of collaboration is not only the basis of Game Theory, but also contradicts Adam Smith's classic economic assumption (known as "the invisible hand of the market"), for whom the pursuit of each individual for his or her own interests would automatically benefit society. The continuity of Nash's work in this area would result in such significant contributions that would lead him, decades later, to receive the Nobel Prize in Economics in 1994.

3 DIVE INTO THE IRRATIONAL

In the 1950s, Nash worked with several problems of pure mathematics, including a work that brought him considerable recognition in academia: the isometric immersion of Riemannian manifolds (more details on the subject can be found in the book "The Nash-Moser Theorem and its Applications", by Hounie and Malagutti, published in 1991 by IMPA-CNPq).

In 1958 Nash was working on the Riemann Hypothesis when he began to perceive encrypted messages, sent exclusively to him by abstract powers from outer space, or by foreign governments. As he felt more psychically exhausted, mental images became more and more recurrent and diffuse. Einstein's old political ideal began to take over his spirit, which would make him stay awake all night, writing to the UN, ambassadors and even the Pope. Through the letters, intercepted in the Department's correspondence, it was learned that Nash was trying to organize a world government.

Invaded by delirium, Nash suffered his first hospitalization in a hospital linked to Harvard Medical School. Forty days after hospitalization, the diagnosis of paranoid schizophrenia was made. Treated with an antipsychotic and psychotherapy, in a matter of weeks there was complete remission of his acute crisis. Although doctors knew that the symptoms would be camouflaging something much deeper, on May 28 he was discharged. Considering himself a pacifist at risk of being drafted, and an opponent of the kinds of military research the country wanted American mathematicians to do, Nash set out for Paris, where, guided by the Register of Citizens of the World, he began a long pilgrimage to renounce American citizenship. He went to Luxembourg, then to Switzerland (the country that had granted citizenship to Albert Einstein). However, all the American Consulates to which he went refused his passport and his oath of renunciation. Nash said he felt like a prisoner of an endless farce, of a soulless mechanism for the circulation of documents. Washington's response to the consultation carried out by the Swiss authorities corroborated the precision of their feelings, since they understood that his attempt to renounce American citizenship had

as its sole reason not to be drafted by the United States army, nor to render his services as a mathematician to the official organizations, fearing that his collaboration could help the authorities of their country to maintain the Cold War or prepare for war.

After several unsuccessful attempts, in a fit of desperation, Nash destroyed his passport. Difficult times would come. New attempts to obtain European citizenship were made, until on December 15, acting in accordance with the highest echelons of the American State Department, the Swiss authorities deported him to France. Tired, and with little hope that his dream would come true, in early March Nash accomplishes a feat: he travels alone and without a passport to East Germany, staying there while his asylum application is analyzed. Located by the FBI, Nash was summoned to leave East Germany. Back in Paris, a short time later he would be escorted by the police to Orly airport, heading to the United States.

Upon his return in 1961, Nash would undergo his second hospitalization. At Trenton State Hospital, Nash would experience what Franco Basaglia would define, in 1964, as the daily life of the asylum "(...) closed in the cramped space of his lost individuality, oppressed by the limits imposed on him by the disease, he is forced by the institutionalizing power of hospitalization to objectify himself in the very rules that determine him" (BASAGLIA, 1964, apud SARACENO, 2001, p. 62). There, Nash was recognized by a number, shared a room with thirty or forty other people; He no longer had his own clothes, his own soap or shaving cream. For the next six weeks, five days a week, Nash underwent insulin therapy, which caused him to struggle incessantly during the comatose phase, in fits compared to epileptic seizures. Nash would describe insulin therapy as "torture" and say "I was left to rot in a 'Tower of Silence', with anti-Promethean vultures attacking my entrails" (NASAR, p.183). Due to the overcrowding of the hospital, in six weeks he was discharged.

In July 1962, Nash returned to Paris to give a lecture at the College de France, but the feeling of strangeness and loneliness would seize him again. In December he returned to Princeton, and, still obsessed with the idea of seeking asylum, addressed his application to St. Paul's Church (where he married). Shortly thereafter, his difficulties would be attributed to the machinations of the Ecumenical Council.

To the regret of his colleagues and friends, who surrounded him, between 1963 and 1965 Nash was again admitted, this time to Carrier Hospital. The Carrier was regarded with indignation at Princeton. The most educated professors abhorred "chemical straitjackets" and electroshock, and the cure by the word, the main instrument of psychoanalysis, considered in academic circles to be the most humane and adequate therapy. The fact that electroshock was frequently used in the Carrier provoked a great mobilization in Princeton, which resulted

in Nash's transfer to another unit of the clinic, where, assisted by Dr. Mele, he was treated with an antipsychotic and individual psychotherapy. Nash reacted quickly to the treatment and his departure from the clinic was conditional only on a job. In a true rescue mission, Oppenheimer raised funds of various kinds to appoint him to the position of collaborator at the Institute for Advanced Study in Princeton. However, taking advantage of the opportunity to participate in a national conference, between June and July, Nash changed course and returned to Paris. It took a few more weeks for him to finally give up and return to his treatment with Mele in the United States. In the early summer of 1965, his discharge was once again conditional on obtaining a job and continuing his psychiatric treatment.

Once again Princeton welcomed him, offering him what he so desperately needed: security, freedom, friends. In 1992, Nash would claim that he took refuge in Princeton to escape the feeling of not having a home.

4 EMERGENCE OF THE IRRATIONAL

When Nash's name resurfaced in the headlines of major publications in the late 1980s, many researchers thought he had died or was abandoned in some asylum.

In his autobiographical essay, written after receiving the Nobel Prize, Nash refers to disease remissions not as pleasurable returns to a healthy state, but as "interludes, as it were, of forced rationality." (NASAR, p. 188)

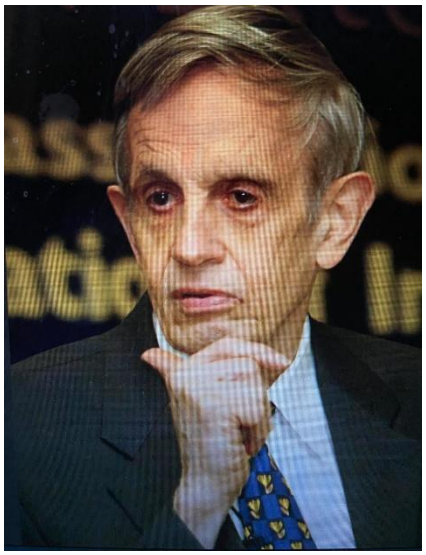
In 1996, Nash would attribute to the attempt to resolve the contradictions of the theory of quanta one of the triggering factors of his disease. In his words, working with Heisenberg's theory of uncertainty was an "excessive and psychologically destabilizing" attempt (NASAR, p. 142).

The remission of Nash's disease began to be noticed at Princeton in the early 90s. According to Nash himself, despite the use of a state-of-the-art antipsychotic, the process of "return" itself did not occur due to a specific treatment, but was forged by the growing ability to reject certain lines of thought, influenced by the delusional state, which means an almost superhuman effort for someone who claimed, in 1957, that his delusional ideas came from the same source from which his mathematical ideas came

For John Nash, therefore, his recovery can be thought of as the emergence of irrationality itself. (NASAR, p. 206).

Figure 1

John Nash, 2007



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REFERENCES

Harari, A., & Valentini, W. (Orgs.). (2001). A reforma psiquiátrica no cotidiano. Hucitec.

Hounie, J. G., & Malagutti, P. L. A. (1993). O teorema de Nash-Moser e suas aplicações (Vol. 1). IMPA/CNPq.

Malagutti, P. L. A., & Maniakas, G. F. (2003). John Nash: Entre a genialidade e a loucura. Univerciência, (3), 47–51.

Nasar, S. (2001). A beautiful mind: A biography of John Forbes Nash, Jr., winner of the Nobel Prize in economics, 1994. Simon & Schuster Paperbacks. (Original publicado em 1998)

Princeton University News. (2015, 27 de maio). A “tragic but meaningful” life: Legendary Princeton mathematician John Nash dies. https://www.princeton.edu/news/2015/05/27/tragic-meaningful-life-legendary-princeton-mathematician-john-nash-dies

Saraceno, B. (1999). Libertando identidades: Da reabilitação psicossocial à cidadania possível. TeCorá; Instituto Franco Basaglia.