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WHY DO WE SHARE. AN INTERDISCIPLINARY PERSPECTIVE

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ABSTRACT. This study focuses on explaining why people decide to share information online and what are the factors that influence what content we distribute using the latest scientific papers in Psychology, Sociology, Neurosciences and Communication.

Keywords: share, communication, content, social capital, dopamine, activation, novelty, behaviour

1. Introduction

People have shared stories, news and information with those around them for thousands of years, and technologies such as Facebook, Twitter, other social networks and online platforms have made this happen faster and easier than ever.

Aristotle considered the man to be a "zoon politikon", i.e. a social animal, the difference between him and animals being the ability to transmit complex information. The survival of the human species over various development periods has depended on the humans' ability to exchange information.

Aristotle's intuition has been confirmed by numerous scientific studies. Researchers from the University of California, Los Angeles (UCLA) have published a study that shows that whenever people hear

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information, their brains activate the neural networks involved in thinking about how this information can be interesting to other people. "We are built to want to pass on information to other people," says Matthew Lieberman, professor of Psychology, Psychiatry and Behavioral Sciences at UCLA, in a detailed study (Lieberman, 2013).

What lies beneath the decision to distribute a certain type of information and what are the factors that influence this mechanism are key issues both for the marketing industry, whether we are talking about trade or politics, and for the media.

The survival of press institutions has become increasingly dependent of the number of people that view the produced content, and this figure often depends on the capacity of those materials to create the reader's willingness to share the obtained information (Benton, 2014). Thus, being shared from human to human through a mechanism similar to the spread of viruses, articles can become viral. So, in order to know how to trigger media consumers to distribute content, media institutions need to know what makes them decide to share the information they receive.

This study focuses on explaining why people decide to share information online, it analyzes the characteristics of the information that is most often distributed, as well as the neurological mechanisms that affect the sharing of content.

2. The Anthropological Perspective

Aristotle says in "Politics": "Man is a social being by his nature, while the antisocial in nature, not by occasional circumstances, is either a superhuman or a beast. (…) At the same time, it is clear why man is a more social being than any bee and any beast; because nature does not create anything without purpose. But only the man out of all creatures has spoken. The voice is a sign of pleasure and pain, and it exists in all other creatures, because their nature rises only up to there, to feel the

pleasure and the pain, and to signal it to others, while the language of man serves to express what is useful and harmful, as well as what is right and wrong", says Aristotle. (Bezdechi, 1924). In other words, what distinguishes the man from the animal is the transmission and sharing of knowledge and experiences. "As social beings we are built to share information," says researcher and journalist Alfred Hermida, the author of "Why we share" (Hermida, 2014). The author further states that the ability to share information has greatly increased the chances for people's surviving. Humans can be smarter than other creatures, but neither of us is clever enough to gather all the information necessary to survive in a particular habitat by himself.

Artistotel's theory was scientifically demonstrated by researchers at the University of California, Los Angeles (UCLA), who found that part of the brain associated with the distribution of ideas: the outer brain area - the temporoparietal junction (TPJ), which is activated when people find something interesting, useful or fun to pass on. "People are usually receptive to how the things they have seen will be useful and interesting not only for themselves but also for others. We always seem to be looking for other people who would also consider this information to be useful, funny or interesting. At the first encounter with a piece of information, people use their brain network involved in thinking about how this information can be interesting for others. We are built so that we want to pass on information to others", says Matthew Lieberman, professor of psychology, psychiatry and behavioral sciences at UCLA, in a detailed study (Lieberman, 2013). „We are constantly exposed to information on Facebook, Twitter and other networks, some which we further distribute, some which we don't", Lieberman says. The UCLA study has shown that the temporoparietal junction is activated when we hear ideas that we consider to be interesting to others. By further studying neural activity in these regions of the brain to see what information and ideas these regions are working on, psychologists could actually predict which press articles or advertising messages are most likely to become viral.

"Without noticing, our brain helps us assess the social currency to be achieved through the exchange of information. (...) Today, the media encourages us to distribute, like or recommend a story on the many digital devices we have at our disposal, appealing to an inner desire to be appreciated by others", considers Alfred Hermida (Hermida, 2011).

3. The Sociological Perspective

People's desire to share information also has an important social component, functioning as a "currency" that feeds the social capital of each person.

"Posting on Facebook, YouTube or any of the many social platforms is not a matter of life and death; this is a way of giving something in the hope of getting something in return. Digital sharing is the latest expression of the ritual exchange of goods and information that favors social capital, serving as a binder that helps societies to thrive and to live on", says researcher Alfred Hermina in" Why we share" (Hermida, 2014).

3.1 The Social Capital

Man is built to share information, as demonstrated by neurological researchers (Lieberman, 2013), and this human activity, like any other activity, targets the receiving of a reward (Hermida, 2014). The author of the book „Why We Share" claims that the distribution of information becomes a kind of social currency that feeds the social capital of people (Hermida 2014).

According to the French sociologist Pierre Bourdieu, "social capital is the sum of real or virtual resources belonging to an individual or to a group because people have a sustainable network of more or less institutionalized relationships of mutual knowledge and recognition." (Bourdieu, 1992).

American sociologist Robert Putnam argues that there are two forms of social capital: bonding capital and bridging capital. Strengthening connections (bonding) occurs when we relate to people who resemble us, the same age, the same race, the same religion like family, close friends or people in similar environments (Putnam, 2000). The recommendation on a social network of a short film for example is a way to exchange consolidation capital for cultivating a common sense of identity. But Putnam says that in order to create peaceful societies in a multiethnic society, there is also a need for "bridge" social capital, which involves connecting with those in different backgrounds or with different points of view. Putnam argued that the two forms of social capital are mutually reinforcing, the decline in bonding ties will inevitably lead to the decline of "bridge" capital that leads to ethnic tensions. The researcher believes that "the central premise of social capital is that social networks do have value. Social capital refers to the collective value of all "social networks" (who do people know) and the mutual aid behaviors arising from these networks (rules of reciprocity)" (Putnam, 2000). The American author also points out: "The term "social capital" emphasizes not only sweet and warm feelings but also a wide variety of specific benefits stemming from the trust, the reciprocity, the information and the cooperation associated with social networks. Social capital creates value for people who are connected and, at least sometimes, for those who are not connected". Putnam states that America has suffered an unprecedented collapse in the civic and social activity, its association capacity and engagement in political life since the 1960s with serious negative consequences for the country. The country's social capital has been severely affected, the researcher considers.

One of the most important criticisms of Robert Putnam's theories is that he neglects the beneficial effects of the internet and social networks upon social capital.

3.2 Symbolic / cultural capital

The ability to reach beyond familiar circles helps the development of other forms of capital that provide status and power, says the French sociologist Pierre Bourdieu. He extended the notion of capital beyond the terms of economic capital and social capital so that it also includes cultural and symbolic capital. Bourdieu sees the symbolic capital (for example, prestige, honor, the attention that individuals enjoy within society) as an essential source of power (Bourdieu, 1992). Cultural capital refers to assets such as the skills, the abilities, the qualifications that allow the holders to mobilize cultural authority. Participating in online discussions and posting links to informative articles represents a cultural and symbolic capital exchange that is beneficial to both parties. The person providing the information receives recognition and notoriety for the expertise it transmits, while the audience gains knowledge and understanding.

Sending a message on Twitter gives symbolic capital to the person who wrote it, and it can also indicate what is important to that person. A retweet is a way through which others are informed that distributed information actually matters. By giving it attention, the receptors recognize the value of the message, as well as the fact that it builds up to their professional capital by enriching their knowledge. In social networks, the act of listening is just as important as the act of conversation", Hermida claims. (Hermida, 2014)

3.3 Digital identity clothing

"The desire to be heard is one of the top five reasons why people go online. Everyone wants to be heard. The Internet provides an open microphone that anyone can use to talk on forums or to post links on various social networks", says Alfred Hermida (Hermida, 2014). The analysis of the comments' section of a news site reveals that posting an opinion is also a way to express repression.

Distributing news, information, and posting comments through social networks is an identity statement that signals to others how one would like to be seen by them. "The clothing we choose has been an identity statement for a long time. Just as an Elizabethan (sixteenth-century) law permitted only the Counts and Knights to wear purple colored clothes for people to realize their social status through the clothing they wore, the materials we distribute online are a digital clothing of our identity", says Hermida (Hermida, 2014). Our goal is to project an idealized image of us by choosing what we share, when, where and to whom. By publishing information on the Internet, we try to influence the impressions that others make about us. Sharing is becoming a way to shape how others see us.

3.4 The Preferred Subject of Internet Users

Much of the information distributed online has as a main subject the person that posted it. "It seems that social networks pull out the Narcissist from us, but actually that's just the way we're built. Speaking about ourselves - in a personal conversation or through social sites such as Facebook or Twitter - triggers the activation of those parts of the brain responsible for pleasure associated with food, money or sex, according to a study conducted at the University Harvard (Tamir, 2012). The same study reveals that people allocate 30-40% of the time they talk to others to sharing their own subjective experiences.

In a study realized by the marketing department of "The New York Times" (Consumer Insight Group, 2015), 2500 active and extremely active online people were asked why they distribute certain information through social media. Five reasons have been identified:

1. To draw the attention of others to valuable and funny contents: 94% of those interviewed think about how the information they distribute will be useful to the recipient.
2. To define themselves in front of others: 68% of the interviewed people distribute in order to make others understand who they are and what they care of.

3. To develop and to fuel interpersonal relationships:
   78% exchange information online because this allows them to stay connected to people they could not otherwise be connected with;
   73% exchange information because it helps them connect with everyone who shares their interests.
4. Self-fulfillment - 69% disseminate information because it allows them to feel more involved in the world.
5. To inform others about different social campaigns and brands:
   84% distribute information to support the causes and issues they care about.

The study also identified six types of people who distribute: altruists (distribute in order to help others), careerists (distribute business related information and exchange ideas on how to increase the value of company relationships with customers), hipsters (online distribution is a part of their identity), "boomerang" people (post controversial things because they want to be perceived as being involved and provocative), connectors (post in order to connect with others), and selective people (distribute information only to those for which that information would be relevant).

The New York Times study reveals that nine out of ten people have said that whenever they share on social networks, they always consider the way that information could be useful to others.

4. Physiological Activation and Social Transmission

The social sharing of information is everywhere, both online and offline: friends talk about holidays or movies, those who are interested in politics discuss the latest events, analysts exchange tips on different issues, neighbors gossip and young people talk about school or about what happens after school. "Interpersonal communication affects everything from decision making to the spreading of ideas, the persistence of stereotypes and the diffusion of culture", writes Johan

Berger in an article published in Psychological Science (Berger, 2011). He tries to answer to two questions: What makes people share?, and Why are some stories and information more shared than others?.

Traditionally, researchers have argued that rumors spread according to the "3C" rule: conflict, crisis and catastrophe (wars or natural disasters) (Koenig, 1985) and the main explanation for this phenomenon has been the generalized anxiety and the concerns for negative results, Berger writes (Berger, 2011), but points out that "Such theories can explain why rumors are blossoming in panic times but they are less useful in explaining positive rumors such as the ones related to the Cannes Film Festival or the boom of the Internet. Moreover, although recent works on the social distribution of emotions suggest that positive emotions can also lead to an increase in content sharing, it is not clear why certain emotions determine distribution or why certain emotions determine distributions more than others".

The researcher suggests in the above cited paper that the social transmission of information is partly determined by physiological activation. The intense physiological stimulation activates the autonomic nervous system, and the mobilization caused by this state may increase the distribution of content, Berger explains, while arguing that this theory explains why content that evokes more emotions of a certain kind (e.g. disgust) might be distributed more than others. Furthermore, this hypothesis also suggests a predictable mechanism: high activation emotions such as anxiety or fun will increase sharing much more than emotions characterized by low levels of psychological stimulation such as sadness or contentment.

"In a previous paper, we found that emotion was a decisive feature of the New York Times articles that have been the most distributed ones by email. Interestingly, we found that while articles that evoke more positive emotions were generally more viral, some negative emotions such as anxiety and anger increased the level of sharing, while others, such as sadness, decreased the level of sharing. Trying to understand why, we found that the degree of psychological activation might be a key factor", says Berger, a marketing professor at the University of Pennsylvania (Berger, 2011).

In the study, Berger suggests that fear, annoyance, or amusement determine people to share news and information. „If something makes you angry, for example, there are more chances for you to share it with your family and friends because you are psychologically activated, unlike the situations that make you sad," the researcher continues (Berger, 2011).

The hypothesis that activation, both physical and psychological, causes people to distribute has been tested in two experiments.

In the first experiment, which focused on specific emotions, 93 students participated in what they were told to be two unrelated studies. In the first study, students from two different experimental groups watched videos that made them feel either anxious or amused (emotions that triggered an increased activation), or videos that made them feel sad or content (emotions with low activation). In the second study, they were shown an emotionally neutral article and video and they were further asked how willing they would be to share that article and video with their friends and family members. The results have shown that students who have experienced high activation emotions have been more inclined to distribute that content to others (Berger, 2011).

In the second experiment, activation was stimulated outside of an emotional context. Forty students participated in what seemed to be two unrelated studies. At first, participants were told that researchers are interested in how their physical states affect their visual perception. The volunteers in a group sat down on their seats, while the second group ran for 60 seconds, an activity demonstrated to result in a general physiological activation. Then they were asked to evaluate the brightness of a set of five neutral images, a task designed to dissimulate the true purpose of the experiment. Finally, in what was said to be another study unrelated to the first, the participants had to read an online press article they could send by e-mail to anyone they wanted. Activation has again boosted the distribution of information. 33% of those who had previously sat down sent the article by e-mail to their acquaintances, and 75% of those who had previously run sent the article too (Figure 1b).

The study demonstrates that: "physiological activation can reasonably explain the transmission of news or information across a wide range of situations. Situations that increase activation should stimulate social distribution, whether positive (for example, an inauguration) or negative (for example, panic). These findings have a number of important implications. Firstly, they suggest that the content that causes activation should be more distributed than the non-activating content. Public Health related information, for example, could spread more effectively if it would rather evoke anxiety and not sadness. In general, the findings of the study show how psychological processes influence collective outcomes (e.g. culture): content that causes strong activation should be more widely distributed on the Internet and it should gain more public attention (Milkman, 2015).

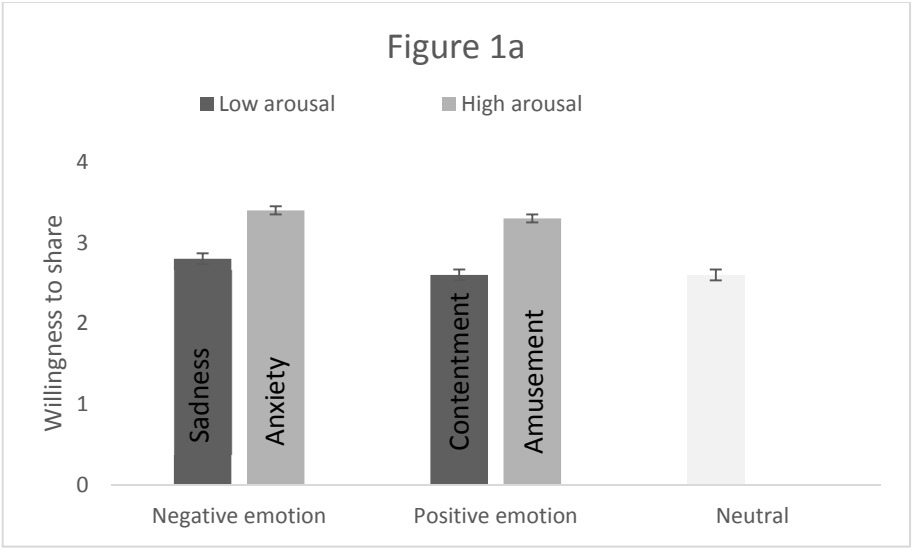

Figure 1A. The volunteers who experienced high activation emotions were much more inclined to further distribute the content to others (Berger, 2011).

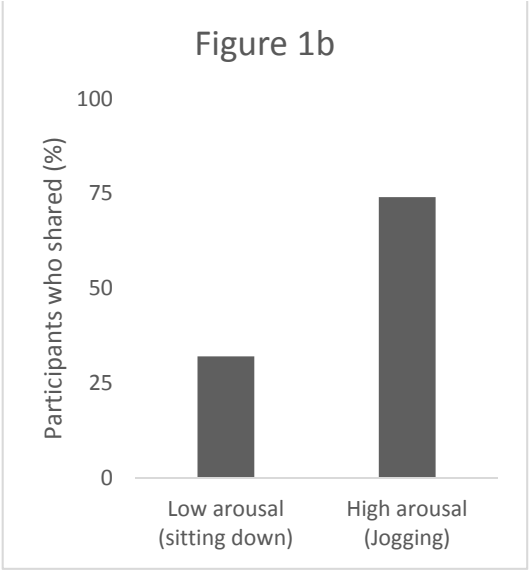

Figure 1B. Activation has boosted the distribution of information: 33% of those who sat down sent the article by e-mail to their acquaintances, and 75% of those who ran also sent the article by e-mail. (Berger, 2011).

5. The Surprise Factor/Novelty in the Distribution Mechanism

Researchers at the Massachusetts Institute of Technology (MIT) published on March 9, 2018 in the Science journal the largest article on the distribution of fake and true news in the online environment. They investigated the differential diffusion of all verified, true or false news, distributed on Twitter from 2006 to 2017. The analyzed data contain approximately 126,000 news cascades spread on Twitter, distributed by about 3 million people of over 4.5 million times. The news was classified as true or false using information from six independent organizations of facts-checking (Soroush, 2018). "Our results were striking: the analysis found that it took real news about six times more than it took false news to reach 1,500 people and 20 times more to reach a cascade depth of 10 (number of ramifications)", points out the study (Soroush, 2018).

This analysis shows that out of all the fake news, the ones about politics, urban legends and science have reached the most people, while the fake news on politics and urban legends have spread the most rapidly and have been the most viral ones. "When we estimated a model of the likelihood of redistributing news, we found that fake news had 70% more chances to be redistributed on Twitter than the real news did", the researchers concluded. (Soroush, 2018)

The Explanations. What are the explanations for these surprising results? An explanation derives from the information theory and from the Bayesian theory of decision: "People value the novelty. As others have also noticed, novelty attracts people's attention, contributes to productive decision taking, and encourages the exchange of information. Essentially, novelty can update our understanding of the world. When information is new, it is not only surprising, but it's also more valuable from the perspective of an information theory (provides the greatest help for decision-making) and socially (conferring social status based on the fact that the person who distributes information is a connoisseur or has access to unique «from within» information)," presents the study (Soroush, 2018).

To verify the results, the authors of the study have tested whether fake news is information with a higher degree of novelty than true news, and whether Twitter users are more likely to redistribute newer information. "The tests confirmed our findings. Numerous diagnostic and validation statistics supported our results and confirmed their robustness", the researchers said. Moreover, a sophisticated algorithm for detecting and removing "bots" - software that creates fake Twitter profiles to send messages and distribute posts containing malicious links - has been used. Even if posts made from false profiles were removed or even when these posts were not removed, one of the main findings of the study remained unchanged: "False news is still spreading, faster, deeper and wider than real news is. The inclusion of the «bot» programs has accelerated the spread of both true and false news, affecting the spread of both types of news. This suggests the

opposite of what many believe, that false news is spreading faster and deeper than the true news, because people are more likely to share them than the «bot» programs" the article concludes. (Soroush, 2018)

6. The Neurological perspective: dopamine

Dopamine is one of the 20 major neurotransmitters that carry messages between neurons, nerves and other body cells. In the 1980s, researcher Wolfram Schultz discovered that dopamine is linked to the reward we receive for an action. Wolfram Schultz, Peter Dayan and Ray Dolan received the € 1 million prize from the Lundbeck Foundation in Denmark in the spring of 2017 for their vital contribution to understanding how the human brain works. "Together, their research has shown how dopamine-related brain rewards systems influence our behavior and survival, playing important roles in decision-making, gambling, drug addiction, psychopathic trends, and schizophrenia," says an article from New Scientist. (Coghlan, 2017)

Schultz discovered through experiments on monkeys, 30 years ago, that when animals receive a reward, specialized brain cells become more active and produce dopamine. Later, he showed that this could be triggered by learned clues, even without reward.

In Silicon Valley, dopamine is considered the secret ingredient that makes an application, a game, or a social platform successful.

"Technology companies understand the causes of increases in the dopamine level in the brain and supply their products with "hijacking techniques" that lure customers and create "compulsion loops'. Snapchat has Snapstreak, which rewards the users who distribute daily, thus encouraging social network dependence. News feeds are structured like «endless bowls», so one-page viewing leads to another and then to another, and so on. Most social media sites provide rewards at irregular time intervals; you must compulsively check your device because you never know when a social affirmation explosion might come from Facebook', writes David Brooks (Brooks, 2017).

A widely used term when it comes to using psychology in technology products is the "compulsion loop", where compulsion has a meaning derived from Psychology: "an imperious need and obsessive tendency towards having a repetitive conduct with pathological significance which, if not manifested, leads to psychological tension, restlessness, etc. Specific is its unintentional, involuntary character, the conduct thus determined being of no use to the individual". (Popa, 1993).

6.1 Operational Conditioning

The compulsion loop is nothing but a modern-day translation of the behavior strengthening principle.

Operational conditioning (sometimes referred to as instrumental conditioning) is a learning method that uses rewards and punishments for different behaviors. By operative conditioning an association is established between a behavior and a consequence of that behavior (Domjan, 2009). For example, when a lab rat touches a blue button, it receives a piece of food as a reward, and when it presses the red button it receives a slight electric shock. By this mechanism it learns to press the blue button and avoid the red button.

Operational conditioning also plays an important role in the learning process that people perform each day.

The term "operative conditioning" was introduced by American psychologist Burrhus Frederic Skinner (March 20, 1904 - August 18, 1990), who also was a renowned author, inventor, philosopher and professor at Harvard University. Skinner believed that it was not really necessary to analyze the thoughts and internal motivations in order to explain human behaviors. Instead, he suggested that we should only look at the external, observable causes of human behaviors. (Domjan, 2009)

In the early part of the twentieth century, behaviorism became a major force in Psychology.

The operational conditioning is based on a simple premise: the actions that are followed by a reward will be consolidated and they will be more likely to emerge again in the future. Because behavior has been followed by rewards or a desired result, previous actions are consolidated.

On the contrary, actions that result in punishment or unwanted consequences will appear less in the future.

Skinner's Box

Skinner's box or the operational conditioning room is a laboratory instrument used to study animal behavior. The box was created by B. F. Skinner in 1930 when he was a PhD student at Harvard. The tool allows researchers to study conditioning behaviors by teaching an animal subject to perform certain operations in response to a specific stimulus (like a leverage). When the subject performs the expected behavior, the mechanism of the Skinner box provides food or another reward. In some variants of the mechanism, the subject can receive a punishment for not adopting the desired behavior.

The structure of the instrument consists of a large enough box that accommodates the subjects for which it is designated, usually lab rats or pigeons, which avoids all external stimuli that could distract the attention of the studied animals. Skinner's box is made up of an operator - usually a lever / button - that once pressed, activates a mechanism for the delivery of a primary consolidation element - usually food or water. Modern operational conditioning rooms have more levers and a variety of mechanisms that can generate many more stimuli, including lights, sounds, music or certain images, but they also have electrified areas. (Skinner, 1983)

Skinner has identified two types of consolidations and two types of punishments. Positive consolidation involves rewarding, such as giving a gift to the child after cleaning his/her room. Negative consolidation involves eliminating an unpleasant stimulus. Positive punishment means

applying an unpleasant response after a certain behavior, such as scolding a child when he/she is wrong. Negative punishment involves the removal of a pleasant element after a certain behavior.

There are two types of cure programs:

1. The continuous cure program, in which the desired behavior is reinforced every time it occurs. This program is used best in the initial stages of learning, to create a strong association between behavior and response.

2. The intermittent cure program: Behavior is not rewarded every time. There are four partial consolidation programs: I. Fixed weight consolidation programs - those in which a response is rewarded only after a certain number of iterations. II. Variable weight consolidation programs - which occur when a response is rewarded after an unpredictable number of iterations. III. Fixed-range consolidation programs are those in which the first response is rewarded only after a certain amount of time has passed. IV Variable-range consolidation programs occur when a response is rewarded after an unpredictable time interval has passed. (Coon, 2014).

While he was analyzing conditioned behavior, B. F. Skinner tested pigeons' reaction to different consolidation/reinforcement programs. The most effective one was the one that provided an intermittent reward scheme, i.e. food was not provided after each lever activation, but at certain intervals. If the reward is too rare, the animal gets frustrated and gives up trying, but if it comes every time, the pigeon will no longer push the lever so often.

"A great part of the behavior, however, is only intermittently strengthened. A certain consequence may depend on a series of events that are not easily predictable. We do not always win the game of cards or dice because the results are very difficult to determine so we call them "chance". We do not always find proper ice or snow when we go skating or skiing. Situations involving people's participation are, in particular, subject to an uncertain outcome. We do not always get a good meal in a particular restaurant because cooks are not always

predictable. We do not always get an answer when we call a friend because the friend is not always at home. We do not always find the pen in our pocket because we do not always put it there.

Consolidations of industry and education-specific behaviors are almost always intermittent because it is not feasible to control behaviors by strengthening each response. As can be expected, behaviors that are only intermittently hardened often result in an intermediate frequency, but laboratory studies of various programs have revealed some surprising complexities. Usually, this enhanced behavior is remarkably stable and persists for a long time after the reward no longer exists.

In an experiment, over 10,000 responses occurred in the extinction curve of a pigeon whose behavior was strengthened by a special intermittent program. Nothing of this kind has ever been obtained after the continuous strengthening program. This is a technique for "getting more answers from an organism" in return for a given number of rewards", explains Skinner (Skinner, 1953).

6.2 From Gambling, to Video Games and Social Networks

Natasha Schüll, an associate professor at MIT who had researched automated gambling devices for 15 years, published the book "Design Dependency: Gambling in Las Vegas in 2012. Schüll says that modern slot machines use the intermittent reward program. "It turns out that too many rewards have caused players to stop playing because this represents an intense change of the situation, making them pause, stop, take their money and then leave", says the researcher (Schüll, 2012). Instead, increasing the playing time with small rewards will lead towards the consolidation of that behavior, Schüll says.

The researcher presents the significant change that occurred in the gambling industry in the recent years: "By the mid-1980s, mass games such as blackjack and dice games dominated the casinos, while slot machines were piled on the edge of casinos and had as their main purpose to keep the companions of the "real" players occupied. (...) By

the late 1990s, these machines moved into key casino positions and generated twice as much revenue as all the «live games» put together (Schüll, 2012). Frank J. Fahrenkopf Jr., president of the American Gaming Association, the lobby institution of this industry, estimated in 2003 that more than 85% of casino profits come from slot machines (Schüll, 2012).

The researcher explains that the foundation of the extraordinary productivity associated with the gambling industry is based on the intermittent variable consolidation program, where players never know how much or when they will win; that's exactly the one considered by B.F. Skinner to be the most effective in determining a particular behavior.

Gaming disorders have been included in the latest reviewed version of the International Classification of Diseases, a document realized by the World Health Organization, with the following definition: "a gaming behavioral pattern ("digital games" or "video games") characterized by an insufficient control over the game, manifested by the prioritization of the game in front of other activities as much as the games have priority over other interests and daily activities, and the increase of the time allocated to these games despite the occurrence of some negative consequences. In order to diagnose gambling-related disorders, the pattern of behavior must be of sufficient severity as to cause significant effects upon the personal, family, social, educational, occupational, or other important areas of human activity, and the behavior must have manifested for at least 12 months "(World Health Organization, 2018). The World Health Organization's New International Classification of Diseases would be released in mid-2018.

In the announcement published in March 2018, the institution draws attention to: "Studies suggest that gambling disorders only affect a small fraction of people engaging in digital or video games. However, people who practice video games should be careful about the time they allocate to these activities, especially when it comes to excluding other daily activities as well as affecting their physical or psychological health and their social life, if these situations could be attributed to their game behavior" (World Health Organization, 2018).

This warning is a silent acknowledgment of the fact that the way video games are built can induce addiction even in the case of a person who does not have a predisposition to it.

A research published in 2017 in "Frontiers in Human Neuroscience" reviewed 116 scientific articles on video games. One third of the studies referred to the dependence of video games, and 14% focused on video game violence. "Researchers have tried to discover the neuro-biological basis of video game addiction, and if it is similar to other addictive behaviors, by monitoring the extent to which abnormal reward processing patterns exist for the addicts. Studies seem to support this assumption, as many of the regions involved in the rewards system have been affected in video game addicts" (Palaus, 2017). The conclusion of the study is that, in general, video games addicts have a number of reward deficiencies involving dysfunction in the dopaminergic system, a common neurobiological anomaly for other addictive behavioral disorders (Palaus, 2017).

John Hopson, head of the "User Research" department of the Bungie Video Game Developer Company and principal investigator for a wide range of successful video games like "Halo" or "Age of Empires", has written several articles about the link between behavioral psychology and video game design. Hopson, who has a Doctorate in Brain and Behavioral Sciences from Duke University, claimed that video games can be described as a series of choices. "The player's entire journey is the result of thousands of small choices that lead towards success or failure, but they also determine the player's pleasure or dissatisfaction", he explains. (Hopson, 2002). According to Hopson, the system of rules that determines when the player receives his rewards is essential to the success of a video game. The researcher reminds of the same type of consolidation programs used by Skinner, the famous psychologist.

When confronted with multiple options, the player will choose the option that maximizes his rewards. "While maximizing is a positive thing for the player, it's probably not a good thing for the designer. If the player maximizes his performance, it means he will be able to

master the game. This means that the game has become predictable and, very likely, boring. A bonus rewards program that contains an unpredictable element will keep the player's interest for a longer time and will be more attractive to him", says Hopson. (Hopson, 2002).

To the question, "How do you make players maintain a high and consistent activity rate?", Hopson replies: "By analyzing the four basic behavioral consolidation programs, the answer is given by a variable consolidation program, one in which each action has the chance to gain a reward" (Hopson, 2011).

To the question, "How do you make players never give video games up?," Hopson replies: "The short answer is to make sure there *always* is a reason why the player is playing. The variable consolidation programs we have discussed produce a steady probability of reward, and so the player always has a reason to do the next thing and keep playing. What a gaming designer also wants from players is a lot of "behavioral impulses", a tendency to continue doing what they do even in times when there is no immediate reward. A consolidation program that produces a lot of behavioral impulses is the avoidance program, where players have to take care to prevent negative outcomes. Even when nothing happens, the player can get something positive by postponing a negative consequence." (Hopson, 2011)

Social Media

Social networks make full use of the mental mechanisms that lead to the release of dopamine in the brain.

"Revenues and virality depend on user involvement and their retention. The survival of an application is guaranteed if it becomes a user's habit. Fortunately, habits are programmable: we do what we are stimulated to do. We do what gives us joy and amusement. Getting the proper stimulation is not luck, it is science. Neuroscience, specifically"- this is the motto of a controversial Silicon Valley company, Dopamine Lab, which provides customers with advice so that the applications they develop would create user dependency (BoundlessMind, 2018).

Several successful models are described on the company's website. An example is the "Vimify" application, which manages the diet and physical activity of users. Users' performances increased by 21% after the consolidation system was introduced to transform physical activity and healthy diet into habits. In the spring of 2014, two groups of users were monitored for 28 days: one group that used the company's incentive system and another group that used a system based on the random generation of user's rewards. The first group achieved 21% better results.

This system also worked, according to Dopamine Lab officials, in the case of "Tala" application, whose users in Kenya have paid their micro-credits in advance after installing the system. After monitoring two groups for 50 days in 2015, the conclusions pointed out the fact that the group that used the incentive system obtained 14% better results, i.e. they paid their micro-credits in advance.

The explanation for these results is the following: "These explosions to stimulate the new habit do not just cause a state of well-being, but they reconnect the brain centers for habits. Stimulation/ consolidation is how the brain learns new habits. The rhythm and the timing of stimulating the new habit tells the brain what to focus on and what to ignore. Our program finds the pace needed by every user. Then it optimizes the pace to model the user and any behavior in your application" (BoundlessMind, 2018).

Why It Is Hard to Resist Social Networks

"Why is it so hard to resist the desire to use social networks?" - is the question that the researchers at the Department of Communication Sciences of the University of Amsterdam have tried to answer.

"A possible answer is that people who frequently use social networks have strong and spontaneous hedonistic reactions to social stimuli, which, on the other hand, make it more difficult to resist social temptations", argues a study published in 2017 (Koningsbruggen,

2017). The Dutch researchers investigated the spontaneous hedonistic reactions that frequent users expressed as well as those who make sporadic use of social networks. "The results have shown that frequent social network users have had positive affective reactions in response to social media stimuli, as compared to control stimuli, while the affective reactions of sporadic social networks users are similar in the case of social stimuli as in the case of control stimuli", shows the study (Koningsbruggen, 2017). Moreover, spontaneous hedonistic reactions to social media stimuli (compared to control stimuli) influence the desire to use social networks, according to the same study. "These findings suggest that spontaneous hedonistic reactions to the social media stimuli of frequent users could contribute to their difficulty in resisting the desire to use social networks," the researchers conclude. (Koningsbruggen, 2017)

Thus, the conclusion is that they will share those articles that will make the user maximize the long-desired profit: that is, as many social reactions as possible from the other users.

Anti-Facebook Coalition

A group of Silicon Valley technicians, formerly employed by Facebook and Google in their early stages of development, alarmed by the negative effects of social networks and smartphones, have teamed up in order to challenge the companies for whose development they had worked. These specialists have created the "Human Technology Center," The New York Times said in an article published on February 4th, 2018. (Bowles, 2018).

"Facebook, Twitter, Instagram and Google created stunning products that brought great benefits to the world. But these companies are also trapped in a zero-sum race (the situation where a person's gain derives from the loss of another) for our limited attention, which they need in order to make money. Constantly compelled to overcome the performance of their competitors, these producers had to use more

and more persuasive techniques in order to keep customers close to these applications. They use Artificial Intelligence for news feeds, content and notifications, learning continuously how to get user attention and influence user behavior.

Unfortunately, what catches our attention best is not best for our well-being:

Snapchat turns conversations into "streaks" - a situation where two Snapchat users send to each other daily photos, making users seem to have many friends, and further redefining how our children measure friendship.

Instagram glorifies perfect life in its images, eroding our self-worth.

Facebook separates us into echo rooms, fragmenting our communities.

YouTube automatically plays the next video in seconds, even if this mechanism is depriving us of sleep.

These are not neutral products.

They are part of a system designed to provoke addiction", says humantech.com (Humantech.com).

Sean Parker, co-founder of Napster and one of the first investors in Facebook, said that those who set up Facebook knew people would become addicted to the social network. "These applications, Facebook being the first of them, have been built with just one thing in mind: "How to consume the user as much time and conscious attention as possible?" And this means that the application provides a small dose of dopamine to its users once in a while, because someone gave a Like or commented on a photo or a post or anything else. And that will make you provide more content, which will bring you ... more Likes and comments. It's a feedback loop for social validation ... exactly the idea a hacker like me would have in mind in order to exploit a vulnerability in human psychology. The inventors, the creators - like me, Mark (Zuckerberg), Kevin Systromco (the founder of Instagram) - have understood this consciously. However, we continued to develop our applications," Parker explained. (Allen, 2017).

7. Psychology: the human desire to connect

A 2018 study from Frontiers in Psychology analyzing issues related to the use of new digital technologies has concluded that the functions of smart phones that give the highest dependency have one common theme: they all refer to the human desire to connect with other people. Many studies have drawn attention to the danger caused by the excessive use of smart phones: more and more people are unable to live without checking their screens every few minutes, sending messages or reviewing the most recent posts on social networks. One of the main concerns when it comes to smart phone addiction refers to the fact that it stimulates antisocial behavior.

The author of the article, Professor Veissière from the Department of Psychiatry at McGill University in Canada, an anthropologist who studies the evolution of knowledge and culture, explains that the desire to follow and monitor others - but also to be followed and monitored by others – has deep roots in our evolutionary past. "In this paper, we make the provocative claim that the current moral panic in relation to smart phone dependence ignores a factor of fundamental importance: there is no element of mobile technology that causes addiction to itself. We rather suggest that social expectations and rewards for connecting with others and seeking to learn from others induce and maintain this dependency relationship with smart phones. Much has been said about Internet addiction and the new environments and technologies that connect us and make us feel lonely at the same time, causing negative consequences on mental health (Twenge, 2017). However, the profoundly prosocial character of these mechanisms is often underestimated. The compulsive use of smartphones, we argue, is fundamentally social, and not antisocial. Specifically, we argue that the addiction to mobile technology is determined by the human need to connect with other people and the need to be seen, heard, considered, guided and pursued by others; all these are deeply rooted in our social brain, and have their origins far in our evolutionary past", the study shows. (Veissière, 2018)

The Canadian researcher shows that studies have revealed that smart phones are mostly used for social activities such as social networks, text messaging, and phone calls (Li and Chung, 2006, Lopez-Fernandez et al., 2014). Even the less interactive uses of smart phones, such as searching for information on the Internet or simply browsing the web, have implicitly become social: the number of Likes, the number of views and comments are social ratios for prestige and collective attention. In this context, the study shows that "Individuals who use their intelligent devices primarily for social purposes are more likely to develop smart phone dependence more quickly. These findings suggest that we cannot state the fact that intelligent phones cause dependence themselves, but it is rather caused by the direct or indirect social interaction they allow" (Veissière, 2018).

Addiction is caused by the notifications from applications that send beeps, vibrations, audio or visual alerts to let people know that someone is interacting with them.

"Social interaction (digital or not) activates dopaminergic reward circuits in basal ganglia. It is important to note that the very same circuits are involved in drug addiction, compulsive use of video games and the search for rewards in general. These are circuits that are also responsible for associative learning, the process by which an individual learns to associate two stimuli. With a smart phone, almost all notifications received by the user generate some social value and thus they activate the dopaminergic reward circuit, which causes the user to anticipate and search for these reward notifications. With each supplementary use, this relationship increases, and the user will anticipate and search for these rewarding notifications, paving the way for creating a habit", concludes the study (Veissière, 2018).

The dopaminergic system regulates two functions that govern dependence: anticipating rewards and evaluating outcomes (Linnet, 2014). "An important finding about dopamine and addiction, however, is that the release of dopamine usually occurs before the reward itself is obtained, more precisely when a clue (for example, an anticipative audio signal) points towards the reliable delivery of a reward (e.g.

pulling a lever). As activation decreases with frequent and predictable exposure, the expectation of reward is a much stronger mediator of strong dependencies than evaluations of the stimulus' results (Fiorillo et al., 2003, van Holst et al., 2012). According to this finding, dependence is stronger when we cannot predict the pattern for receiving rewards (van Holst et al., 2012). Behavioral scientists call these patterns of addiction, intermittent consolidation or variable consolidation programs (Zuriff, 1970 quoted by Veissière, 2018).

What is important to remember is that psychological activation is more correlated with the anticipation of reward than with the reward itself. The conclusion of the study is that "smart phones can be assimilated with a hyper-efficient kitchen equipment. Both technologies optimize the processing and delivery of specific types of basic needs: food, on the one hand, and social information, on the other. The key to eating well and becoming balanced social beings is to find the quality and intensity of consumption rituals" (Veissière, 2018). The authors of the study do not support the abandonment of smart phones, but the abandonment of elements such as notifications that activate the dopaminergic system announcing a potential reward and thus creating addiction.

8. Conclusion

Each society comes with a way to hunt and gather information that is further passed on. Sharing information is one of the features that helped us survive and evolve as a society and is deeply rooted in our brain. Neuroscientists have discovered that whenever we hear new information, the part of the brain in charge of sharing information is activated, so they conclude that "we are built to share information with other people" (Lieberman, 2013).

The way information is collected, cross-checked and distributed has changed over time, but the dynamics of these processes has still remained constant.

Scientist Alfred Hermida, the author of "Why We Share", thinks „News and information are a coin that shapes what we decide to share within our social circles. People are not addicted to YouTube, Twitter or Facebook, but they are addicted to each other. Tools and services come and go; what remains constant is our human need to share", concludes the researcher (Hermida, 2014).

Hermida says people are further distributing exciting or funny news for the same reasons:

„1. They want to strengthen their social capital by showing that they are aware of what is happening in the world.

2. They want to express and show what is important to them.

3. They want to enrich the lives of others by giving back to the community." (Hermida, 2014).

Behavioral psychology claims that any human behavior can be modeled and strengthened through punishment and, above all, through rewards. Thus, the online distribution of information works just like any other human behavior, so it can be modeled and reinforced through rewards. When we think about rewards, we refer to social interactions, mainly to what sociologists call social, cultural and symbolic capital, about the deeply rooted human need to share information that ensured the mere survival of our species.

Knowing that when confronted with multiple options, one will choose the alternative that grants the maximization of rewards (Hopson, 2002), the conclusion of this paper is that when the internet user considers sharing certain content, he chooses the information that maximizes the chance of achieving the desired social interaction from targeted users. For some people the desired social interaction may mean a comment from which to start a discussion to help them take a decision, for some others it may mean a "Like" that confirms that their projected identity is appreciated, and for others it is important to demonstrate that they are an expert in a certain area.

An external element that has an important influence upon the decision to distribute a certain type of online content is represented by social networks' algorithms. Especially in the case of Facebook, the world's

largest social network, these algorithms do not allow all friends on the list to see the posted information, but only a percentage of them. Posted content that produces interactions as for example "likes," "distributions," "comments" is further interpreted by algorithms as relevant information and will therefore be shown to several friends in the list. This mechanism makes users often distribute that type of content that will cause as much interaction as possible, which, as we have seen above, is content with an emotional activation load such as anger or amusement (Berger, Jonah, 2011) or content with a high degree of novelty / surprise (Soroush, 2018) or a combination of the two variants. This is the explanation of the mechanism by which the social network ecosystem is populated with information. Today, this mechanism favors fake or manipulated news, high emotional content, click bait, infotainment, because what catches our attention best is not the best content from a journalistic perspective.

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