ORIGINAL PAPER



Chemophobia and passion: why chemists should desire Marcel Proust

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Received: 21 May 2022 / Accepted: 6 June 2022 / Published online: 14 July 2022 © Springer-Verlag GmbH Austria, part of Springer Nature 2022

Abstract

In this article, we introduce a new communication strategy called the "communication success dimension" for the suppression and eradication of chemophobia. We explain, using recent examples, that chemophobia presents a danger not only to the science of chemistry but also to humankind. Based on the latest insights from communication research, we emphasize the need to bring more passion, dedication, and human factors into the communication of chemistry. We demonstrate the application of this new strategy by employing Marcel Proust's *In Search of Lost Time* to combat chemophobia.

Graphical abstract

#proust4chemistry

Keyword Communication strategy \cdot Didactics of chemistry \cdot Fears of chemistry \cdot Identity of the chemist \cdot Marcel Proust \cdot Public image of chemistry

Introduction

The 2021 Nobel laureate for chemistry, David Macmillan, has recently encouraged young scientists by advising them to be bold and "don't hesitate to take chances ... try and ... go for things" [1]. The question, however, is how many talented chemists will follow his advice as the numbers of university students decline both in USA [2] and in Germany [3, 4], as well as in the UK [5]. While, one possible answer to this problem is to search for the "missing millions" [6] of underrepresented groups in chemistry [7], another is to effectively translate our merits into a language that is understandable to every citizen or, in simple terms, making chemistry and the profession of the chemist more attractive.

2021 could be called the Year of the Vaccine, when according to the British weekly *The Economist* [8] scientists "showed how vaccines and medicines can save hundreds of millions of lives", or mRNA's breakout year [9] with a totally different perspective on drugs, and the word vax-as a shorthand for a vaccine-was declared Word of the Year [10]. Once again, we chemists have proven ourselves to be innovators in solving problems in the service of mankind. However, we have not yet restored the sovereignty of interpretation. As a result, people remain unaware of the important role that chemists play in the fight against the COVID-19 pandemic. In the past, however, young people have been inspired by the life-saving work of chemists [11, 12]. Furthermore, we cannot effectively challenge the attitudes of many young people toward science-as summed up by Sjaastad [13]—that it is something they value highly but are unwilling to study themselves; or toward scientists as people they do not want to be like; and toward their sciencepreferring peers who are seen to be less attractive, less popular, and less socially literate than their peers who prefer the liberal arts. In short, they do not consider it relevant, and it does not inspire within them a passion for knowledge.

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Although we observed in our previous article [12] a recovery from the anti-chemistry amnesia of the past decades during the pandemic, this awakening has yet to lead to a breakthrough. Chemophobia in its immensity still overshadows the horizon of current society, its roots are too deep and the force of the chemophobic habit perhaps too strong. Understandably, some chemists are disappointed in the lack of interest from the public and "wish more of the public would listen to, believe in, and appreciate our scientific progress" [14]. However, this indifference to our achievements needs to be overcome through a proactive approach and by attracting new chemistry enthusiasts from all parts of society. It may be sad to admit after decades of the modern version of chemophobia, but Angela K. Wilson, President of the American Chemical Society, is right when she says, "I don't think we tell our stories often enough or clearly enough" [14].

Omnipresent chemophobia and its consequences

Today, we chemists cannot complain about the lack of challenges as we continue to tackle pressing global problems, reflect on the advancement of our science with the lack of new talents, and eliminate the negative impact of online education during the pandemic on the performance of young chemists. However, as difficult as these challenges are, we must never forget that challenges have always been the driving force behind progress in chemistry, and we have gained a critical understanding of how the development of society has posed them. After all, William Ramsay, Nobel Prize winner in chemistry, was right when he said: "the country which is in advance of the rest of the world in chemistry will also be foremost in wealth and in general prosperity" [15].

However, beneath the surface of all these challenges lies the fundamental problem of improving the position of chemistry and chemists in society and of overcoming chemophobia. These efforts represent the larger context for the existence of chemistry today. Therefore, we need to "explain facts and debunk myths" [16] to unweave the web of chemophobia and help those who suffer from it. We define chemophobia as a long-lasting and persistent irrational fear of chemistry and chemical substances and a strenuous effort to avoid them, which causes people to become hypersensitive or even intolerant in this respect [11, 12, 17–19]. Over time, we have witnessed many of the troubling effects of chemophobia on the lives of chemistry-fearing or chemistry-ignoring and, therefore, vulnerable people. The following are the most recent examples of such effects (Fig. 1).

People with high levels of chemophobia are less careful when choosing household chemicals, considering them all to be risky [20]. They examine products in less detail and also



Fig. 1 Examples of the troubling effects of chemophobia

focus on information relevant to risk assessment in fewer products. Thus, they put themselves and their families at unnecessary risk.

Fear of chemicals is prompting some consumers to buy food from local producers. However, the habit of buying raw milk from a local farmer may turn out to be a source of microbiological risks and reduced nutritional value. The participants in the study [21] demonstrated a lack of clear knowledge of how to treat raw milk, doing it "as it has always been done." Raw milk must be boiled before consumption, because it can contain pathogens. However, the only correct treatment for milk is pasteurization, developed by the French chemist Louis Pasteur [22]. Milk must reach 72 °C for 15 s as higher temperatures spoil the nutrients. Therefore, an accurate procedure is essential.

Similarly, there is a clear parallel between an aversion to chemistry and a disregard for microbiological risks. The same study [21] shows that participants who try to avoid dyes, preservatives and pesticides, simultaneously practice improper hand-washing, improper use of kitchen towels and sponges, improper washing of food (e.g., eggs, fruits, and vegetables) and utensils, uncontrolled presence of children and pets in the kitchen, and improper food storage—all factors that significantly increase the risk of microbiological contamination of food. Especially, alarming is the lack of hand-washing with detergents, which is observed for almost all participants.

The family and the doctor can be a source of chemophobia. According to a survey of pre-university students, even doctors can sometimes discourage patients from using certain types of products because of a wrong opinion [23]. The same survey shows that advertising campaigns for natural cosmetics increase the fear of chemical products. As it turned out, female participants were more prone to chemophobia than their male counterparts.

An analysis of the public perception of chemistry on Twitter (with tweets considered to be spontaneous expressions of opinion) concludes that the presence of terms such as "chemical-free" or "used chemical" in positive tweets can stoke chemophobic sentiments [24].

Poorly constructed laboratory safety regulations can result in unintentionally teaching chemophobia by professional chemists. Safety regulations imposed in a uniform fashion without any attention to what is actually done in particular laboratory create the impression that all chemicals are equally dangerous. Thus, they paradoxically result in a number of chemical institutions creating workplaces subliminally penetrated by an atmosphere of chemophobia. According to Behrman [25]: "Molecular biology", or more true to the essence, biological chemistry, "laboratories, for example, deal with different materials, compared with those in which high explosives are studied. Nevertheless, the same restrictions may be applied to both involving eye protection, lab coats, gloves, and pipetting techniques. The use of phosphate buffers does not require the same precautions as the use of bromine."

More than 60 years of modern chemophobia bore bitter fruit before the pandemic, as chemistry was viewed by lawmakers rather as "a special interest than a priority" [6]. And most importantly, chemistry was not guaranteed automatic financial support from public sources, because legislators did not see enough chemists making the case for chemistry.

The reluctance to differentiate between synthetic and natural pesticides (essentially a double standard and a classic example of a chemophobic attitude) could undermine stable food production in Switzerland [26]. A popular Swiss initiative called for a total ban on the use of synthetic pesticides and a switch to organic food production by 2030. However, restrictions would not affect natural pesticides such as copper-based pesticides, which are potentially harmful to the environment and human health. They are used primarily in the production of organic foods, which some consumers paradoxically believe to be safer and healthier.

Chemophobia has been cited as one of the factors that, along with some people's reluctance to get vaccinated, helps undermine the effectiveness of measures that have historically improved human health and food production. This phenomenon is considered one of the top ten risks that humanity will face in the decade 2020–2030 (along with pandemics, wars, and climate change). As such, it is considered a direct threat to human health and the environment. It is noted that chemophobia continues to limit the willingness to use highly effective countermeasures against mosquitoes, such as indoor residual spraying. This is despite the fact that this insect "has already contributed to billions of human deaths and chronic misery" [27].

Therefore, further research of chemophobia with a combination of modified education of chemistry and its effective communication is considered to be the only possible solution [28].

Changing conditions of chemistry communication

For us chemists, our ideal is the world as Macquer [29] (Fig. 2) represented it, with "the glorious protection of princes, the zeal of a multitude of illustrious and enlightened amateurs, the profound knowledge and ardor of our modern chemists," or, as he eloquently put it, where "we have the advantage of finally seeing the best days of chemistry" [30]. Not in our case though, as we have recently seen an escalation of public discourse during the COVID-19 pandemic and our reality is being negatively impacted by widespread chemophobia. This will of course have an impact on science communication in general, as well as on our efforts to improve the reputation of chemistry and our fight against chemophobia.

Fig. 2 The influential French chemist Pierre-Joseph Macquer (1718–1784), "in horto regio chymiae professor a rege designatus et nominatus" (in the royal garden—the famous Jardin du Roy—professor of chemistry designated and appointed by the king), and the extract on period rank of chemistry from the first edition of his famous Dictionnaire de chymie, contenant la théorie et la pratique de cette science (Paris 1766), shortened translation in text



Nous avons l'avantage de voir enfin les plus beaux jours de la Chymie. Le goût de notre fiecle pour les matieres philofophiques, la glorieufe protection des Princes, le zele d'une multitude d'amateurs illustres & éclairés, le profond favoir & l'ardeur de nos Chymistes modernes, que nous n'entreprenons pas de louer, parcequ'ils font au desfus de nos éloges, tout femble nous promettre les plus grands & les plus brillans fuccès. Nous avons vu la Chymie naître de la nécessité, recevoir de la cupidité un accroiflement lent & obscur: ce n'est qu'à la vraie Philos phie qu'il étoit réfervé de la perfectionner.

During the pandemic, the human needs to grasp and seize the moment has led to intellectually challenging but sometimes endless discussions on social media, during web-conferences and in the traditional media. In many cases, we have seen a loss of true understanding, a tendency to exaggerate, and the proliferation of unconfirmed, and in many cases misleading, information. As observed by OECD [31] "the pandemic has brought ... to light ... the erosion of public trust in government and in expert advice, which was compounded by a wave of mis- and disinformation." One of the hallmarks of a pandemic is that the increased presence of scientists in the media prompts a rather negative sentiment on the part of the public. As summarized by the German monthly Cicero [32] "experts mutate into sought-after public intellectuals who are willing to comment on everything and sometimes go beyond their core competence immeasurably." This criticism forms a counterpart to the criticism in the German weekly newspaper Die Zeit of those who "overestimated their ability to form a correct and objective judgment" and, for example, believe that they "can judge for themselves how likely it is that new variants of the virus are more dangerous than Omicron" [33].

We chemists could not help but feel déjà vu as we observed this development. The misperception that society has faced over the past few years is not new to us, as chemophobia has been the same phenomenon for over 6 decades. We are also well aware of the consequences of failing to communicate with the public, as chemophobia has capitalized on the communication vacuum created by our inability to engage with the public and address their feelings. As a result, for 60 years, the chemical discourse has been dominated by non-chemists and their mix of indifference, hostility, chemical illiteracy, and unwillingness to do anything about it.

To protect the reputation of chemistry in our unstable, rapidly shifting world we need to communicate innovatively and first of all seamlessly. It is not enough to have welleducated chemists, it is crucial that they willingly present their achievements to the general public and look for ways to change society's negative attitude toward chemistry. To succeed in communication, we have to adapt to the conditions of today's media world and keep up with its dynamic development.

This is all the more true in modern society, where "the most important condition of existence is not our knowledge but our attention" [34]. One of its main features may be the shift from information scarcity to abundance, but information abundance competes for limited collective attention [35]. However, instead of reliable information, we are confronted with a flood of fake news, hoaxes, and misinformation [36]. However, in this new digital reality, misinformation breeds false beliefs and can exacerbate partisan disagreements even over basic facts [37]. Originally created

to entertain users, social media platforms have transformed the way social perceptions are constructed. In doing so, they influence the development of the public debate, especially on controversial issues [38], that pose a serious threat to the uptake of vaccination and compliance with public health guidelines [39]. Therefore, it is not surprising that the World Health Organization has been forced to redouble its efforts to combating both the epidemic and the infodemic [40].

Two years of the pandemic have accelerated long-term trends such as fragmentation of the media [41, 42], social networks [43], society [44], and hypernarrativity [45]. Similarly, the influence of emotions on public discourse has substantially increased [46], and this development coincides with the massive spread of misinformation. Therefore, current research of this phenomenon is of fundamental importance to us chemists, since it can influence the way we deal with chemophobia.

These results can often surprise us. False claims can be refuted by fact-checking, but with a short-lived effect [9], since most people are vulnerable to the vagaries of times and news construction. Because they place disproportionate weight on the latest news as previous effects wear off over time [47], particular attention should be paid to a combination of multi-stakeholder interventions against the provision and consumption of misinformation [48]. In addition, attention needs to be drawn to the inner world of those who spread misinformation, and chemophobia in particular. As Cinelli et al. [38] observe when consuming the information on the Internet, these people prefer information consistent with their worldviews, ignore dissenting information, and form polarized groups around shared narratives. Not surprisingly, the greater the polarization of opinion, the more misinformation spreads. Equally important is the finding of Ecker et al. [48] that the dissemination of misinformation is associated with the satisfaction of psychological needs, for example, to make others feel good, to signal group affiliation, to promote oneself, to foment moral outrage in others, or even to create chaos.

The communication success dimension

Modern chemists may not be familiar with the name of John Read (1884–1963), but this organic chemist and historian of chemistry was able to correctly predict the shift in the way chemists view the world they live in [49]. This turned out to be one of the factors that subsequently led to a reduced sensitivity to the need to communicate with the world outside of chemistry. According to Read "with ever-increasing specialization, the chemist has been forced in a large degree to get to know 'more and more about less and less'" [50]. This, of course, had consequences as his chemical horizon narrowed as "he was to lose his sense of chemical perspective" and "neglect the historic and humanistic appeal of chemistry." At the same time, in his *Humour and Humanism in Chemistry* (1947), Read warned of the danger of "twentieth-century chemistry to relapse into a jargon-laden esotericism reminiscent of alchemy" (Fig. 3).

Based on the COVID-19 communication research results mentioned above, we introduce here a new dimension to effectively inform non-chemists about chemistry. We have named it the "communication success dimension." At the same time, this dimension should help reverse the effect that Read warned about. The communication success dimension (CSD) is given by the equation

$$CSD = (K (D+P))^{HF},$$
(1)

where K stands for knowledge of chemistry, D for dedication to chemistry, P for the passion with which a given chemist approaches our science, and HF for the human factor. The magnitude of the CSD is apparently the product



Fig. 3 Title page of the book *Humour and Humanism in Chemistry* (1947) by the English Chemist John Read

of the knowledge of chemistry and the sum of dedication and passion for this science. However, the human factor is evidently crucial, because it can either increase or decrease CSD dramatically. Thus, communication success depends strictly on the personal approach of each individual chemist.

Communication using CSD will help us to encourage society not to accept conventional chemophobia. Such communication will be dual in nature. On the one hand, it will serve as an effective barrier to the further spread of chemophobia, and on the other hand, it will be a communication antidote to those who already suffer from chemophobia.

We assume that diligence (alongside, e.g., curiosity, discipline, independence, and the ability to work in a team) is one of the most important characteristics of chemists. They willingly invest thousands of hours of work into achieving a goal. If they fail, they do not give up, but look for new ways to achieve their goals. And in the end, they succeed. We believe that they should also put as much passion and diligence into the communication of chemistry. Whenever we have the opportunity to bring chemistry to non-chemists, CSD should inspire us to ask ourselves if we can infuse our communication with more passion, and thereby be more relevant to the needs of our audience, and, as a result, also be more effective. At the same time, it will help us to consider the human factor in the communication of chemistry. After all, it was the persistent communication effort of a handful of individual chemists-this manifestation of the human factor par excellence-that in the past paved the way for the institutionalization of chemistry in the universities and then for a fundamental improvement in the material conditions that the newly emancipated science needed to carry out its mission. In view of the current wave of misinformation, the importance of each individual chemist increases again, because translating our merits into an understandable language must be a matter of constant reflection and action for every chemist [11]. This will make the chemical contours of modern society smoother, clearer, and easier to recognize.

A closer look at chemistry makes it easy to see that there are countless ways CSD can be used. However, it is not only about reinterpreting chemistry, but also about changing the perception of the public.

Marcel Proust, an inspiration for the communication of chemistry with passion

We chemists are not used to erecting monuments to our heroes. And we are not even used to the fact that society normally erects monuments to them. After all, it took more than a hundred years to commemorate the father of modern chemistry, Lavoisier [51, 52]. And yet it is the ability to manage and maintain one's public presence effectively, to stylize oneself according to the inner needs of the public that paves the way into hearts and minds. Not an easy task, though.

Perhaps, we can find inspiration in Marcel Proust (1877–1922) and those who revere him, the Proustians (Fig. 4). The French author managed to weave in an unexpected amount of chemistry, chemicals, and chemical operations and procedures into the plot of his novel \hat{A} la recherche du temps perdu (In Search of Lost Time). And this work, which the famous Russian–American writer Vladimir Nabokov characterized in chemical terminology as "the transmutation of sensation into sentiment" [53], became one of the most famous novels of the twentieth century. And it is precisely Proust's contribution to the public perception of chemistry which has been almost neglected up to now, and that can be effectively conveyed through CSD. This is all the more true, as this year marks the 100th anniversary of Marcel Proust's death.

In 1912, 12 years after the erection of the Lavoisier monument, Marcel Proust finished his work on *Du côté de chez Swann* (Swann's Way), the first volume of his novel \hat{A} *la recherche du temps perdu* (In Search of Lost Time, the English translation is also known by the title of Scott Moncrieff's first translation, *Remembrance of Things Past*). However, the book failed to arouse the interest of publishers, and in 1913, Proust had to fund the publication himself [54]. However, the second volume of the novel, which was published after the First World War in 1919, was awarded the prestigious literary prize The Prix Goncourt. A total of seven volumes of the novel were published in 1927, the last three of them posthumously (Fig. 5).



Fig.4 Marcel Proust, a painting by Jacques-Émile Blanche from 1892



Fig. 5 The first edition of \hat{A} la recherche du temps perdu (In Search of Lost Time) from 1913–1927 covers more than 3400 pages

In his novel, Marcel Proust immerses his hero, the Narrator, in the universe of his childhood memories and reflections on the experiences of adult life, taking the reader to the world of the highest social circles in France at the turn of the nineteenth and twentieth centuries, the so-called Belle Époque. According to Carter [55], during his lifetime, Proust witnessed the transition from the horse-and-buggy world without electricity and central heating, without high-speed transport and mass communications, to a world of aviation, Cubism, modern fashion, comfort, and hygiene. The plot of the novel, with more than 200 characters, unfolds against the backdrop of these dramatic changes. In Search of Lost Time is characterized by a masterful style, is written in highly cultivated language, and is an exceptional reading experience. And as Thiher [56] points out, the book is "a far-reaching attempt to reconcile the scientific worldview with the artistic possibility of vouchsafing poetic value to the individual life."

We do not know where Proust's interest in chemistry came from. Perhaps, we can trace its roots to his father Adrien Achille Proust (1834–1903), who was a noted epidemiologist and hygienist and professor of medicine at the University of Paris, or to Proust's younger brother Robert Emile (1873–1935), who was also a doctor, or it may be based on Proust's personal experience in treating his many diseases. However, the fact is that the wealth of references to chemistry in the novel is so unexpectedly large that it is a cornucopia of chemistry and the work itself can be undoubtedly described as Proust's great chemical novel, as we have shown in our previous article [57].

However, there is a fundamental difference between the reality of Proust's book and its public perception, which was more of a romantic view, influenced by the iconic symbol of the book, a reminiscence of the past evoked by the aroma of linden tea and the taste of madeleine cake with nuts and lemon zest. Unsurprisingly, as a result, for a long time, the scientific bent of Proust has tended to be overlooked [58]. Or as Watt [59] so aptly put it, "perhaps disappointingly" for many, "the developments of modern technology also have important roles to play in the unfolding of the themes of time, space, memory and identity" and "teach the Narrator [of the novel] valuable lessons."

This also applies to chemistry, which occupies an important place in the novel. For Proust, a good knowledge of chemistry becomes a source of many comparisons, metaphors, and reflections, enabling the writer to better express his artistic vision of the world, depicting the lives of contemporary elites and ordinary people, and giving the reader an unexpectedly perfect insight into the development of human destinies [57].

Here are some of the examples of Proust's mastery of chemistry (we have discussed this issue in detail in our previous article [57]). All quotations are taken from the Modern Library edition of *In Search of Lost Time* in six volumes, translated by Scott Moncrieff and revised by Kilmartin and Enright; except for *Time Regained*, for which a translation by Mayor and Kilmartin, revised by Enright, is used:

• Proust demonstrates an excellent knowledge of the Paracelsian principle of *dosis sola facit venenum* (only the dose makes the poison) by comparing human memory with a chemical laboratory, as: "we find a little of everything in our memory; it is a sort of pharmacy, a sort of chemical laboratory, in which our groping hand may come to rest now on a sedative drug, now on a dangerous poison."

• Proust compares the creation of the groundbreaking but fictional Vinteuil's *Sonata* to the scientific achievement of one of the most celebrated chemists of all time: "An audacity ... as inspired, perhaps, as that of a Lavoisier or an Ampere – the audacity of a Vinteuil experimenting, discovering the secret laws that govern an unknown force."

• In connection with the said sonata, Proust aptly mentions the importance of laboratory notebooks when comparing Vinteuil's difficult-to-read scores to solving: "the illegible notebooks in which a chemist of genius, who does not know that death is at hand, jots down discoveries which will perhaps remain for ever unknown."

• The satisfaction of one of the characters of the novel, Madame de Cambremer, when learning that the two eminent guests of her soiree did not know each other, brought to her lips: "the smile of a chemist who is about to bring into contact for the first time two particularly important bodies."

• Proust uses the chemical process of crystallization to describe the Narrator's boyish preoccupation with feeding fish: "I procured some bread from our picnic basket, and threw pellets of it into the Vivonne which seemed to • With bravura, Proust uses the chemical processes to depict sudden changes in human behavior that seem inexplicable, but are—in fact—the result of a slow accumulation of silent causes. The most striking passage in this regard is the moment when the Narrator found that the absence of his beloved Albertine causes him the mental pain that forms: "with the image, alas! of Albertine herself, a sort of precipitate, as they say in chemistry." We find a similar description in a situation where a suddenly revealed fact causes the Narrator mental distress: "this knowledge, which the shrewdest perceptions of the mind would not have given me, had now been brought to me, hard, glittering, strange, like a crystallized salt, by the abrupt reaction of pain."

• To reveal the true intentions of his mistress Albertine, the Narrator does not hesitate to subject her statement to a number of chemical operations in his mind: "Such and such an adverb ... bursting into flames through the involuntary, sometimes perilous contact of two ideas which the speaker has not expressed but which, by applying the appropriate methods of analysis or electrolysis, I was able to extract from it, told me more than a long speech." As a result, the hero of the novel finds out—to his grief—at: "Albertine's words, when one interrogated her, never contained an atom of truth."

• Spectral analysis is another chemical method that Proust brings to the scene. During a visit to the theater, the Narrator observes Madame de Guermantes and states that in her strange, knowing gaze, he sees: "the azure brilliance with which it glowed while she surrendered her hand to them one after another, a gaze which, could I have broken up its prism, analyzed its crystallisations, might perhaps have revealed to me the essence of the unknown life which was apparent in it at that moment."

• The era of Proust's life also includes the great development of the periodic table. During his lifetime, a total of 23 new elements were described, but only one of them is used in the novel—radium. He used its radioactive decay to describe Odette de Crécy's unfading beauty: "In the case of Odette one could say much more than this; her appearance, once one knew her age and expected to see an old woman, seemed a defiance of the laws of chronology, more miraculous even than the defiance of the laws of nature by the conservation of radium."

• From a chemical point of view, however, there is another interesting point in the book. When Proust mentioned in his novel the fact of "showing a profound knowledge of *Elective Affinities*" as a way of impressing society, he presented an interesting reception of Goethe's work, in which chemical theory forms the plot. We have pointed out the importance of Goethe in the popularization of chemistry in our previous articles [11, 60].

Conclusions

Chemophobia continues to have an adverse effect on chemistry and human life; in particular, wrong decisions made due to the ignorance of chemistry and under the influence of chemophobia. Therefore, chemophobia must be suppressed and eradicated. In this article, we introduce the "communication success dimension" as another communication strategy and apply it to the example of the world-famous author Marcel Proust. We see Marcel Proust and his novel In Search of Lost Time as an opportunity for students and cultural elites to acquire chemistry at their level of perception. By communicating Proust's positive sentiment of affection for chemistry and the abundance of chemistry in his novel, we can present chemistry in a completely unexpected way, thereby contradicting the established, i.e., rather negative perception of our science. As a result, we will create an opportunity to overcome the lack of understanding or even ignorance beyond the surface of manifested chemophobia. After all, as Proust himself says in his novel In Search of Lost Time: It is the chemistry of Time that is at work upon society.

Acknowledgements We are grateful to the project "Cooperatio" of Charles University for financial support.

Funding Univerzita Karlova, Cooperatio.

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