FOLIA 278

Annales Universitatis Paedagogicae Cracoviensis

Studia ad Didacticam Biologiae Pertinentia 8 (2018)
ISSN 2083-7276
DOI 10.24917/20837276.8.7

Mohamed Djouani, Marie-Stéphanie Abouna, Dalila Kessouar, Sebastien Malpel, Sophie Demonceaux, Robert Andres, Nathalie Pinsard, Emmanuella Di Scala

"What can be done to avoid cancer" in the students' mind

Introduction

Cancer and representations

Social representations are products of thought, which are related to an object, an idea, a concept. Representations which are shared by a large part of the population result from the influence of knowledge, beliefs and practices (Durkheim 1967; Moscovici 1989; Clément 1994). The cancer disease is known since antiquity and its connotation built over centuries has led to images of terror and angst, which are the origin of popular beliefs. Cancer used to convey the social representation of an incurable disease with no hope for a cure. It has been often associated with the negative image of "the plague of the modern world". Contracting the cancer disease was considered shameful and people did not talk about it at home. Cancer conveys also the image of the "bad dead" in the collective imagination: the announced dead with endless sufferings, the body putrefaction…

Cancer is an object of particular interest, in a communication point of view, because its strong impact on society, its frequency and gravity make it ubiquitous in everyday life, notably in the media, despite a certain kind of taboo around this disease. Today cancer has become a major societal issue. It is less taboo and one can evoke it more easily, as exemplified by prevention campaigns, information relays, in order to demystify the disease and remove its negative image.

The issue of the causes of cancer remains a controversial issue. "Cancer is perceived as a consequence of the modern way of life in secular thinking" (Herzlich, Pierret 1991). The different modern ways of life show that the individual has broken with nature and accommodates "chemical" food (Gregg, Curry 1994), full of toxins, pesticides, preservatives, a "tampered" food, "rigged" (Herzlich 1969). After chemical food, come the waves (transformers, High voltage lines, computers, cell phones, magnetic fields, etc) (Barreau 1999). In addition to toxic substances such as tobacco and alcohol, the "rich" food is reproached (animal fats, meats), another consequence of the modern way of life. Stress is also raised to challenge the modern way of life and the rhythm of life it imposes on individuals. Finally, risky behaviors also appear as one of the possible causes of cancer in secular explanations. It seems that general opinion on this subject has significantly changed over the last decades: indeed, several studies report that the general public has long pointed to individual causes,

risky behaviors, indicating that patients had some responsibility for their illness (Alby 1999; Dany 2008; Chapple et al. 2004). But more recently, people are more focused on a collective responsibility, pointing to societal and environmental causes, as the Cancer Barometer 2010 points out (Beck 2012).

Background and objectives of the research

In previous studies, we showed that cancer is the most present disease in the minds of young students. It is also the most cited disease among lethal diseases.

The main objective of this study is to explore the representational fields of cancer and the diversity of these representations from a young scholar audience (from the year 9 level to the Master level. In this article, "year 9" and "year 12" will refer to the English levels nomenclature). Thanks to it, we try to underline the importance of these representations to promote a better understanding of the disease. In addition, cancer is virtually absent from scholar curricula, at least in France. Indeed, cancer is not really studied at school: awareness of the consequences of smoking on health is often carried out in the middle class or at the end of primary school. The genetic origin of cancer, its physiological functioning and its consequences are taught thereafter only to science specialized year 12 students. The role of school seems however essential to improve population's health and for prevention. To reduce inequalities in the prevention of cancer requires to have realistic representations on the issue and probably to develop the curricula in this direction.

In this context, we study the answers given by students from different levels to the question "What can be done to avoid cancer?". This question reveals in the first place what should be done, in the students' mind, if we want to avoid cancer. It also tells us what students consider to be important risk factors that should be avoided. Finally, we will also see that a significant part of students consider that there is nothing to do to prevent cancer, fatalism that has already been noted by other authors, with general public (Baromètre Cancer 2010: 50).

The abundance of the students' productions, will allow us to study their representations from the perspective of the practices, the values and the used knowledge. Indeed both behaviors and attitudes towards the disease, like the use of tests or health professionals and the involved knowledge will be evaluated. According to the age of the studied public, we will determine which constituents of the KVP triptych seem to be preferred and orient their positioning.

Otherwise, as the relation to health and disease has an important gendered dimension, we will investigate whether this dimension is manifested with this young audience.

The interest of the gender and health issue

Questioning the relationship between gender and health is of particular interest. Indeed, if various studies are interested in inequalities or gender differences in areas of society such as work, family or sport (Segalen, Martial 2013; Singly 2017), the topic of health is still poorly explored. So far health has been widely studied from a biological point of view to the detriment of the social aspect. And yet, studies in

anthropology show the need to take into account the weight of representations and gendered practices to fully understand this "total social fact" (Mauss 1925, 2007).

There is a link between gender and health, as attested by many publications (Vidal, Salle 2017; Touraille 2008; Löwy 2015). In particular, studies on gender and health have shown that certain biological traits that are considered to be innate may also be the result of social construction. For example, based on the models of evolutionary sciences, Priscilla Touraille (2008) argues that the gap in size between men and women is likely to have evolved under the constraint of gender-inegalitarian diets that structure all of the known human societies.

Gender stereotypes still tend to link health disparities to differences in the constitution between men and women (Arbogast 2018; Vidal, Salle 2017; Polton 2016; Löwy 2015; Touraille 2008). Thus, the body of women is marked by their sexual affiliation (e.g. diseases related to pregnancy and childbirth, cancer of reproductive organs) and by their gender affiliation (e.g. stress related to cognitive overload, physical and psychological violence). The history of male bodies also refers to the weights of biology (e.g. male sexual organ cancers) and gender ratios (e.g. alcoholism, smoking (Polton 2016; Salle 2013; Bloomfield et al. 2006). This variable is thus involved in many diseases, to the detriment of the other gender. For example, male osteoporosis is less studied and less looked into among older patients, just like the symptoms of heart attacks, which differ for women, are far less known than those of men (Arbogast 2018).

In addition, health inequalities are characterized by the fact that women appear to be favored, with higher life expectancy. However, as Dominique Polton points out (2016), however, they spend more years than men in poor health and face different morbidity rates, at different ages and for many pathologies.

Cancer appears to be a relevant indicator of social gender relations and it is in this perspective that we analyzed cancer incidence among academic and school populations in a gendered logic.

Methodology

Participants

The studied population comprised 220 students, from the region of Dijon (Burgundy, France), spread over three school levels: 102 from year 9, 80 from science specialized year 12 and 38 master students. Students were interviewed in the classroom using questionnaires during the 2014–2015 school year.

Questionnaires

After a first very open questionnaire on the diseases they were aware of, a second questionnaire focused more specifically on cancer (see Malpel et al.; Andres et al.). Among others, there was the question "what can be done to prevent cancer?".

This open question allowed the students interviewed to give several answers. The multiplicity of these responses was suggested by the layout of the document that was given to them. Indeed, following the statement of the question, followed a series of dashes inviting to multiply the answers.

Categorical analysis of representations

After being collected, the students' answers were first analyzed from a lexical point of view. In a first large category of answers, we grouped the answers expressed using action verbs (e.g. "do", "eat", "wash") in the affirmative form. From a semantic point of view, we then grouped in this first category, which we called "do", all the answers that express an action that can be carried out to avoid cancer. In a second large category of answers, we have grouped the answers that contain the verb "avoid", and answers that express dangers (for health) and imply the word "avoid". We have also grouped in this category the answers expressed using a negation (e.g. "Do Not Smoke", "do not expose ourselves to the sun"). We have sometimes considered equivalent responses from the same semantic register (e.g. "Avoid smoking" and "Do Not Smoke"). The semantic analysis of the data also allowed us to identify a category "Nothing to do" and to define several sub-categories.

Analysis of the results according to the level of study

To allow comparison between the studied levels despite the different sample sizes, and to avoid bias linked to significant differences in the number of answers provided, we expressed the proportions of answers, in the different Categories and sub-categories, as a function of the total number of answers of the considered level. Statistical comparisons were performed using chi-squared tests, with the actual numbers of answers being compared to the expected theoretical numbers of answers, taking into account the total number of answers of the level.

Analysis of results based on gender

For the gendered analysis of the data, we took into account the answers of 194 students, including 104 girls and 90 boys, as the gender of 26 interviewed students could not be determined from the questionnaire. Statistical comparisons were also carried out by chi-squared tests, always taking into account the total number of answers of the considered group.

Results

Global analysis

From the answers given by the students of the 3 levels, we have listed 77 different answers. After inventory, the categorical analysis of these answers allowed to end up at a system of classification into main categories and subcategories (Table 1): indeed, we found that some answers related to, first, (1) what should be done to avoid cancer in the minds of the students surveyed (36.5% of the responses). That means, how to act, how to behave on a daily basis to limit risks. In this broad category of responses, we can distinguish two thematic clusters, which determine two subcategories: on the one hand, the answers which are related to the medical community (14.6%), in particular to prevention and on the other hand, those related to daily life (22.4%), lifestyle habits and in particular those related to hygiene, food or sport.

Secondly, (2) a large part of the answers correspond to what should not be done ("avoid" category) or what should be avoided to avoid cancer (51.8%). It should be

noted that we do not necessarily expect this type of response to our questionnaire, since the question asked here was: "What **must be done** to avoid cancer?". It may be assumed that the question in fact implied that it was possible to answer in a negative way by advocating what **not to do**, since more than half of the answers formulated fall into this category. In this broad category, we distinguished three thematic clusters, the responses that relate to individual behaviors: risk behaviors (8.6%, e.g., exposure to the sun) or addictive substance use (26.0%, i.e., tobacco, alcohol, drugs), and secondly, responses that are related to environmental factors that ideally should be avoided, but to which we are more or less exposed (17.6%, e.g., waves, chemicals, pollution).

Finally, some answers do not fall into either of these categories and indicate that some students think that there is nothing to do, that nothing can be done or simply that they do not know what could be done to avoid cancer. We grouped all of these answers into a third category (3) "nothing to do" (10.9%).

Table 1: Breakdown of student responses between identified categories and subcategories. The percentages are averages on the three levels studied. Total number of replies: 629.

Do	**37.0%**
Medical prevention	14.6%
Life style	22.4%
Do not do (avoid)	**52.1%**
Environmental factors	17.5%
Risky behaviors	8.6%
Addictive substances	26.0%
Nothing to do	**10.9%**

Different representations depending on the level of education

The first observations of the data allowed us to organize the results and to produce a conceptual map for each level in order to represent the answers formulated by the students based around the categories and subcategories identified.

- Year 9 level (Fig. 1):

Students gave a slight majority of answers in the "avoid" category (51.3%). There are few references here to environmental factors (7.6%), e.g. carcinogens, chemicals or electromagnetic waves. Some answers are related to risky behaviors (3.8%), such as "sun exposure" or "mobile phone use". For these young students, the main risk of cancer is linked to smoking (32.4%) and alcohol consumption (6.5%). Another large part of the answers is with regards to "what should be done" to prevent cancer (37.9%). In this category we find, in equal proportions, answers relating to medical prevention (18.4%, e.g. tests, hospitalization, protection) and lifestyle (19.5%, e.g. "playing sports", "eating a balanced diet", as well as more surprising answers such as "personal hygiene" or "using condoms"). It may be noted that about 10% of the answers can be interpreted as "there is nothing to do". In the opinion of the students, cancer might be a fatality. Indeed, some of them do not hesitate to state that "it cannot be avoided", and for others "it is just bad luck" or that it depends on genetic factors. Finally, some others say, quite simply, that they do not know.

- Year 12 level (Fig. 2):

For these students and in the "what should be done" category (38.7%), there are no significant changes from the year 9 classes, with again some naive answers (e.g. "washing hands"). In the "avoid" category (52.4%), we can observe an increase in the "environmental factors" sub-category (18.4%), which is close to that of "addictive substances" (24.2%). There were also slightly more answers related to "risky behaviors" (9.8%). In line with the year 9 students, we can find the category of "nothing to do" answers (9.0%).

- Master level (Fig. 3):

For the Master degree students, "environmental factors" are more important (26.6%), while "addictive substances" are less (13.8%). In particular, "smoking" has decreased to 8% of the total number of answers at the Master level, while it was 32.4% at the year 9 level. In fact, it is surprising to note that about 60% of Master degree students did not mention that smoking should be avoided. It is, however, likely that these students in the biology section know that tobacco is one of the first causes of cancer. But they may also consider that other factors are just as important. This assessment seems to be consistent with the many environmental factors they cite (e.g. carcinogens, radioactivity, pollution). It can also be assumed that their opinions regarding tobacco may have changed over the years. We can also note that the "lifestyle" category represents 25.5% of the answers. Finally, a similar proportion of answers were found in the "nothing to do" category. It seems so that an equivalent proportion of students consider cancer as inevitable. At this level, opinions may be linked to the knowledge of genetic predispositions relating to certain cancers.

- Comparison of the 3 levels

A comparison of the three levels (Year 9, Year 12, Master) reveals significant differences and a correlation between health and environmental factors. Table 2 presents the frequency of responses by sub-category.

Table 2: Frequency of responses by sub-category. * : $p<0.05$. *** : $p<0.001$.

	Total number of answers	Medical prevention	lifestyle	Environ-mental factors	Risky beha-vior	Addictive substances	Nothing can be done
level		*		***	*	***	
Year 9	185	18.4	19.5	7.6	3.8	40.0	10.8
Year 12	256	16.4	22.3	18.4	9.8	24.2	9.0
Master	188	9.0	25.5	26.6	12.2	13.8	12.8

What seems most remarkable when comparing the three levels of education is the gradual increase in the number of answers in the "environmental factors" sub-category. The difference between the three levels is very significant ($p<0.001$).

It seems that with age, students increasingly consider the harmful elements of the environment as determinants of the risk of cancer.

At the same time, students also seem to attach more and more importance to people's lifestyles. The number of answers in this category, relative to the number of students surveyed, is very significantly different between the three

levels ($p<0.001$). There is a strong correlation between variations in the two subcategories "environmental factors" and "lifestyle" ($r = .988$). It can be noted that most answers in the "lifestyle" category correspond to what should be done to avoid the environmental factors that may cause cancer (e.g. "eat healthy", "lead a healthy life"). There is, therefore, some consistency between the parallel increases in these two types of answers. On the other hand, the frequency of answers in the sub-category "addictive substances" appears to decrease with age, with a very significant difference between the three levels ($p<0.001$). It is strongly inversely correlated to the frequency of answers in the "environmental factors" category ($r = -.995$). Similarly, the importance of "medical prevention" seems to diminish in the minds of older students ($p<0.05$).

Transformation of the representations of the causes of cancer, according to the level of study and the gender

Table 4. Comparison of girls' and boys' proportions of responses by sub-category. * : $p<0.05$

	Total number of answers	Medical prevention	Life style	Environmental factors	Risky behaviors	Addictive substances	Nothing to do
Gender						*	
Girls	299	16.7	23.4	18.4	9.4	21.7	10.4
Boys	257	13.2	21.8	16.3	8.2	30.7	9.7
Gender/ level interaction			*				

- What can be done

Girls generally give more answers than boys in relation to medical prevention and lifestyle. For medical prevention, this difference is significant in the case of year 12 students. This result is consistent with various studies in public health which, for example, show that women consult more easily and more regularly with doctors than men (Vidal, Salle 2017). A number of responses relate to the need for "(screening) tests". This can be interpreted as the weight of gender stereotypes related to status and gender roles assigned or incorporated by young girls and boys. For example, "healthy eating" and "body care" refer to societal concerns as feminine. It should also be noted that the fight against cancer has focused on women (Löwy 2013), which clearly puts gender to the center of health issues. This seems less true for younger students, as in year 9, boys give even more answers in relation to lifestyle.

- Avoid

Only the responses related to addictive substances are prevalent in boys. This is consistent with studies demonstrating the differentiated relationship of men and women towards risky behaviors, including the use of psychoactive products such as alcohol, tobacco, etc (Vidal, Salle 2017; Le Breton 2011; Leclerc et al. 2008).

Discussion

Transformation of the depictions of the causes of cancer, according to the level of education and gender

The question we asked the students here was not directly about the causes of cancer. However, their answers provide us indirectly, with information about what students assume these causes to be. Indeed, in the "avoid" category we can find the most at risk factors, known or suspected, which cause cancer, starting with tobacco and alcohol, chemicals, carcinogens, asbestos, electromagnetic waves...

Among these possible causes, our results show a very strong increase in the mentioning of risks related to the environment, between the fourth grade and the Masters level. In particular, several terms appear in this subcategory, among the Masters students, which were not present in the other grades (e.g. additives, pesticides).

How can this transformation be explained? It may be assumed that nowadays, with the influence of the media, young people are increasingly aware of the need to protect the environment and the impact of pollution on health (Dab 2007). This is certainly becoming a major concern for many young French people who, because of this, will later turn to organic farming for their food.

Having said that, our results indicate that this concern for the environment is less pronounced among younger students. On the contrary, they are more aware of the harmful effects of tobacco or alcohol. In this case, the media and the family probably contribute to this awareness, but school certainly has a relatively important impact, thanks to anti-tobacco campaigns that are often proposed to year 6 or year 8 classes in France.

A partial parallel effect can be seen between this transformation in the student depictions of the causes of cancer and that observed in the general population in recent decades (see Introduction 1.1). Indeed, young students seem to have an initial depiction, corresponding to an archaic vision of cancer that would depend mainly on individual behavior (e.g. tobacco or alcohol consumption) pointing to the individual's responsibility for his or her illness. Their depiction appears to evolve at a later stage, when questioning society as a whole, via the environmental causes that are brought to the fore by older students (e.g. pollution, chemicals), as is the case nowadays within the general population.

Is this change in perspective a reflection of a certain freedom from guilt on the part of individuals? Several students use tobacco (not documented here), which is the main risk factor for cancer, but by listing the risk factors linked to the environment, students somehow dilute their own responsibility within that of society as a whole.

It could be interesting to correlate, in a future study, the perception of the risk of cancer linked to tobacco with students' actual consumption. Do students naturally tend to minimize the risk when they are consumers? A corresponding result is highlighted by the 2010 cancer barometer for the general population (Guignard et al. 2012). Indeed, this study shows that the perception of the risk of cancer associated with tobacco is linked to the smoking status of the respondents. Occasional smokers

and regular smokers (<10 cigarettes per day) are less likely to consider that there is a definite link between smoking and cancer than non-smokers and heavy smokers.

With regard to gender, without generalizing our findings, we can provisionally conclude that this variable is not neutral in the depictions related to cancer. The differences observed may refer in particular to the traditional distribution of roles between women and men. This distribution of roles results in women consulting physicians more frequently for themselves and also managing children's health more frequently than men. Being present in a medical environment makes them acquire knowledge that is often ignored by men. These social roles tend to guide how women and men are exposed to health problems differently, how they perceive the conditions that affect them, how they use or do not use the health care system, how the responses given by health professionals are constructed differently according to the gender of their patients. These findings seem to be reflected in the social depictions of cancer by the audiences interviewed.

It appears, therefore, to be difficult to address the issue and public health policies in general, and cancer in particular, without taking aspects of gender into account. Awareness and relevance of this factor is now generalised both at the scientific and the political level, within national and international bodies.

Is cancer a fatality in students' minds?

The proportion of responses in the "do nothing" category remains essentially the same at all levels. This is surprising, as one would expect young students to be more unfamiliar with cancer risk prevention issues than adults, especially biology students. So, in fact, young students make fewer different proposals than Masters students yet the frequency of "nothing can be done" responses remains relatively high. This result can be compared to another part of our cancer research in relation to students, where we asked, "How is cancer treated?" In reply to this question too, we obtained a relatively high proportion of responses such as "we can't treat it" (about 20% of responses in the 4th grade), and "I don't know" (up to 43% of responses in the 5th grade, these percentages being lower in higher grades, handwritten in preparation). It therefore seems that both the young and old continue to view cancer with a certain fatalism. The incurable and ineluctable nature of the disease seems to be quite often present in people's minds, despite a reality out of step with regards to medical progress. This observation had already been made in adults. Despite the cure rates that can today be quite high for certain cancers, especially when they are detected early enough, a large part of the population has kept this very negative image of cancer, of a disease that can always come back, with little hope of survival (Moulin 2005), and the medical profession, which often prefers to use the term "remission" rather than "cure", is probably not completely foreign to this depiction. Furthermore, this fatalism, this way of considering that "nothing can be done", is perhaps another way of coping with guilt. Those types of expression "it's pure luck", used by students of all ages, seem to mean: "Why do something, since you can't do anything about cancer?". These opinions could be a pretext for inaction.

Gender-linked differences

With regard to the gender dimension, and without generalizing our findings, we can temporarily conclude that the gender variable is not neutral in representations of cancer. The differences observed can refer in particular to the traditional distribution of roles between men and women. The consequence of this distribution is that women consult doctors for themselves and deal with their children's health more frequently than men. Their participation in the medical environment enables them to acquire knowledge that men are not aware of. These social roles tend to guide how women and men are exposed to health problems differently, how they represent the conditions that affect them, how they use the health care system or not, and how the responses given by health professionals are constructed differently according to the gender of their patients. These findings appear to be reflected by the representations of cancer of our studied public, as the educational sphere is probably influenced by the social representations of gender (family, media influence...).

It is therefore difficult to deal with this question and with public health policy on a general basis, and more particularly cancer, without taking gender aspects into account. The awareness around this issue and its relevance is now global, both at scientific and political level, in local and international authorities.

Conclusion

It appears in this triptych KVP, constituting the depictions, that the knowledge and information "K" mobilized with age regarding risks linked to the environment, and their associated practices "P", make it possible to change the depictions of the subjects by displacing them from more individual depictions to more collective and shared social depictions. Conversely, this study also shows that "V" beliefs linked to the fatality of the disease, despite the progress observed in medicine, remain omnipresent regardless of age. Inaction "P" behavior, associated with these beliefs, also remains anchored at all age levels studied. It therefore seems here that the depictions of the public studied are the product of two interactive duos KP and VP, Information-behavior regarding environmental risks on the one hand and beliefs-behavior regarding the fatality of the disease on the other hand. A complementary analysis could make it possible to identify, through interviews for example, which interactive duo really prevails over the other and guides the position taken by the individual studied. However, as a result of this research, we can suggest that, in addition to raising awareness regarding environmental risks, a greater awareness allowing for beliefs to be changed faced with the fatality of the disease could make it possible to change an individual's depictions of the disease.

References

Alby N., *Cancer: sens et non sens,* Le Journal des psychologues, nº 170, septembre 1999, 21–49.

Andres R., Di Scalla E., Ricaud P., Malpel S., Pinsard N., Narbonnet S., 2016, *Representations of cancer among pupils: a linked influence of the academic and extracurricular environments*, ICERI 2016 Proceedings, 878–884.

Arbogast M., *La santé n'est pas étrangère au genre,* lejournal.cnrs.fr, mars 2018. https://lejournal.cnrs.fr/billets/la-sante-nest-pas-etrangere-au-genre Barreau B., 1999, *Essai sur les représentations profanes dans le dépistage du cancer du sein,* mémoire de DEA d'Anthropologie, option Anthropologie bio-culturelle, Aix-en-Provence.

Beck F., Gautier A., 2012, dir. *Baromètre cancer 2010.* Saint-Denis: Inpes, coll. Baromètres santé, 50.

Bloomfield K., Gmel G., Wilsnack S., 2006, *Introduction to special issue "Gender, culture and alcohol problems: a multi-national study"*, Alcohol & Alcoholism,Vol. 41, Supplement 1, i3–i7.

Cambois E., Robine, J.M., *Pour qui la retraite sonnera? Les inégalités d'espérance de vie en bonne santé avant et après 65 ans,* In Bulletin épidémiologique hebdomadaire, Numéro thématique – Inégalités sociales de santé, mars 2011 / n° 8-9

Chapple A., Ziebland S., McPherson A., 2004, *Stigma, shame, and blame experienced by patients with lung cancer: qualitative study*, British Medical Journal*,* 328, 754, 1470.

Clément P., 1994, *Représentations, conceptions, connaissances,* [in:] A. Giordan, Y. Girault (eds.), Conceptions et connaissances, Berne, Peter Lang.

Clément S., Membrano M., 2001, *Des alcooliques pas comme les autres? La construction d'un catégorie sexuée*, in Femmes et hommes dans le champ de la santé. Approches sociologiques, Pierre Aïach, Dominique Cèbe, Geneviève Cresson et Claudine Philippe (dir.), Paris, Ed. ENSP.

Dab W., *Santé et environnement*, Que sais-je?, PUF, 2007.

Dany L., Dudoit E., Favre R., 2008, *Analyse des représentations sociales du cancer et de la souffrance*, Psycho oncologie, 2, 53–58.

Durkheim E., 1967 [1898], *Représentations individuelles et représentations collectives*, Sociologie et philosophie, Paris, PUF.

Herzlich C., Pierret J., 1991, *Malades d'hier, malades d'aujourd'hui*, Paris, Bibliothèque scientifique Payot, (2nd edition).

Herzlich C., 1969, *Santé et maladie, analyse d'une représentation sociale*, Paris, Éditions de l'École des Hautes Etudes en Sciences Sociales, réimpression en 1992.

Gregg J., Curry R.H., 1994, *Explanatory models for cancer among african-american women at two Atlanta neighborhood health centers: the implications for a cancer screening program*, Social Science and medicine, 39 (4), 519–526.

Guignard R., Beck F., Deutsch A., 2012, *Tabac et cancer. Pratiques tabagiques, attitudes et perceptions des risques*, in Baromètre Cancer 2010, Saint-Denis : Inpes, coll. Baromètres santé.

Guilbert P., Peretti-Watel P., Beck F., Gautier A., 2006, *Baromètre cancer 2005*, Editions INPES.

Jodelet D., 1989, *Les représentations sociales*, Paris, Presses Universitaires de France.

Le Breton D., *Sociologie, psychanalyse et conduites à risque des jeunes*, Revue du MAUSS, 2011/1 n°37, 365–384.

Leclerc A., Kaminski M., Lang T., 2008, *Inégaux face à la santé. Du constat à l'action*, Paris, La Découverte, 2008.

Löwy I., *Le genre du cancer*, Clio. Femmes, Genre, Histoire [En ligne], 37 | 2013, mis en ligne le 01 juillet 2015. URL : http://journals.openedition.org/clio/10986 ; DOI : 10.4000/clio.10986

Malpel S., Di Scalla E., Ricaud P., Andres R., Pinsard N., 2015, *Study on the cancer's representations from primary school pupils and their filing systems*, New perspectives in science education.

Maruani M., 2011, *Travail et emploi des femmes*, Seuil, Paris (4th edition).

Mauss M., 1925, *Essai sur le don. Forme et raison de l'échange dans les sociétés archaïques, L'Année Sociologique*, 30–186.

Migeot V., et al., *Comportements de santé des étudiants d'IUT de l'Université de Poitiers*, Santé Publique, 2006/2 Vol. 18, 195–205.

Moscovici S., 1963, *Attitudes and opinions,* Annual Review of Psychology, 14, 231–260.

Moscovici S., 1989, *Des représentations collectives aux représentations sociales : éléments pour une histoire*, [in:] D. Jodelet (ed.), Les représentations sociales; Paris, Presses Universitaires de France, 62–86.

Moulin P., 2005. *Imaginaire social et cancer,* Rev Francoph Psycho-Oncologie, 4, 261–267.

Polton D., 2016, Égalité femmes - hommes en matière de santé et de recours aux soins. Regards, 50,(2), 35–45, https://www.cairn.info/revue-regards-2016-2-page-35.htm.

Saillant F., 1988, *Cancer et culture. Produire le sens de la maladie*, Montréal, Editions Saint-Martin.

Salle M., 2013, *Entre permanences et mutations. L'alcoolisme féminin sous le regard des professionnels de santé*, *Cahiers de l'Ireb*, 21.

Ségalen M., Martial A., 2013, *Sociologie de la famille*, Armand Colin, Paris.

Singly (de) F., 2017, *Sociologie de la famille contemporaine*, Armand Colin, Paris.

Touraille P., 2008, *Hommes grands, femmes petites: une évolution coûteuse. Les régimes de genre comme force sélective de l'évolution biologique*, Paris, Éditions de la Maison des Sciences de l'Homme, 441.

Vidal C., Salle M., 2017, *Femmes et santé, encore une affaire d'hommes: Penser la santé au prisme du sexe et du genre*, Belin, Paris.

Ziebland S., Chapple A., Dumelow C., Evans J., Prinjha S., Rozmovits, L., 2004, *Information in practice. How the internet affects patients' experience of cancer: A qualitative study*, BMJ, 328, 1–6.

"What can be done to avoid cancer" in the students' mind

Abstract

Cancer is one of the most known and impressive diseases. It is considered by the largest part of the population as the most frightening disease. It is also strongly associated with death in people mind (Guilbert 2005). Otherwise, the question of the factors responsible for cancers is still under debate. In student population, the representations of cancer have been poorly explored. It is very intriguing to know the representations of young pupils about cancer because this topic is almost not treated, at least in France, in all school levels until science specialized year 12.

In previous studies, we found that cancer is the disease the most present in young pupils' mind and the most associated with death (Malpel et al. 2016).

In this study we explore the representations of students, more specifically about "what can be done to avoid cancer", using questionnaires, considering age and gender as influencing factors.

Our results indicate a large variety of representations in relation to different variables: namely the academic level and the gender. This latter aspect is interesting regarding the well-known different relation of adult men and women to the disease (Salle, Vidal, 2017).
Moreover, we found that all students' answers can be categorized into "what should be done", "what should not be done" and "there is nothing to do".
In the second category, our results indicate that the relative importance of individual dependent factors versus environmental factors change according to the age of students.
Attention to the environmental factors becomes more important in older students' mind to avoid cancer.

Key words: social representations, disease, school, pupils, gender

Mohamed Djouani, dr
Laboratoire CIMEOS UBFC, Dijon, France
email: mohamed.djouani@u-bourgogne.fr

Marie-Stéphanie Abouna, dr
Laboratoire CIMEOS UBFC, Dijon, France
Ileps (France)
email: ms.abouna@ileps.fr

Dalila Kessouar, dr
Laboratoire CIMEOS UBFC, Dijon, France
email: dalila.kessouar@u-bourgogne.fr

Sebastien Malpel, dr
Laboratoire CIMEOS UBFC, Dijon, France
email: sebastien.malpel@u-bourgogne.fr

Sophie Demonceaux, maître de conférence
Laboratoire CIMEOS UBFC, Dijon, France
email: sophie.demonceaux@u-bourgogne.fr

Robert Andres
ESPE UBFC, Dijon, France
email: robert.andres@acdijon.fr

Nathalie Pinsard, professeur certifié
ESPE UBFC, Dijon, France
email: nathalie.pinsard@u-bourgogne.fr

Emmanuella Di Scala, dr
ESPE UBFC, Dijon, France
email: emmanuella.di-scala@u-bourgogne.fr