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HOW PSYCHOSOCIAL CONTEXT INFLUENCES YOUNG ADULTS' CONCEPTION OF CANCER AND ITS PREVENTABILITY

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University of Porto
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ABSTRACT

The present work delves deeper into young adults' conceptions about cancer and its prevention, focusing on how these are affected by social proximity to cancer-diagnosed people and different content retrieval settings. To test the hypotheses an experimental study was conducted with 78 Portuguese young adults (aged 18 to 29 years old) using a 2 (Social Proximity) x 2 (Evocation Structure) design. Participants were invited to evocate not only how they characterize cancer and its contexts, but also the factors that might promote its prevention. Results reveal that age and gender impact cancer awareness, with older individuals demonstrating more socio-cognitive complexity, and male participants exhibiting higher lexical production, and more negative, regarding cancer preventability. As expected, proximity to the attitudinal object increased emotional processing, and the oriented retrieval setting resulted in higher complexity on preventability (higher production and more negative content). A series of cluster analyses revealed different profiles regarding proximity to cancer and its characteristics and preventability: *Proximity* – (1) Extended Family and Acquaintances, (2) Close Family, (3) No Proximal Contact, (4) Friends, Extended Family and Acquaintances; *Characteristics* – (1) Negative Emotions, (2) Pain, Suffering and Resilience, (3) Complexity, Physical and Mental Health; *Preventability* – (1) Medical Check-ups and Attention to Symptoms, (2) Lifestyle, Eating Habits and Addictive Behaviors. These findings identified distinct response profiles, underscoring the importance of tailoring health communication to address the unique experiences, knowledge levels, needs, and obstacles of this age group in public health policies and cancer prevention interventions.

Keywords: Cancer prevention; Young adults; Social determinants; Health communication; Public health interventions; Applied social psychology.

RESUMO

Este trabalho explora concepções dos jovens adultos sobre o cancro e a sua prevenção, focando no impacto da proximidade social a pessoas com cancro e diferentes contextos de recuperação de conteúdo. Para testar as hipóteses, foi realizado um estudo experimental com 78 jovens adultos portugueses (18 – 29 anos), utilizando um desenho 2 (Proximidade Social) x 2 (Estrutura de Evocação). Os participantes evocaram características do cancro e respetivos contextos, e fatores que promovem a sua prevenção. Os resultados revelam que idade e género impactam a consciencialização sobre o cancro, com indivíduos mais velhos a demonstrarem uma maior complexidade sociocognitiva, e o género masculino a exibir uma maior e mais negativa produção lexical em relação à prevenção do cancro. A proximidade em relação ao objeto aumentou o processamento emocional, e o contexto de recuperação orientado resultou numa maior complexidade sobre a prevenção (maior produção e conteúdo mais negativo). Análises de cluster revelaram diferentes perfis em relação à proximidade, características e prevenção do cancro: *Proximidade* – (1) Família Alargada e Conhecidos, (2) Família Próxima, (3) Sem Contacto Proximal, (4) Amigos, Família Alargada e Conhecidos; *Características* – (1) Emoções Negativas, (2) Dor, Sofrimento e Resiliência, (3) Complexidade, Saúde Física e Mental; *Prevenção* – (1) Rastreios e Atenção aos Sintomas, (2) Estilo de Vida, Alimentação e Comportamentos Aditivos. Estes perfis de resposta distintos sublinham a importância de adaptar a comunicação na saúde para abordar as experiências, níveis de conhecimento, necessidades e obstáculos únicos deste grupo etário nas políticas de saúde pública e nas intervenções de prevenção do cancro.

Palavras-chave: Prevenção de cancro; Jovens adultos; Determinantes sociais; Comunicação na saúde; Intervenções em saúde pública; Psicologia social aplicada.

INTRODUCTION

The following chapter serves the purpose of delving deeper, through a lens of Applied Social Psychology, into the underlying ambiguity of the conceptions that young adults' have on cancer as a health condition, and its corresponding preventability. In other words, the study aims to, considering the various ways in which the brain can retrieve information, pinpoint the differences that exist within this age-group regarding health beliefs, risk conceptions, and behavioral change, in order to effectively develop interventions that resonate with them and that further contribute to the improvement of health systems.

Applied Social Psychology within the field of Social Psychology

Applied Social Psychology (ASP) distinguishes itself from simple Social Psychology by concentrating on the practical application of psychological concepts and knowledge to address and solve social problems. In one hand, Social Psychology can be defined as a scientific field that seeks to shed light on the way individuals interact with and influence one another, with an emphasis on exploring their motivations, cognitions, and emotions revealed through certain social behaviors, whereas ASP seeks to bridge these concepts into real-world practical interventions and strategies that promote positive change (Schneider et al., 2005; Steg & Rothengatter, 2008). Despite their different principles, basic Social Psychology and ASP are undoubtedly interconnected, where the first serves as the theoretical framework for applied work, and the findings from applied research can help develop Social Psychology theories (Oskamp & Schultz, 1998).

In other words, Applied Social Psychology seeks to apply scientific methods to design, implement, and evaluate interventions aimed at promoting the well-functioning of individuals, groups, organizations, and communities, ultimately leading to problem resolution by addressing specific social needs (Oskamp & Schultz, 1998; Kidd & Saks, 1980; Schneider et al., 2005; Steg et al., 2017).

In its core, ASP comprehends five general objectives: description (gaining detailed knowledge of the social problem, its nature, and frequency); prediction

(identifying factors related to the phenomenon); determining causality (observing how changes in one factor can cause change in the others); explanation (understanding the reasons behind the social problem and the relationship between identified factors); and control (the ability to manipulate specific conditions to produce changes in the social phenomenon under study), being this latter the particular characteristic that distinguishes ASP from basic Social Psychology like aforementioned (Schneider et al., 2005). In essence, detailing the social problem and factors that may be related to it, enables practitioners to anticipate events by postulating variables or conditions that should be controlled or manipulated to achieve desired objectives (Oskamp & Schultz, 1998).

Applications of Applied Social Psychology on Health and Well-Being

One of the goals of Social Psychology is to encourage community wellness by establishing supportive conditions for health promotion and disease prevention. Together with Applied Social Psychology, it comprises a wide range of matters, from understanding individual behavior to outlining public health policies.

In this sense, Applied Social Psychology plays a crucial role in exploring the reasons behind people's health-related decisions and behavior, i.e., why people adopt certain health practices or resist healthier lifestyles, as well as how factors, such as message framing, perceived source trustworthiness, and socioeconomic determinants of health (e.g., literacy and accessibility) influence public health campaigns and stimulate more or less positive behavioral change (Arora, 2008; Junger & Stroebe, 2021; Stroebe, 2019).

Focusing on communication strategies that resonate with individuals and communities, not only aids in effectively disseminating information, but also contributes to more equitable and inclusive health policies (Junger & Stroebe, 2021), i.e., incorporating these perspectives into health initiatives provides a more comprehensive, holistic, and human-centered approach that allows policymakers to address both individual behaviors and systemic issues to promote health and disease prevention in a way that acknowledges health response as a complex interplay of social, economic, and environmental factors (Christiansen & Chandan, 2021). By integrating psychosociological insights into policy strategies, the design of

interventions becomes consistent with individuals' values and beliefs, and tailored to their realities and profiles, hence, increasing their impact and recognition while improving health on a population level (Junger & Stroebe, 2021; Steg et al., 2017). Recognizing cancer as more than just a medical condition, as a disease that requires attention both on physical and emotional dimensions, ultimately allows researchers to address changes in individuals' attitudes, values, behaviors, and lifestyles that are needed for health promotion (Weiten et al., 2023; Zimbardo, 2004).

Behavior and Attitude Change

Attitudes, which are learnt evaluations of objects or ideas that significantly influence thoughts, feelings, and actions, serve as the key aspect for developing the aforementioned interventions, as they are known to shape human behavior and cognition. i.e., how one makes decisions. The structure of attitudes is typically composed of three main components: cognitive (beliefs and thoughts related to the object); affective (emotions and feelings associated with it); and behavioral (reflects the actions and intentions toward the object) (Breckler, 1984; Krech, Crutchfield, & Ballachey, 1962; Ostrom, 1968; Rosenberg & Hovland, 1960, as cited in Hogg & Vaughan, 2018).

The strength of an attitude can be influenced by factors such as the importance to the individual, its accessibility in memory, and the amount of knowledge associated with it, which, subsequently, can make it range from extremely positive to extremely negative (Crano & Gardikiotis, 2015). In turn, and in concordance with what was above mentioned, attitudes within the field of health can be particularly shaped by a multitude of elements, e.g., perception of disease preventability, knowledge of risk factors, exposure to public health campaigns and media, and overall cultural beliefs, which, moreover, highlight the importance of context in addressing health attitudes and behaviors (Ajzen & Fishbein, 2005).

On the other hand, behavior can be defined as any observable action or response of an individual to internal or external stimuli and, while there is evidence that changing attitudes can lead to changes in behavior, this approach often overlooks the nature of habits (learnt associations between situations that lead to automatic behavior over time), that can form boundary conditions for attitude-directed interventions.

Considering both attitudes and habits in behavior change interventions has since become imperative to identify when and how behavior change strategies will be the most effective (Verplanken & Orbell, 2003).

Health and Social Cognition: Beliefs, Attitudes and Expectations

In regard to health and well-being, social cognition is known to impact health beliefs, attitudes, and expectations by having an effect on how individuals perceive health risks and prevention initiatives.

Understanding the intricate cognitive processes underlying public health campaigns is paramount for developing adequate interventions, where the impact of messaging can be life-altering (Conner and Norman, 2005). Research has revealed a disparity between the perceived impact of cancer prevention campaigns and what they can actually do to promote preventive behaviors among target populations. This stresses the importance of taking into account a range of psychological aspects when designing campaigns, which include, but are not limited to, social conceptions of cancer, individual self-esteem, interaction of personal and socially shared mindsets, gender-specific differences in message perception, among other factors. By descending deeper into these underlying psychosocial and cognitive processes, public health professionals can come up with more tailored and effective messages that resonate with their intended audience (Ramos et al., 2008).

For instance, the Health Belief Model (HBM), which has been widely used to explain and attempt to predict health behaviors, proposes that these are determined by a one's perception of threat, such as their susceptibility to contracting health issues and its corresponding perceived severity. The model consists in six constructs: perceived susceptibility (belief in the likelihood of developing the condition); perceived severity (belief in the seriousness of the condition and its consequences); perceived benefits (belief in the effectiveness of recommended actions to reduce risk); perceived barriers (consideration of psychological costs in taking the recommended actions); cues to action; and self-efficacy (confidence in one's ability to follow through with actions) (Glanz et al., 2008). However, it has been widely criticized for failing to consider emotional variables that may influence health-related behaviors (Armitage & Conner, 2000). Additionally, and in accordance with Bandura's Social Cognitive

Theory, individuals with higher self-efficacy are more likely to engage in healthy behaviors to prevent illness (Bandura, 1997), which underscores the importance of clearly defining what constitutes "healthy behaviors" to effectively apply the theory in health promotion.

Health Policy on Youth: A Psychosocial Approach to Cancer

Cancer represents a major health concern in Portugal, with statistics indicating that one in every three men and one in every four women are likely to be diagnosed with this disease at some time in their lives (Gouveia et al., 2008). A diagnosis is also correlated with having more severe psychological repercussions (e.g., anxiety, despair, isolation) in young adults than in any other age-group, especially since these people are still navigating important milestones of their lives, such as securing work, establishing social relationships, and planning their future (European Commission, 2021b).

Therefore, psychologists play an indispensable role in tackling this by putting focus into researching this age-group appropriately, including their psychological cognitions and conceptions on cancer and its preventability, and, consequently, the variables that are contributing to a later cancer detection. An approach that becomes especially crucial in contexts where, despite increased governmental and societal efforts to combat cancer, the effectiveness of prevention campaigns remains questionable when analyzed against stubborn incidence and mortality rates (*"Prevenção do cancro – tudo o que Precisa de Saber"*, 2022; Ramos et al. 2008). Portugal's Directorate-General of Health (DGS) has recognized as well the importance of dealing with these societal effects in its health policies, highlighting in the National Cancer Control Strategy of 2021-2030 the need to better understand the social variables that are leading to the increase in late-stage cancer diagnoses (Directorate-General of Health, 2022) - a strategy which aligns with the EU's Europe's Beating Cancer Plan, which has four major action points: prevention and early diagnosis, and treatment and improving cancer patients' quality of life at a later phase (European Commission, 2021a).

Research Objectives and Relevance: Conceptions of Cancer Preventability Among Young Adults

The current study selected Portuguese residents between 18 and 29 years-old as its target group, a choice that goes in line with the increasing late-stage cancer diagnoses amongst these young adults (Donn, 2024), and statistics that show a third of diagnoses and consequent deaths being associated with individual risk behaviors and lack of prevention (*“Prevenção do cancro – tudo o que Precisa de Saber”*, 2022). Hence, it becomes imperative to look into socioeconomic and demographic variables that may be contributing to this trend, as these disparities could be a translation of discrepancies in health literacy, health awareness, positive attitudes, and, ultimately, cancer prevention initiatives (*“Prevenção do cancro – tudo o que Precisa de Saber”*, 2022).

Rural residents, for example, may face greater challenges to early detection of cancer than those living in urban areas simply because of their restricted access to health resources and services (Courtenay, 2000). Similarly, gender differences are another essential factor to take into consideration since men and women are likely to express their conceptions on cancer and its preventability differently, e.g., literature shows that women are more likely to associate cancer with specific risk factors, such as family history or certain behaviors, while men have a more general understanding and depiction of the disease (Courtenay, 2000).

To capture the multifaceted nature of cancer and prevention factors, the study employed a questionnaire to collect qualitative data, an approach that took into consideration how subjective conceptions and beliefs can be, especially when dealing with a complex topic like cancer, and ought participants to express their thoughts, feelings, and experiences fully, i.e., without limiting them to predefined response options (Braun & Clarke, 2013; Patton, 2015). In concordance, open-ended questions were preferred to provide participants with the flexibility needed to capture diverse conceptions, and uncover nuances in conceptions influenced by the aforementioned factors (Creswell & Poth, 2017; Flick, 2014).

To increase the understanding of cancer conceptions, the study devised a 2 (Proximity to Target-Object: Before Evocation vs. After Evocation) x 2 (Evocation

Structure: Open-ended vs. Oriented), as described in better detail in the following chapter.

This experimental design aimed to ascertain how different socio-cognitive contexts influence young adults' conceptions of cancer and its prevention factors. Specifically, by prompting participants to recall their *proximity* to cancer-diagnosed people (for instance, cancer prevalence within their close social circle) before answering prevention-related questions, their awareness of personal vulnerability should be heightened, leading to more thorough and insightful responses, and the same might occur when a structured evocation is enforced.

Lastly, the present research aims to understand the differences within young adults' conceptions of cancer's risk and its respective preventability, which may reveal distinct "profiles" that highlight the underlying ambiguity of conceptions that exist within the group. In addition, such profiles may bring light to whether young adults' responses align more closely with emotional or with rational systems, addressing the criticism given to the Health Belief Model as aforementioned.

STUDY: YOUNG ADULTS' CONCEPTIONS OF CANCER AND OF ITS PREVENTABILITY: THE IMPACT OF AGE, GENDER, AND SOCIAL AND COGNITIVE CONTEXTS

The following hypotheses were proposed as key bases to explore the interplay of the factors in this study:

- H1: *Sociodemographic Factors (Age)* – Age affects lexical production as life experiences and prior knowledge can influence how individuals interpret cancer-related information. As a result, one should expect older adults to possess a more nuanced understanding of cancer due to their more extensive contact and exposure to the disease, its determinants and manifestations, which should be manifested in a higher lexical production, both on the features used to define cancer, and on the factors that foster its preventability by older adults.
- H2: *Sociodemographic Factors (Gender)* – Gender differences may affect individuals' conceptions of cancer, where (H2.1) women are expected to have a more complex representation of cancer, manifested in a higher lexical production, and (H2.2) said production should be more related to risk factors than overall disease depiction.
- H3: *Content Valence* – Cancer-related Characteristics are expected to be more negative than positive, whereas the reverse should occur on Cancer Preventability, thus resulting in a higher lexical production concerning negative features in the former and positive in the latter.
- H4: *Proximity to Cancer* – An increased proximity to the target-object “cancer” is expected to guide the individual to a deeper and more emotional processing of cancer-related information. Therefore, one should expect those with more objective proximity to contexts of contact (physical, but predominantly emotional) with the disease (H4.1) not only to produce more complex content to represent it, but also (H4.2) its preventability, both reflecting a higher lexical production.
- H5: *Content Retrieval based on Structure* – The manner in which individuals represent, or are led to represent, any given social object is strongly dependent on how knowledge, information, and its affective underpinnings are contextualized. As such, the psychosocial context in which the retrieval of individuals' representations on cancer is prompted, namely the structuring of it, should affect the content of

these representations. One should expect that, in an open-ended retrieval setting of Cancer-related Preventability, (H5.1) individuals have a lower, (H5.2) more redundant, and with (H5.3) more positive features lexical production than those with an oriented/structured setting.

On top of these hypotheses, a set of exploratory analyses were conducted to identify young adults' conceptions on cancer and on its preventability, respectively with the representativeness of units of meaning, and their prevalence.

Participants

The eligibility criteria defined for this study was an age range from 18 to 29 years old, and residency in Portugal. From a starter pool of 234 questionnaire responses, a total of 156 participants were excluded from the sample: 124 due to incomplete questionnaire submission (completion rate < 100%), 13 for not providing age information, 14 for falling outside the stipulated age parameters, and 5 for leaving all relevant questions blank. Therefore, the final sample comprised 78 participants, representing 33% of the initial database.

As presented in Table 1 below, in this final sample, 71.8% self-identified as female, while the remaining 28.2% self-identified as male.

The mean age of participants is of 22.13 years old ($SD = 2.86$; 18 through 29), and, based on terciles, three age-groups were created: 18 to 20 years old (28.2%), 21 to 22 (37.2%), and 23 to 29 (34.6%).

The vast majority of participants are from the region of Coastal North Portugal (*Região Norte Litoral*).

Table 1.

Sociodemographic profiles considered for the final study sample (N = 78).

		<i>n</i>	%
Gender	Female	56	71.8%
	Male	22	28.2%
Age	18	6	7.7%
	19	12	15.4%
	20	4	5.1%
	21	12	15.4%
	22	17	21.8%
	23	7	9.0%
	24	2	2.6%
	25	8	10.3%
	26	2	2.6%
	27	3	3.8%
	28	3	3.8%
	29	2	2.6%
Age-group	18 and 20	22	28.2%
	21 and 22	29	37.2%
	23 and 29	27	34.6%
Region	Norte Litoral	60	76.9%
	Norte Interior	6	7.7%
	Centro Litoral	5	6.4%
	Centro Interior	3	3.8%
	Região Autónoma dos Açores	3	3.8%
	Região Autónoma da Madeira	1	1.3%

Procedure

The dissemination of the questionnaire was conducted via the institutional email of the University of Porto, through social media, and shared with Associação Acreditar (Associação de Pais e Amigos de Crianças com Cancro).¹ By having this approach, there was an attempt to engage participants who would meet the defined criteria for the study and whose information would potentially be relevant to the research in question. Participants were also asked to share the questionnaire with others within the target population.

The study was conducted via an online questionnaire in the platform Qualtrics XM, which ensures participant non-identification. In the introduction, participants were informed about the objectives of the research, the voluntary nature of participation, and the guarantees of anonymity and confidentiality (full questionnaire and its flow can be found in Appendix I).

Common to all experimental conditions was the question "In your opinion, which characteristics best describe Cancer and the situations in which someone suffers from the disease?", followed by a question to elicit the aspects of cancer preventability which could be either *open-ended* or *oriented* depending on which condition the platform randomly allocated the participant (*Evocation Structure*). In two other independent questions participants indicated if they had had any "*objective*" *proximity* with cancer-diagnosed people and the degree of *closeness* that they had with them ("Acquaintances", "Friends", "Extended Family" (family members who do not live or have lived with them), and "Close Family" (family members who live or have lived with them). The last section was exclusively dedicated to the collection of sociodemographic data, specifically regarding age, gender, and region of residency in Portugal. Placing these questions in the end envisioned to avoid interference with the experimental manipulation and was for strict sample control.

Content Analysis and Judges' Agreement

All content produced by the participants was transcribed according to the *significant units of meaning* extracted from the lexical production.

¹ The research received favorable approval from the Data Protection Unit of the Rectory of the University of Porto on February 16th, 2024, and data collection took place from then until March 18th, 2024.

The subsequent step involved defining categories composed of equivalent units of meaning, either through simple word synonymy, aided by a Portuguese language dictionary, or, more frequently, through content analysis.

After compiling all lexical production from the sample, the inclusion of each unit of meaning in a specific category was submitted to a *judges' agreement* process, in which the panel consisted of three independent judges, and units of meaning were solely included in a category when there was unanimity among the judges on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

Experimental Design

Participants were distributed across the four experimental conditions of the design: 2 (Proximity to Target-Object "Cancer": Before Evocation vs. After Evocation) x 2 (Evocation Structure: Open-ended vs. Oriented).²

The manipulations were as follows:

Proximity to Target-Object "Cancer" – in the *Before Evocation* condition participants were asked to answer questions regarding cancer *proximity* before being requested to evoke cancer-related traits and prevention-related factors; in the condition *After Evocation*, participants were asked to recall cancer-related characteristics and preventability aspects prior to *proximity* questions.

Evocation Structure – in the *Open-Ended* condition participants had to recall prevention-related factors without any explicit guidance or structure; on the contrary, in the *Oriented* condition participants were instructed to recall five positive and five negative aspects associated with cancer preventability.

As required to conduct the research, gender and age-group were equivalent across the four Experimental Conditions [respectively, $\chi^2(3, N = 78) = 1.37, ns$, and $\chi^2(3, N = 78) = 9.61, ns$].³

² Qualtrics XM randomly assigned participants to conditions; The number of participants was equivalent across conditions, ranging from $n = 17$ to $n = 21$, $\chi^2(N = 78, 3) < 1$.

³ Male ($N = 22$): $n = 4$ to $n = 7$ across conditions; Female ($N = 56$): $n = 12$ to $n = 17$ across conditions.

RESULTS

Lexical Production, Redundancy, and Content Valence

The lexical production of participants was analyzed according to three constructs: *Total Lexical Production* – The whole contents that were evoked (TLP); *Differential Lexical Production* – Contents that have a single meaning (DLP); and *Lexical Redundancy Index* – An index that represents the redundant content produced by the participant with the formula $LRI = TLP / DLP$. With the LRI, the study aimed to analyze the extent participants are able to "elaborate" in a more or less complex manner about the object on which they must comment. In simple terms, a high LRI indicates lower production complexity since "the same thing" is said repeatedly (i.e., in different ways, but with the same meaning).

Total Lexical Production. The 78 participants produced a total of 808 constructs with around 10 constructs evoked per participant ($M = 10.35$, $SD = 5.46$). The *Total Lexical Production* had 379 constructs regarding *cancer characteristics* ($M = 4.86$, $SD = 3.26$) and 418 regarding *preventability* of the disease ($M = 5.36$, $SD = 3.37$).⁴

Differential Lexical Production. Different constructs totaled 575, with a mean of 7.37 words per participant ($SD = 3.12$), comprising 289 for characteristics ($M = 3.71$, $SD = 1.94$) and 275 for prevention factors ($M = 3.53$, $SD = 1.79$).⁵

Lexical Redundancy Index. LRI had a mean of 0.25 ($SD = 0.16$), with higher redundancy for prevention ($M = 0.27$, $SD = 0.21$) than characteristics ($M = 0.18$, $SD = 0.17$). This indicates that 25% of participants' Lexical Production is redundant as they evoke "the same thing" one every four times.⁶

Content Valence. In concordance with H3, the findings show that Content Valence is significantly more negative than positive in Cancer Characteristics (Negative TLP: $\Sigma = 293$; $M = 3.75$, $SD = 2.43$; Positive TLP: $\Sigma = 80$; $M = 1.02$, $SD = 1.61$)⁷, and, in contrast, the opposite trend is found in participants' production of Cancer

⁴ Respectively, $min = 3$, $max = 32$; $min = 0$, $max = 20$; $min = 0$, $max = 16$; $t(77) = -1.16$, ns ; $z < 1$ (Wilcoxon).

⁵ Respectively, $min = 2$, $max = 17$; $min = 0$, $max = 10$; $min = 0$, $max = 8$; $t(77) < 1$; $z < 1$ (Wilcoxon).

⁶ Respectively, $min = 0$, $max = 0.56$; $min = 0$, $max = 0.70$; $min = 0$, $max = 0.50$; $t(71) = -2.72$, $p = .008$, $d = -0.32$; $z < 1$ (Wilcoxon).

⁷ Respectively, $min = 0$, $max = 12$; $min = 0$, $max = 10$; $t(77) = -8.85$, $p < .001$, $d = -1.00$; $z = -6.48$, $p < .001$ (Wilcoxon).

Preventability (Positive TLP: $\Sigma = 299$; $M = 3.83$, $SD = 2.26$; Negative TLP: $\Sigma = 125$; $M = 1.60$, $SD = 2.12$).⁸

Additionally, participants produced significantly less Positive Characteristics than Positive Preventive Factors ($\Sigma = 80$ vs. 299; $M = 1.02$ vs. 3.83), and, conversely, more Negative Characteristics than Negative Preventive Factors ($\Sigma = 293$ vs. 125; $M = 3.75$ vs. 1.60).⁹

As a whole, results show that these young adults are equally able to come up with characteristics that may describe the features of cancer and of the situations it entails, as well as preventive behaviors, attitudes, emotions that may function as preventive factors for the disease. However, the nature of these characteristics and preventive factors, as expected, is opposed, where the first tends to be elicited on a more negative spectrum, whereas the latter are mostly evoked with a positive valence.

Categorization: Cancer-Related Characteristics and respective Preventability

As presented earlier, the total lexical production was submitted to a process of Judges' Agreement, which resulted in the definition of broader conceptual categories that allow a more concise analysis of participants' evocation.

Out of this process, it was attained a total of 47 categories of which 24 concern the "object" *characteristics*, with 222 units of meaning, and the other 23 are regarding *prevention factors*, with 189 units of meaning. Each of these categories is presented in the form of the constructs/concepts that were defined for the Judges' Agreement (as shown in Appendix II and III).¹⁰

Based on Lexical Production, an *Index of Prevalence* and an *Index of Representativeness*, that correspond, respectively, to the number of participants that elicit each category and the relative weight of each category in the participant's overall evocation was created for both Cancer-related Characteristics and Preventability categories.¹¹

⁸ Respectively, $min = 0$, $max = 15$; $min = 0$, $max = 9$; $t(77) = 7.07$, $p < .001$, $d = 0.80$; $z = -6.48$, $p < .001$ (Wilcoxon).

⁹ Lowest $t(77) = 7.38$, $p < .001$, $d = 0.84$; Lowest $z = -5.53$, $p < .001$ (Wilcoxon).

¹⁰ Only 1.36% of the produced content was not included in any of the units of meaning and consequently in the categories presented here. These 11 evocations were discarded from all analyzes.

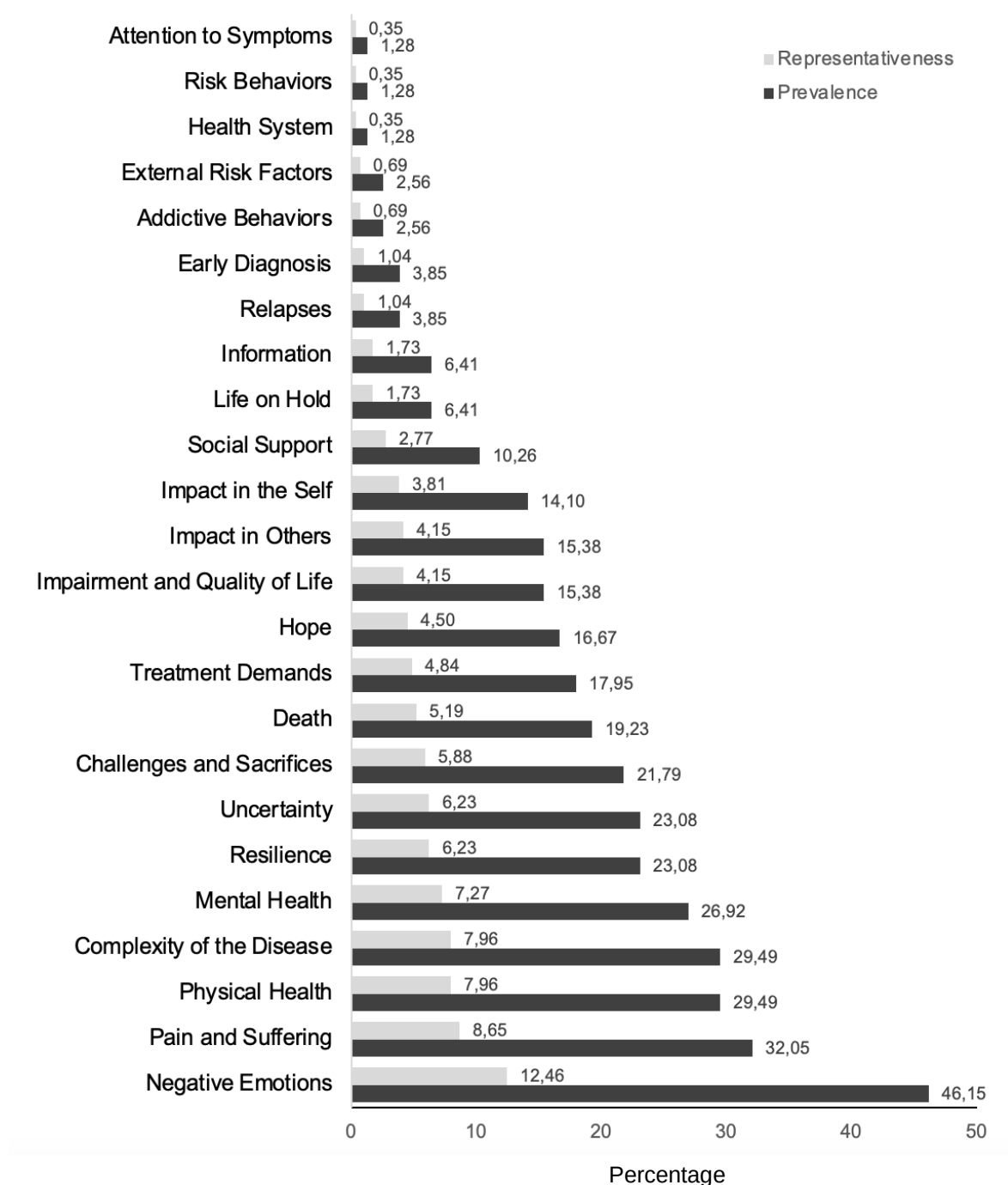
¹¹ The first are non-summative percentages and the latter accounts for 100% of the participant evocation ($\Sigma = 100$).

In Figure 1 below it is shown that, in terms of its prevalence, *Negative Emotions* (“*triste*”, “*medo*”, “*desespero*”, “*angústia*”) is the most elicited characteristic (46.15%), followed by *Pain and Suffering* (“*dor*”, “*sofrimento*”), *Physical Health* (“*cansaço*”, “*fraqueza*”), *Complexity of the Disease* (“*complexo*”, “*depende do tipo de cancro*”, “*doença difícil e complicada*”), and *Mental Health* (“*ansiedade*”, “*depressão*”, “*sofrimento psicológico*”) that are used to describe cancer by at least ¼ of participants. Another group of features with considerable prevalence is composed by *Resilience* (“*resiliência*”, “*força de vontade*”, “*coragem*”, “*paciência*”), *Uncertainty* (“*incerteza*”, “*imprevisibilidade*”), *Challenges and Sacrifices* (“*luta*”, “*desafios multifacetados*”), and *Death* (“*morte*”, “*fim*”, “*luto*”), present amongst 2 in each 10 participants. It is also found that more than 10% of participants represent cancer using characteristics such as *Treatment Demands* (“*exames e tratamentos dolorosos, intensos e duradouros*”), *Hope* (“*esperança*”, “*morte não é inevitável*”), *Impairment and Quality of Life* (“*impotência*”, “*impacto no funcionamento do corpo*”), *Impact in Others* (“*impacto na saúde mental da família*”, “*afeta as pessoas próximas*”), *Impact in the Self* (“*adaptação*”, “*mudança*”), and *Social Support* (“*isolamento*”, “*solidão*”). Jointly, these represent 92% of all Lexical Production (DLP) regarding Cancer Characteristics.

In terms of takeaways, the first grouping focuses on the complexities of the disease, which have a major *impact on people's health*, inflicting *suffering and negative emotions* as they affect both *physical and mental well-being*; the second addresses being *confronted with death*, emphasizing *resilience* (the “vital need” of resisting the infirmity) to face the *severe challenges and impairment in quality of life* that this diseases arises and that require much *perseverance* to overcome; and the third group introduces the concept of *hope*, implying that, despite the overwhelming *toll that cancer may impose on cancer-diagnosed people as well as those closest to them*, there is still a glimmer of hope and optimism that, with yet promising but *demanding treatments*, individuals can find their way to survival, illustrating, in this sense, the overlooked potential for recovery even during times of *adversity*.

Figure 1.

Distribution of Representativeness and Prevalence of each Unit of Meaning within the Cancer-related Characteristics that were evoked by participants.¹²



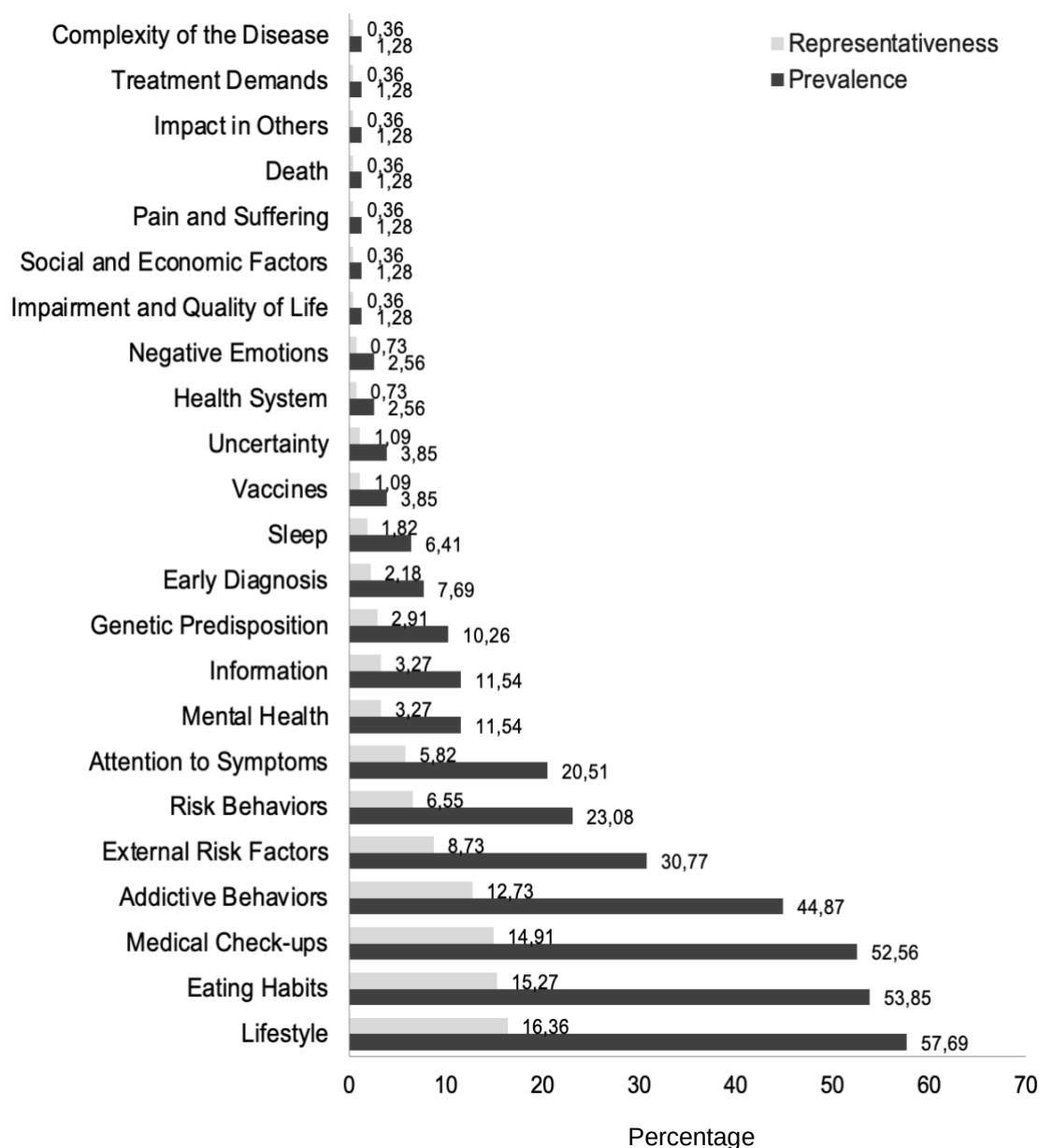
¹² Representativeness = Relative weight of the feature in the whole Lexical Production regarding "Cancer Characteristics"; Prevalence = Number of participants that elicited each category (in percentage).

In turn, it is portrayed in Figure 2 participants' Lexical Production on how they represent factors that may prevent Cancer. The profile of participants views regarding Preventability of the disease is considerably less disperse across the categories, as three features are prevalent amongst more than half of participants: *Lifestyle* (“*praticar exercício físico*”, “*hábitos de vida saudáveis*”), *Eating Habits* (“*alimentação saudável*”), and *Medical Check-ups* (“*exames de despiste regulares*”, “*participação em campanhas de rastreio*”). These three factors represent nearly half (46.55%) of all preventive “aspects” that participants evocate. Two other features emerge from the remaining by being mentioned by four to three participants out of each ten are: *Addictive Behaviors* (“*fumar*”, “*alcoolismo*”), and *External Risk Factors* (“*usar protetor solar*”, “*exposição a radiações*”, “*evitar agentes cancerígenos*”, “*trabalhos de risco*”). Additionally, *Risk Behaviors* (“*evitar comportamentos de risco*”; “*cuidado geral*”, “*evitar comportamentos nocivos para a saúde*”), and *Attention to Symptoms* (“*atenção a sinais anormais*”, “*alerta aos sintomas*”, “*atenção ao corpo e reações*”) are a third group of preventive factors that are mentioned by at least 20% of participants. Lastly, a less prevalent yet important group of factors can be highlighted: *Mental Health* (“*ansiedade*”, “*níveis elevados de stress*”), *Information* (“*conhecimento sobre cancro*”, “*sensibilização em relação à prevenção do cancro*”, “*mais Informação acerca dos vários tipos de cancro*”), and *Genetic Predisposition* (“*conhecimento acerca do histórico familiar*”) prevalent amongst 10% of participants. As a whole, these four groups of conceptual categories represent nearly 90% of all the preventive factors of cancer that participants were able to evocate (89.82%).

Accordingly, the first group considers the important *connection between lifestyle choices and health*, underlining the relevance of preventive measures such as *appropriate food consumption*, *regular physical activity*, and *regular medical check-ups*; the following addresses *risk factors* that are *external to the individual* and that and may contribute to illness development, e.g., *hazards in the environment* and *behaviors like smoking and alcoholism*; the third focuses on *inner factors* affiliated with prevention, such as the *need for self-awareness* and *proactive health control by avoiding any high-risk behaviors* and *being mindful of one's own bodily manifestations*, and the last underscores the importance of *health literacy* and *access to information on health conditions* to allows people to make informed decisions, and improve their general well-being by *reducing their levels of stress* and of overthinking.

Figure 2.

Distribution of Representativeness and Prevalence of each Unit of Meaning within the Preventability Factors that were evoked by participants.¹³



In Figure 3 a word cloud was created by using the WordArt platform to make a visual organization of words based on their frequency (noting that word size reflects their Representativeness). Overall, this imagetic representation corresponds to the interpretation presented above.

¹³ Idem.

Word clouds of evoked words regarding the Characteristics of Cancer (upper part) and its Preventability aspects (lower part).



Differences based on Age-Groups

Results show that, consistently with the first prediction (H1), in comparison with the remaining age-groups, participants aged 23 and older present higher *Lexical Production*, *Lexical Production on Cancer-Related Characteristics*, *Lexical Production on Cancer Preventability*, regardless of redundancy or differentiated units of meaning.¹⁴ Participants ageing 18 to 20 and 21 to 22 years-old present no significant differences between them.¹⁵ As assumed, indeed age and proximity (in the sense of having contact with cancer-diagnosed people) have a positive correlation: objective proximity with cancer increases with age, i.e., the older they get, the more disease contact they will encounter, $r = .24$ ($p = .037$, $N = 78$).

This overall evidence shows a clear trend in which older participants present *higher TLP*, that is, on average, a greater number of words to describe Cancer related situation, both regarding *Cancer-Related Characteristics* and *Cancer Preventability Factors*, suggesting that older participants possess a broader lexical repertoire and a greater capacity for verbal expression.¹⁶

The analyses on the representativeness of all the 24 *Characteristics* and 23 *Preventability* units of meaning showed no significant effects of Age-Group.¹⁷

Additionally, results also show the same profile of conceptual representation on cancer evocation positive-negative valence, although differences significantly occur when comparing older with younger participants.¹⁸

¹⁴ Only one of the ANOVAs presents a marginally significant effect, *DLP for Characteristics*, $F(2, 75) = 2.86$, $p = .063$, $\omega^2 = .05$; Lower remaining effect, on *DLP for Prevention*, $F(2, 75) = 3.15$, $p = .048$, $\omega^2 = .05$; significant pairwise comparison with age-group 23 year-old or higher – lower p using Tukey variant of t test, $p = .041$.

¹⁵ Higher p using Tukey variant of t test, $p = .065$.

¹⁶ The comparison is always the following 23 or older vs. 18 to 20 vs. 21 to 22 years-old: TLP – $M = 13.22$, $SD = 6.58$ vs. $M = 8.27$, $SD = 3.89$ vs. $M = 9.27$, $SD = 4.25$; *Characteristics TLP* – $M = 6.15$, $SD = 4.25$ vs. $M = 4.14$, $SD = 2.40$ vs. $M = 4.21$, $SD = 2.40$; *Preventability TLP* – $M = 6.89$, $SD = 3.85$ vs. $M = 3.95$, $SD = 2.77$ vs. $M = 5.00$, $SD = 2.79$; The pattern is the same in DLP and LRI metrics: DLP – $M = 8.74$, $SD = 3.21$ vs. $M = 6.50$, $SD = 2.72$ vs. $M = 6.76$, $SD = 3.01$; *Characteristics DLP* – $M = 4.41$, $SD = 2.14$ vs. $M = 3.41$, $SD = 1.84$ vs. $M = 3.28$, $SD = 1.69$; *Preventability DLP* – $M = 4.15$, $SD = 1.63$ vs. $M = 2.91$, $SD = 1.63$ vs. $M = 3.41$, $SD = 1.92$; LRI – $M = 0.28$, $SD = 0.17$ vs. $M = 0.19$, $SD = 0.15$ vs. $M = 0.26$, $SD = 0.14$; *Characteristics LRI* – $M = 0.20$, $SD = 0.19$ vs. $M = 0.14$, $SD = 0.16$ vs. $M = 0.18$, $SD = 0.17$; *Preventability LRI* – $M = 0.31$, $SD = 0.22$ vs. $M = 0.17$, $SD = 0.21$ vs. $M = 0.31$, $SD = 0.19$.

¹⁷ Respective MANOVAs, $F(44, 102) < 1$ and $F(38, 112) < 1$.

¹⁸ Lower effect, $F(2, 75) = 3.61$, $p = .032$, $\omega^2 = .06$; pairwise comparison between age-group 23-year-old or higher and 18 to 20, lower p using Tukey variant of t test, $p = .053$; higher p comparing 23 year-old or higher and 21 to 22, $p = .067$ (bear in mind the non-homogeneous variances between groups, reflected in the SD present in former group); *Positive Characteristics* – $M = 1.19$, $SD = 2.09$ vs. $M =$

Differences based on Gender

Contrary to both hypotheses H2.1 and H2.2, results show that Total Lexical Production does not differ between genders. In fact, the findings indicate that male participants actually exhibit a higher Different Lexical Production on Cancer Preventability (4.23 vs. 3.25 words in average), and also that produce more Negative Preventability factors (2.50 vs. 1.25 words in average).¹⁹

Additionally, the analyses on the representativeness of all the 24 Characteristics and 23 Preventability units of meaning showed no overall significant differences between genders in the former, but an effect of gender in the latter.²⁰ Nonetheless, only two of the univariate effect were significant showing that *Uncertainty* is more representative of Preventability among men (.02 vs. .00, i.e., 2% vs. 0%), whereas *Medical Check-Ups* is more representative among women (0.25 vs. .07, i.e., 25% vs. 7%).²¹

Differences based on Proximity to Targeted-Object “Cancer”

The vast majority of participants (85.9%) reported knowing someone with cancer, but with significant differences in regard to the proximity that they have to cancer-diagnosed people: more than half have relatives from their extended family affected by cancer (53.8%), nearly a third have close family members (31.0%) or acquaintances (28.2%) diagnosed and, finally, a lower number of participants have friends with cancer (15.4%). Four participants reported having cancer (5.1%).²²

1.00, $SD = 1.45$ vs. $M = 0.90$, $SD = 1.2$; Negative Characteristics – $M = 4.74$, $SD = 2.94$ vs. $M = 3.14$, $SD = 2.08$ vs. $M = 3.31$, $SD = 1.91$; Positive Preventability – $M = 4.67$, $SD = 2.99$ vs. $M = 3.00$, $SD = 1.41$ vs. $M = 3.69$, $SD = 1.75$; Negative Preventability – $M = 2.19$, $SD = 2.40$ vs. $M = 1.14$, $SD = 1.96$ vs. $M = 1.41$, $SD = 1.91$.

¹⁹ DLP for Prevention, $F(1, 76) = 4.93$, $p = .029$, $\omega^2 = .05$; Negative Prevention Factors, $F(1, 76) = 5.79$, $p = .019$, $\omega^2 = .06$; effect on TLP for Prevention, $F(1, 76) = 3.64$, $p = .060$; highest remaining effect, $F(1, 76) = 2.27$, *ns*.

²⁰ Respective MANOVAs, $F(22, 51) = 1.42$, *ns* and $F(19, 56) = 1.98$, $p = .025$, $\eta^2 = .40$.

²¹ Respectively, $F(1, 74) = 7.48$, $p = .008$, $\eta^2 = .09$. and $F(1, 74) = 7.96$, $p = .006$, $\eta^2 = .10$; highest remaining effect, $F(1, 74) = 2.94$, *ns*.

²² These four participants that answered “Others” to the social proximity questions with having cancer themselves were equally present in each of the 4 experimental conditions, yet discarded from the remaining analyzes.

In order to deduce “proximity profiles” based on the situation in which each participant was located at the intersection of the possibilities described above, a Cluster Analysis was performed using the above described dichotomous variables.²³ This analysis extracted 4 interpretable and conceptually supported Clusters for which the centroids are presented in Table 2.

The first cluster represents *individuals who don't know cancer-diagnosed people* (14.86%), suggesting a group with no direct personal connections to cancer patients and that can be consider a “control group”. Cluster four is mostly composed by participants who *know friends, acquaintances, and members from the extended family* with cancer diagnoses (13.51%) (to a lesser extent, also close relatives), indicating a broad network of relationships with cancer-diagnosed people. The second is composed by participants who only have *close family members diagnosed* with cancer (22.97%), representing those with a more intimate level of proximity. And, lastly, the third and largest cluster consists mostly of participants who know *only members from the extended family with cancer diagnoses* (48.64%), thus representing people with close proximity to the disease, but less intimate than those from cluster two.

Table 2.

Profiles of Objective Proximity: Centroid Values for each group of participants extracted in the Cluster Analysis (N = 74).

	Cluster			
	1	2	3	4
Knows no Cancer-Diagnosed People	1.00	.00	.00	.00
Acquaintances	.00	.00	.33	.70
Friends	.00	.06	.00	1.00
Extended Family	.00	.00	.89	.80
Close Family	.00	1.00	.00	.40
<i>n</i>	11	17	36	10

²³ K-Means Method, without running means; in the five measures, lowest $F(3, 70) = 9.29, p < .001$; the model was defined after 4 iterations; The variables in the model are “signal measures,” meaning they are dichotomous numerical variables, indicating presence or absence (0, 1). Thus, the centroids of each cluster represent, in practice, a percentage (decimal values varying between 0 and 1). In other words, for example, a value of .33 means that 33% responded (signaled) that option/measure.

The test of Hypothesis 4, and its declinations, requires performing an *omnibus* ANOVAs on the effect of Cluster Membership, however the difference between the clusters' samples size does not allow such analysis and, therefore, can't be explored in the present study.²⁴

Effects of Proximity to the Targeted-Object "Cancer" and Evocation Structure

To test the effects of the manipulated factors in 2 x 2 design, it was performed a series of five MANOVAs on all the relevant dependent measures.²⁵ Results show that: (1) *Evocation Structure* has a significant effect on all other measures, although on *Lexical Redundancy* the effect is marginally; and (2) *Proximity to the Targeted-Object "Cancer"* has no significant effects.²⁶

As given in Table 3, overall, results confirm Hypotheses 5.1 and 5.2 showing that in the Oriented condition, participants' *Lexical Production regarding Preventability* is (1) higher both on its TLP and DLP forms and (2) more negative, but, contrary to the study's prediction, (3) more redundant. Putting it into numbers, participants in the Oriented retrieval setting produce, in the whole, more 2.5 words on Preventability of Cancer, and 1 word more with different meaning. However, contrary to H5.3, their lexical production (34.0%) is more redundant than those in an Open-ended condition (21.0%).

²⁴ Nonetheless, pairwise comparisons between clusters using one-sample t tests were performed, in which the mean from the larger sample is the contrast value. This procedure reduces the probability of Error Type II to occur, that is, a significant p is less significant with a smaller sample. None of these revealed significant differences between clusters.

²⁵ By experimental design, *Evocation Structure* can't have any effect on measure regarding the Lexical Production of Characteristics, thus these are elicited prior the manipulation of this factor; The MANOVAs entered the 2 Independent Factors (*Proximity to the Targeted-Object "Cancer"* and *Evocation Structure*) and were performed in 5 models, each entering the following 3 dependent measures: (1) *Lexical Production* (TLP, Characteristics TLP, Preventability TLP); (2) *Differential Lexical Production* (DLP, Characteristics DLP, Preventability DLP); (3) *Lexical Redundancy* (LR, Characteristics LR, Preventability LR); (4) *Content Valence* (Positive Characteristics, Negative Characteristics, Positive Preventability, Negative Preventability); (5) *Representativeness* (of Positive Characteristics, of Negative Characteristics, of Positive Preventability, of Negative Preventability).

²⁶ (1) Lowest effect of *Evocation Structure* across all measures, $F(3, 68) = 3.31, p = .025, \eta^2 = .13$, except on *Lexical Redundancy*, $F(3, 62) = 2.45, p = .092$; (2) Highest effect of *Proximity to Target-Object "Cancer"* across all measures, $F(4, 61) = 1.43, ns$.

Table 3.

Mean and standard-deviation on measures of Lexical Production that present an effect of Evocation Structure.²⁷

		Evocation Structure of Preventability [<i>M (DP)</i>]	
		Open-Ended	Oriented
Total Lexical Production (TLP)	Preventability	4.15 (2.80)	6.63 (3.46)
	Overall	8.64 (5.24)	11.89 (4.95)
Differential Lexical Production (DLP)	Preventability	2.95 (1.57)	4.05 (1.76)
	Overall	6.41 (3.02)	8.14 (2.75)
Lexical Redundancy Index (LRI)	Preventability	0.21 (0.22)	0.34 (0.20)
	Overall	0.22 (0.15)	0.28 (0.16)
Negative Content Valence	Preventability	0.33 (0.83)	2.83 (2.04)
Content Valence Ratio	Positive Preventability	0.06 (0.13)	0.37 (0.18)

Note: Both LRI and the Content Valence Ratio range from 0 to 1, thus representing a percentage.

Also as predicted, in the Oriented condition participants produced more negative preventability features: nearly 3 words against an average of less than one in the Open-ended setting. In fact, whereas in the latter only 6.0% of the content is of a negative nature, in the Oriented setting they represent more than 37.0% of all evocation regarding preventability.

²⁷ Lowest effect of the six presented in Table 3, $F(1, 70) = 6.28$, $p = .015$, $\eta^2 = .08$.

Profiles of Conceptions Cancer and its Preventability

Two cluster analyses were conducted to identify distinct profiles based on participants' conceptions of Cancer-Related Characteristics and on its Preventability.

Table 4.

Profiles of Cancer-Related Characteristics Lexical Production: Centroid Values for each group of participants extracted in the Cluster Analysis (N = 70).

	Cluster		
	1	2	3
Negative Emotions	.11	.51	.02
Pain and Suffering	.20	.02	.00
Complexity of the Disease	.00	.11	.21
Physically Health	.05	.01	.21
Mental Health	.04	.06	.14
Resilience	.11	.00	.02
<i>n</i>	31	17	22

In terms of *Cancer-Related Characteristics*, it yielded three interpretable and conceptually supported clusters, each representing an unique perspective on the disease, as can be seen in Table 4: (1) *Negative Emotions* – participants in Cluster two (24.28% of the sample) associate their conceptions of cancer with negative emotional experiences, focusing on the toll that the disease induces, such as fear, anxiety, sadness, and despair; (2) *Pain, Suffering, and Resilience* – The first and largest cluster (44.29%) is composed of participants who view cancer through the lens of hardship and human endurance and recognize the intense pain and suffering often associated with cancer, while also acknowledging the resilience and strength that is needed to face the disease; (3) *Complexity, Mental Health, and Physical Health* – a final cluster represents participants that have a more holistic view of cancer,

recognizing the complexity of the disease and its interconnectedness with mental and physical, as these profoundly impact one's well-being (31.42% of the sample).²⁸

Table 5.

Profiles of Cancer Preventability Conceptions: Lexical Production: Centroid Values for each group of participants extracted in the Cluster Analysis (N = 72).

	Cluster		
	1	2	3
Medical Check-ups	.36	.05	.08
Lifestyle	.10	.14	.41
Eating Habits	.04	.24	.26
Addictive Behaviors	.04	.29	.05
Attention to Symptoms	.12	.02	.01
<i>n</i>	32	27	13

In turn, as presented in Table 5, when it comes to Cancer Preventability, the analysis yielded also three interpretable and conceptually supported clusters, each representing a distinct perspective on preventive measures: (1) *Medical Check-ups and Attention to Symptoms* – The first cluster represents participants represents participants focused on a more clinical approach to cancer prevention that prioritizes regular medical check-ups and screenings as key preventive strategies, while also stressing the importance of being vigilant about potential symptoms and seeking prompt medical attention; (2) *Eating Habits and Addictive Behaviors* – In the second cluster participants focus on the importance of having proper dietary habits and managing and/or avoid addictive behaviors that may increase cancer risk, such as smoking or excessive alcohol consumption; (3) *Lifestyle and Eating Habits* – The last cluster, and less prevalent of the three, is composed by participants that focus on maintaining a healthy lifestyle, but also, to a lesser extent, on proper dietary habits, and to whom addictive behaviors are not a relevant issue.²⁹

²⁸ K-Means Method, without running means; in the six measures, lowest $F(2, 67) = 5.30, p = .007$; the model was defined after 6 iterations; see remaining description on footnote 23.

²⁹ K-Means Method, without running means; in the five measures, lowest $F(2, 69) = 5.77, p = .005$; the model was defined after 4 iterations; see remaining description on footnote 23.

GENERAL DISCUSSION AND CONCLUSIONS

This study provides a comprehensive analysis of young adults' conceptions of cancer and its respective preventability, specifically focusing on the influence of sociodemographic factors, proximity to cancer, and the manner of content retrieval in order to understand how psychosocial factors shape health-related attitudes and behaviors among young adults.

The Impact of Sociodemographic Factors

One of the key-findings is that sociodemographic factors, particularly age and gender, have a substantial impact on young adults' conceptions of cancer.

It was found that older individuals (aged 23 to 29 years olds) possess a more thorough understanding about cancer, as seen by an increased lexical output whilst asked to address both cancer-related characteristics and prevention factors, which reinforces the tenet that both life experiences and an increased exposure to health-related contexts become increasingly prevalent as people age, and, subsequently, improve individuals' cognitive complexity when it comes to health concerns.

Gender was also confirmed to be an important factor in how participants conceive cancer characteristics and its prevention. However, contrary to the initial expectation, male participants display a higher lexical production and more negative content related to cancer preventability, which might have occurred due to the influence of other psychological mechanisms of information retrieval. Said mechanisms may include perceived vulnerability since, like aforementioned, there's a higher incidence of cancer in men (one in every three) in comparison to in women (one in every four), and, moreover, men are known for taking more health risks than women (Newman, 2024). As a consequence, they might feel a stronger need to articulate their understanding and strategies for risk mitigation.

Additionally, results are at odds with those found by Courtenay (2000) in a study ran in the United States of America, in which women were likely to produce more

cancer risk factors in comparison to men's overall disease depiction. Aside the evident cultural and contextual differences between the populations represented in the studies that might be at play, this difference might also be due to the shift that has been happening since 2000 in gender roles and conceptions, particularly in the realm of healthcare awareness and professional development, as women have been attaining more equitable roles and positions in society, and, subsequently, increasingly their engagement in education and overall access to information (U.S. Census Bureau, 2023). Although this would require further investigation, it might have been a factor that led to a more scientifically informed understanding of cancer coming from women, characterized by a comprehensive "overall disease depiction", therefore, contributing to the reduced gender-gap discrepancy seen regarding cancer conceptions.

How Psychosocial Context Influences Cancer Conceptions

Due to the significant differences in sample sizes between the clusters, it was not feasible to perform the necessary analysis to explore the emotional weight associated with proximity to individuals diagnosed with cancer. As a result, no inferences could be made about how emotional proximity might affect responses, thus, the relation between proximity, emotional weight, and cognitive processing was left unexplored in the current research. Nevertheless, addressing this constraint in future studies may provide valuable insights into the role of objective proximity in shaping attitudes toward cancer, as well as how social networks can be leveraged to promote cancer prevention.

The study's experimental design sheds light on the impact of content retrieval structure on cancer-related conceptions, revealing that, as hypothesized, oriented settings lead to more extensive and negative lexical production concerning cancer preventability. Participants prompted in an structured evocation condition produce more content, yet it was more redundant and deeper on a negative spectrum than those in open-ended settings, highlighting the role of cognitive structuring on health-related information retrieval, which suggests that the manner in which information is displayed in health communication programs has a significant effect on public engagement as well as understanding of preventive behaviors.

Profiling Cancer Conceptions

The clustering of different conceptions on cancer and its preventability into three distinctive profiles as follows provides valuable insights for health interventions: those focusing on negative emotions, those highlighting pain and suffering with perseverance as a spotlight, and those with a more holistic perspective that comprises mental and physical health, illustrate the diversity in how young adults process the reality of cancer. Similarly, prevention-focused clusters reveal diverse attitudes pertaining to medical check-ups, lifestyle moderation, and the avoidance of addictive behaviors. The identified profiles highlight the range of conceptions within this target group, underlining the need of interventions that meet subgroups' unique experiences, knowledge levels, and concerns. By personalizing health communication to these distinct profiles, public health initiatives will resonate more with young adults, eventually increasing the likelihood of success and effectiveness of cancer prevention efforts.

The emergence of different profiles in cancer characteristics and preventability underlines the complexities of young adults' conceptions, providing a practical critique of the Health Belief Model, as one of the most common raised criticisms directed at HBM was its failure to address the emotional and psychological factors which can influence health-related behaviors, instead focusing solely on rational concepts of both risk and benefit. Particularly the preventability cluster centered on *negative emotions*, such as fear, anxiety, and despair, illustrate that participants' conceptions of cancer are not solely based on rational risk assessments, but are deeply intertwined with emotional responses, hence proving how HBM fails to fully capture the role of emotion in health decision-making.

Furthermore, the results confirmed Bandura's Self-Efficacy Theory, which draws attention to the significance of an individual's belief in their ability to carry out actions effectively, notably in the *Lifestyle, Eating Habits, and Addictive Behaviors* preventability cluster, in which participants focused on concrete actions they could take to prevent cancer, such as adopting healthier diets, avoiding tobacco or excessive alcohol consumption, and maintaining a physically active lifestyle, i.e., they recognize the importance of personal agency and behavior changes in cancer prevention, reflecting confidence in their ability to control and manage their health through personal decisions and effective actions to reduce cancer risk.

Future Endeavors

While this research provides valuable insights, several recommendations must be acknowledged and addressed in future studies.

Despite the considerable size of the sample regarding the study's major goals, it prevents the use of more diverse data analysis procedures that one could use to explore "more subtle" relations between variables, as well as testing other mediators and moderators. Such shortcoming was highlighted in all the cluster analyses that could sustain other subsequent analyses. Future studies should aim for a larger and more diverse sample, which would not only improve the statistical power, but also support more comprehensive analyses.

Although generalizability of results for the Portuguese youth population was not a goal of the study, the use of a representative sample would be a major contribution to the field, particularly if it included the geographic diversity from rural, urban, and coastal areas. Such an approach would provide a more complete assessment of regional differences in cancer conceptions, especially regarding healthcare access and prevention behaviors.

Additionally, while the study included participants of varying age and gender and these were equivalent across experimental conditions, the subsamples of gender were clearly biased towards an "overrepresentation" of women. This limitation can only be discarded *post facto*, because the lower engagement of men is a pervasive problem that can only be addressed once the sample is fully collected. A more balanced gender representation in future studies would allow for deeper exploration of gender-specific effects and more robust comparisons across groups, providing clearer insights into how men and women conceptualize cancer and its preventability.

Given the personal and distinctive nature of cancer experiences, future research ought to employ longitudinal designs, notably accelerated longitudinal approaches, to track changes in cancer conceptions over time, and especially following personal or family diagnoses, which could enrich our understanding on how health attitudes evolve, and present greater confidence in data on the psychological impact of cancer over time.

In sum, this study emphasized the importance of tailored health communication strategies that account for young adults' diverse cognitive and emotional profiles, as well as for the variations in cancer conceptions to enhance the efficacy of public health initiatives aimed at cancer prevention and health literacy among this group. While the findings have significant implications for public health policies and cancer prevention interventions that target young adults, they also suggest that health communication strategies should be customized to different age subgroups within this population, taking into account different degrees of socio-cognitive complexity in order to address differences in conceptions of cancer preventability.

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APPENDICES

Appendix I.

Questionnaire's Flow of the Study "Young Adults' Conceptions of Cancer and of its Preventability: The Impact of Age, Gender, and Social and Cognitive Contexts"



INTRODUÇÃO

O presente questionário faz parte de um projeto de investigação no âmbito do Mestrado em Psicologia da Faculdade de Psicologia e Ciências da Educação da Universidade do Porto e desenvolvido através do SINCLab – Social Inclusion Laboratory, desta faculdade.

Poderá constatar que o objetivo deste estudo é conhecer as ideias e opiniões que as pessoas têm acerca do Cancro.

O questionário encontra-se implementado numa plataforma gerida pela Qualtrics, sujeito às condições da licença subscrita pela FPCEUP (<https://www.qualtrics.com/legal/customers/gtcs/>). As suas respostas serão descarregadas da plataforma para o computador dos investigadores, onde serão analisadas de forma agregada, conjuntamente com as respostas dos restantes participantes. A informação recolhida será tratada de forma confidencial e utilizada apenas no contexto desta investigação.

Embora varie consoante a pessoa que responde, estimamos que a resposta a todas as questões do inquérito demore até cerca de 10 minutos.

A sua participação é muito importante para nós, e agradecemos o seu envolvimento neste projeto.

Para qualquer questão relacionada com esta investigação, poderá contactar a investigadora responsável, Filipa Silva, através do seu endereço eletrónico: up201909902@up.pt

CONDIÇÃO 1

Em algumas das questões que se seguem iremos pedir-lhe uma resposta em que terá de escrever. Como pode estar a usar um meio digital que não facilite a escrita (um tablet, telemóvel, etc.), pedimos-lhe que não se preocupe com as gralhas que possam ocorrer

enquanto escreve. O importante para nós é que nos faça chegar as suas opiniões de modo espontâneo.

Na sua opinião, quais as características que melhor descrevem o **Cancro** e as **situações em que alguém sofre da doença?**

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

Quando pensa em **prevenção de Cancro**, que aspetos gerais ou comportamentos positivos e negativos lhe associa?

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

	[Para escrever, clique dentro de um ou vários retângulos]	
	Aspetos / comportamentos POSITIVOS	Aspetos / comportamentos NEGATIVOS
1.		
2.		
3.		
4.		
5.		

Conhece ou teve contato com alguém diagnosticado com cancro?

- ☐ Sim
- ☐ Não

Conhece ou teve contato com alguém diagnosticado com cancro?

- ☐ Sim
☐ Não

Qual a sua relação com essa(s) pessoa(s)?

(Pode Selecionar todas as opções que se apliquem)

- ☐ Pessoa(s) conhecida(s)
☐ Pessoa(s) amiga(s)
☐ Pessoa(s) da Família Alargada (familiares que não vivem/viveram consigo)
☐ Pessoa(s) da Família Próxima (alguém que vive/viveu consigo)
☐ Outra situação. Qual?

CONDIÇÃO 3

Em algumas das questões que se seguem iremos pedir-lhe uma resposta em que terá de escrever. Como pode estar a usar um meio digital que não facilite a escrita (um tablet, telemóvel, etc.), pedimos-lhe que não se preocupe com as gralhas que possam ocorrer enquanto escreve. O importante para nós é que nos faça chegar as suas opiniões de modo espontâneo.

Conhece ou teve contato com alguém diagnosticado com cancro?

- ☐ Sim
☐ Não

Qual a sua relação com essa(s) pessoa(s)?

(Pode Selecionar todas as opções que se apliquem)

- ☐ Pessoa(s) conhecida(s)
☐ Pessoa(s) amiga(s)
☐ Pessoa(s) da Família Alargada (familiares que não vivem/viveram consigo)
☐ Pessoa(s) da Família Próxima (alguém que vive/viveu consigo)
☐ Outra situação. Qual?

Qual a sua relação com essa(s) pessoa(s)?

(Pode seleccionar todas as opções que se apliquem)

- ☐ Pessoa(s) conhecida(s)
- ☐ Pessoa(s) amiga(s)
- ☐ Pessoa(s) da Família Alargada (familiares que não vivem/viveram consigo)
- ☐ Pessoa(s) da Família Próxima (alguém que vive/viveu consigo)
- ☐ Outra situação. Qual?

CONDIÇÃO 2

Em algumas das questões que se seguem iremos pedir-lhe uma resposta em que terá de escrever. Como pode estar a usar um meio digital que não facilite a escrita (um tablet, telemóvel, etc.), pedimos-lhe que não se preocupe com as gralhas que possam ocorrer enquanto escreve. O importante para nós é que nos faça chegar as suas opiniões de modo espontâneo.

Na sua opinião, quais as características que melhor descrevem o **Cancro e as situações em que alguém sofre da doença?**

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

Quando pensa em **prevenção de Cancro**, que aspetos gerais ou comportamentos lhe associa?

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

Na sua opinião, quais as características que melhor descrevem o **Cancro** e as **situações em que alguém sofre da doença?**

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

Quando pensa em **prevenção de Cancro**, que aspetos gerais ou comportamentos positivos e negativos lhe associa?

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

[Para escrever, clique dentro de um ou vários retângulos]		
	Aspetos / comportamentos POSITIVOS	Aspetos / comportamentos NEGATIVOS
1.		
2.		
3		
4		
5		

CONDIÇÃO 4

Em algumas das questões que se seguem iremos pedir-lhe uma resposta em que terá de escrever. Como pode estar a usar um meio digital que não facilite a escrita (um tablet, telemóvel, etc.), pedimos-lhe que não se preocupe com as gralhas que possam ocorrer

enquanto escreve. O importante para nós é que nos faça chegar as suas opiniões de modo espontâneo.

Conhece ou teve contato com alguém diagnosticado com cancro?

- ☐ Sim
- ☐ Não

Qual a sua relação com essa(s) pessoa(s)?

(Pode Selecionar todas as opções que se apliquem)

- ☐ Pessoa(s) conhecida(s)
- ☐ Pessoa(s) amiga(s)
- ☐ Pessoa(s) da Família Alargada (familiares que não vivem/viveram consigo)
- ☐ Pessoa(s) da Família Próxima (alguém que vive/viveu consigo)
- ☐ Outra situação. Qual?

Na sua opinião, quais as características que melhor descrevem o **Cancro e as situações em que alguém sofre da doença?**

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

Quando pensa em **prevenção de Cancro**, que aspetos gerais ou comportamentos lhe associa?

(Na sua resposta pode utilizar tanto palavras isoladas, como frases completas)

DADOS SOCIODEMOGRÁFICOS

Idade:

Género:

- ☐ Feminino
- ☐ Masculino
- ☐ Outro. Qual?
- ☐ Prefiro não dizer

Região:

- ☐ Norte Litoral
- ☐ Norte Interior
- ☐ Centro Litoral
- ☐ Centro Interior
- ☐ Área Metropolitana de Lisboa
- ☐ Alentejo Litoral
- ☐ Alentejo Interior
- ☐ Algarve
- ☐ Região Autónoma dos Açores
- ☐ Região Autónoma da Madeira

Desenvolvido pela Qualtrics

Appendix II.

Distribution of Units of Meaning throughout the Categories that define the Characteristics of the Targeted-Object "Cancer"

		<i>f</i>	<i>%</i>
SOCIAL SUPPORT (<i>M</i> = 0.10, <i>SD</i> = 0.31)	<i>amor</i>	1	1.3%
	<i>apoio</i>	1	1.3%
	<i>apoio familiar</i>	1	1.3%
	<i>companheirismo</i>	1	1.3%
	<i>empatia</i>	1	1.3%
	<i>família</i>	1	1.3%
	<i>isolamento</i>	3	3.9%
	<i>solidão</i>	2	2.6%
	<i>união</i>	1	1.3%
ATTENTION TO SYMPTOMS (<i>M</i> = 0,01, <i>SD</i> = 0,11)	<i>sintomas</i>	1	1.3%
ADDICTIVE BEHAVIORS (<i>M</i> = 0.03, <i>SD</i> = 0.16)	<i>alcoolismo</i>	1	1.3%
	<i>fumar</i>	2	2.6%
RISK BEHAVIORS (<i>M</i> = 0.01, <i>SD</i> = 0.11)	<i>vulnerabilidade dos comportamentos de risco</i>	1	1.3%
CHALLENGES AND SACRIFICES (<i>M</i> = 0.22, <i>SD</i> = 0.42)	<i>avançar/confrontar o problema</i>	1	1.3%
	<i>batalha muito difícil</i>	1	1.3%
	<i>consequências muito duras</i>	1	1.3%
	<i>desafio</i>	1	1.3%
	<i>desafios multifacetados</i>	1	1.3%
	<i>dureza</i>	1	1.3%
	<i>longo percurso</i>	1	1.3%
	<i>luta</i>	10	12,8%
	<i>marcas deixadas para sempre</i>	1	1.3%
	<i>pequenas batalhas</i>	1	1.3%
	<i>sacrifício</i>	1	1.3%
EARLY DIAGNOSIS (<i>M</i> = 0.04, <i>SD</i> = 0.19)	<i>diagnóstico precoce positivo</i>	3	3,9%
	<i>recuperação porque diagnóstico precoce</i>	1	1,3%

COMPLEXITY OF THE DISEASE (<i>M</i> = 0.30, <i>SD</i> = 0.46)	<i>afeta organismo</i>	3	3,9%
	<i>células anormais</i>	3	3,9%
	<i>complexo</i>	3	3,9%
	<i>contração de outras doenças</i>	1	1,3%
	<i>depende do tipo de cancro</i>	3	3,9%
	<i>doença devastadora</i>	1	1,3%
	<i>doença difícil e complicada</i>	2	2,6%
	<i>doença grave</i>	2	2,6%
	<i>doença insidiosa</i>	1	1,3%
	<i>doença prolongada</i>	1	1,3%
	<i>doença terrível e avassaladora</i>	1	1,3%
	<i>doença violenta</i>	1	1,3%
	<i>espalha-se pelo corpo</i>	1	1,3%
	<i>galopante</i>	1	1,3%
	<i>muito variável</i>	1	1,3%
	<i>perigosa</i>	1	1,3%
	<i>rápida expansão</i>	1	1,3%
	<i>risco da doença</i>	1	1,3%
	<i>séria</i>	1	1,3%
	<i>situações delicadas</i>	1	1,3%
PAIN AND SUFFERING (<i>M</i> = 0.32, <i>SD</i> = 0.47)	<i>tumor maligno</i>	1	1,3%
	<i>desconforto</i>	1	1,3%
	<i>doloroso</i>	4	5,1%
	<i>dor</i>	16	20,5%
	<i>mal-estar</i>	1	1,3%
	<i>reações dolorosas</i>	1	1,3%
HOPE (<i>M</i> = 0.17, <i>SD</i> = 0.38)	<i>sofrimento</i>	15	19,2%
	<i>crença</i>	1	1,3%
	<i>esperança</i>	10	12,8%
	<i>futuro</i>	1	1,3%
	<i>morte não é inevitável</i>	2	2,6%
	<i>oportunidades</i>	1	1,3%
TREATMENT DEMANDS (<i>M</i> = 0.18, <i>SD</i> = 0.39)	<i>exames e tratamentos dolorosos, intensos e duradouros</i>	4	5,1%

IMPACT IN OTHERS ($M = 0.15$, $SD = 0.36$)	<i>medicação</i>	1	1,3%
	<i>muitas idas ao hospital</i>	2	2,6%
	<i>operações sem fim</i>	2	2,6%
	<i>quimioterapia</i>	2	2,6%
	<i>terapia e processo de cura difícil</i>	2	2,6%
	<i>testes e exames intermináveis</i>	3	3,9%
	<i>tratamentos invasivos</i>	4	5,1%
	<i>afeta as pessoas próximas</i>	2	2,6%
	<i>ansiedade nos outros</i>	1	1,3%
	<i>esforço familiar acrescido</i>	1	1,3%
	<i>impacto na saúde mental da família</i>	3	3,9%
	<i>muda a dinâmica familiar</i>	1	1,3%
	<i>normalização da situação para outros</i>	1	1,3%
	<i>preocupação dos outros</i>	1	1,3%
	<i>repensar/reflexão na vida pelos outros</i>	1	1,3%
	<i>trabalho e esforço para cuidar de alguém com cancro</i>	1	1,3%
	<i>tristeza para a família</i>	1	1,3%
IMPACT IN THE SELF ($M = 0.14$, $SD = 0.35$)	<i>adaptação</i>	2	2,6%
	<i>afeta o indivíduo</i>	2	2,6%
	<i>autorreflexão do self na vida</i>	1	1,3%
	<i>impactos para o doente</i>	1	1,3%
	<i>leva a pessoa aos poucos</i>	1	1,3%
	<i>mudança</i>	2	2,6%
	<i>necessidade de escape</i>	1	1,3%
	<i>normalização da situação para o self</i>	1	1,3%
	<i>repensar/reflexão do self na vida</i>	1	1,3%
UNCERTAINTY ($M = 0.23$, $SD = 0.42$)	<i>ambiguidade</i>	1	1,3%
	<i>dúvida</i>	1	1,3%
	<i>imprevisibilidade</i>	2	2,6%
	<i>incerteza</i>	5	6,4%
	<i>inesperado</i>	2	2,6%

	<i>nunca estamos à espera</i>	1	1,3%
	<i>pode aparecer em qualquer altura da vida</i>	1	1,3%
	<i>probabilidade</i>	1	1,3%
	<i>sem causa aparente conhecida</i>	1	1,3%
	<i>sem cura definitiva</i>	1	1,3%
	<i>silencioso</i>	2	2,6%
	<i>taxas de sobrevivência</i>	1	1,3%
	<i>todas as idades</i>	1	1,3%
	<i>aprendizagem/informação</i>	2	2,6%
	<i>compreensão da situação</i>	1	1,3%
INFORMATION (<i>M</i> = 0.06, <i>SD</i> = 0.25)	<i>desconhecimento</i>	2	2,6%
	<i>desconhecimento/falta de informação</i>	2	2,6%
	<i>taboo</i>	1	1,3%
IMPAIRMENT AND LIFE QUALITY (<i>M</i> = 0.15, <i>SD</i> = 0.36)	<i>debilitação</i>	2	2,6%
	<i>degeneração</i>	1	1,3%
	<i>impacto no funcionamento do corpo</i>	3	3,9%
	<i>impotência</i>	4	5,1%
	<i>limitante</i>	1	1,3%
	<i>reduz a qualidade de vida</i>	2	2,6%
DEATH (<i>M</i> = 0.19, <i>SD</i> = 0.40)	<i>despedida</i>	1	1,3%
	<i>fim</i>	2	2,6%
	<i>luto</i>	2	2,6%
	<i>perda</i>	1	1,3%
	<i>perda gradual da vida</i>	1	1,3%
	<i>sentença de morte</i>	9	11,5%
	<i>terminal</i>	1	1,3%
	<i>tragédia</i>	1	1,3%
	<i>vida em risco</i>	1	1,3%
RELAPSES (<i>M</i> = 0.04, <i>SD</i> = 0.19)	<i>recaída</i>	1	1,3%
	<i>sequelas</i>	1	1,3%
	<i>volta a aparecer</i>	1	1,3%
RESILIENCE (<i>M</i> = 0.23, <i>SD</i> = 0.42)	<i>coragem</i>	3	3,9%

	<i>esforço</i>	1	1,3%
	<i>fazer frente à doença</i>	1	1,3%
	<i>força</i>	3	3,9%
	<i>força de vontade</i>	4	5,1%
	<i>manter-se positivo</i>	1	1,3%
	<i>paciência</i>	3	3,9%
	<i>perseverança</i>	2	2,6%
	<i>resiliência</i>	6	7,7%
	<i>trabalho e esforço para viver com cancro</i>	1	1,3%
EXTERNAL RISK FACTORS (<i>M</i> = 0.03, <i>SD</i> = 0.16)	<i>exposição a substâncias cancerígenas</i>	1	1,3%
	<i>poluição</i>	1	1,3%
PHYSICAL HEALTH (<i>M</i> = 0.30, <i>SD</i> = 0.46)	<i>cabelo a cair</i>	2	2,6%
	<i>cansaço</i>	6	7,7%
	<i>consequências fisiológicas</i>	2	2,6%
	<i>corpo frágil, débil e doente</i>	1	1,3%
	<i>destrói o corpo da pessoa</i>	1	1,3%
	<i>dificuldades físicas</i>	1	1,3%
	<i>dor física</i>	1	1,3%
	<i>enjoo</i>	1	1,3%
	<i>exaustão</i>	1	1,3%
	<i>falha nos órgãos</i>	1	1,3%
	<i>fragilidade</i>	3	3,9%
	<i>fraqueza</i>	3	3,9%
	<i>impacto a nível físico</i>	2	2,6%
	<i>impacto nas capacidades físicas</i>	1	1,3%
	<i>náuseas</i>	1	1,3%
	<i>perda de peso</i>	1	1,3%
	<i>sofrimento físico</i>	2	2,6%
	<i>tonturas</i>	1	1,3%
MENTAL HEALTH (<i>M</i> = 0.27, <i>SD</i> = 0.45)	<i>ansiedade</i>	5	6,4%
	<i>avassaladora em termos psicológicos</i>	1	1,3%

NEGATIVE EMOTIONS
($M = 0.46$, $SD = 0.50$)

<i>baixa confiança</i>	1	1,3%
<i>choque emocional</i>	1	1,3%
<i>depressão</i>	4	5,1%
<i>destrói a alma</i>	1	1,3%
<i>diagnóstico precoce porque mentalidade</i>	1	1,3%
<i>dificuldades emocionais</i>	1	1,3%
<i>diversidade de recursos psicológicos</i>	1	1,3%
<i>dor mental</i>	1	1,3%
<i>falta de produtividade</i>	1	1,3%
<i>fonte de insegurança</i>	1	1,3%
<i>impacto a nível psicológico</i>	2	2,6%
<i>impacto na saúde mental do paciente</i>	1	1,3%
<i>retira a luz da pessoa</i>	1	1,3%
<i>sofrimento psicológico</i>	2	2,6%
<i>angústia</i>	5	6,4%
<i>assustadora</i>	2	2,6%
<i>avassalador</i>	1	1,3%
<i>chocante</i>	1	1,3%
<i>desânimo</i>	2	2,6%
<i>desconcertante</i>	1	1,3%
<i>desencorajador</i>	1	1,3%
<i>desespero</i>	5	6,4%
<i>desgastante</i>	1	1,3%
<i>desmotivação</i>	1	1,3%
<i>desolador</i>	1	1,3%
<i>entristecedor</i>	1	1,3%
<i>frustração</i>	1	1,3%
<i>injustiça</i>	3	3,9%
<i>medo</i>	7	9,0%
<i>pânico</i>	1	1,3%
<i>pena</i>	1	1,3%
<i>piedade</i>	1	1,3%

HEALTH SYSTEM ($M = 0.01$, $SD = 0.11$)	<i>preocupação</i>	3	3,9%
	<i>susto</i>	1	1,3%
	<i>triste</i>	11	14,1%
	<i>acompanhamento médico inadequado</i>	1	1,3%
	<i>demora na realização dos exames</i>	1	1,3%
	<i>demora tratamentos</i>	1	1,3%
	<i>falta de condições ideais</i>	1	1,3%
	<i>falta de recursos</i>	1	1,3%
	<i>longas esperas</i>	1	1,3%
	<i>obstáculo no sistema de saúde</i>	1	1,3%
LIFE ON HOLD ($M = 0.06$, $SD = 0.25$)	<i>data marcada</i>	1	1,3%
	<i>jogo de espera</i>	1	1,3%
	<i>pausa na rotina</i>	1	1,3%
	<i>um dia de cada vez</i>	1	1,3%
	<i>vivência diária/dia-a-dia</i>	1	1,3%

Appendix III.

Distribution of Units of Meaning throughout the Categories that define the Cancer-Related Preventability Factors

	<i>f</i>	<i>%</i>
EATING HABITS ($M = 0.54$, $SD = 0.50$)	<i>alimentação completa</i>	2 2,6%
	<i>alimentação cuidada</i>	2 2,6%
	<i>alimentação deficitária</i>	1 1,3%
	<i>alimentação equilibrada</i>	3 3,9%
	<i>alimentação não saudável</i>	3 3,9%
	<i>alimentação não variada</i>	1 1,3%
	<i>alimentação orgânica</i>	1 1,3%
	<i>alimentação rica em gorduras</i>	1 1,3%
	<i>alimentação saudável</i>	28 35,9%

	<i>evitar a ingestão de substancias cancerígenas</i>	1	1,3%
	<i>evitar comer enchidos</i>	1	1,3%
	<i>evitar comidas ultraprocessadas</i>	7	9,0%
	<i>evitar consumo de carne em demasia</i>	1	1,3%
	<i>evitar corantes artificiais</i>	1	1,3%
	<i>evitar obesidade</i>	2	2,6%
	<i>exagerar em certos alimentos</i>	1	1,3%
	<i>ingerir alimentos demasiado quentes</i>	1	1,3%
	<i>ingestão de água</i>	1	1,3%
	<i>má alimentação</i>	6	7,7%
	<i>não ingerir alimentos demasiado quentes</i>	1	1,3%
	<i>nutrição</i>	2	2,6%
	<i>obsessão com a alimentação</i>	1	1,3%
	<i>reduzir ingestão de açúcar</i>	3	3,9%
ATTENTION TO SYMPTOMS (<i>M</i> = 0.21, <i>SD</i> = 0.41)	<i>alerta aos sintomas</i>	4	5,1%
	<i>atenção</i>	1	1,3%
	<i>atenção ao corpo e reações</i>	2	2,6%
	<i>atenção a quistos</i>	2	2,6%
	<i>atenção a sinais anormais</i>	6	7,7%
	<i>atenção às manifestações corporais</i>	1	1,3%
	<i>caroços</i>	1	1,3%
	<i>conhecimento dos sintomas</i>	1	1,3%
	<i>desvalorização dos sintomas por parte do doente</i>	2	2,6%
	<i>febre</i>	1	1,3%
	<i>hematomas</i>	1	1,3%
	<i>ignorar sintomas</i>	2	2,6%
	<i>não negligenciar sinais da doença</i>	1	1,3%
	<i>vigilância</i>	1	1,3%
ADDICTIVE BEHAVIORS (<i>M</i> = 0.45, <i>SD</i> = 0.50)	<i>alcoolismo</i>	10	12,8%
	<i>beber com moderação</i>	3	3,9%
	<i>consumir drogas</i>	3	3,9%

RISK BEHAVIORS (<i>M</i> = 0.23, <i>SD</i> = 0.42)	<i>consumo descontrolado de substâncias</i>	2	2,6%
	<i>consumo excessivo de medicamentos</i>	1	1,3%
	<i>deixar de fumar</i>	2	2,6%
	<i>evitar consumo de álcool</i>	4	5,1%
	<i>evitar fumar</i>	9	11,5%
	<i>evitar tabagismo</i>	7	9,0%
	<i>evitar vícios</i>	2	2,6%
	<i>fumar</i>	20	25,6%
	<i>não consumir drogas</i>	1	1,3%
	<i>atenuar fatores de risco</i>	1	1,3%
	<i>autocontrole</i>	1	1,3%
	<i>comportamentos de risco</i>	1	1,3%
	<i>comportamentos individuais</i>	1	1,3%
	<i>comportamentos preventivos</i>	1	1,3%
	<i>cuidado geral</i>	2	2,6%
	<i>evitar comportamentos de risco</i>	6	7,7%
	<i>evitar comportamentos nocivos para a saúde</i>	1	1,3%
	<i>falta de prevenção</i>	1	1,3%
	<i>gestão de comportamentos diários</i>	1	1,3%
EARLY DIAGNOSIS (<i>M</i> = 0.08, <i>SD</i> = 0.27)	<i>maiores cuidados</i>	1	1,3%
	<i>maus hábitos</i>	1	1,3%
	<i>mudanças comportamentais</i>	1	1,3%
	<i>prevenção</i>	2	2,6%
	<i>descoberta da doença cedo</i>	2	2,6%
	<i>deteção precoce do cancro</i>	2	2,6%
COMPLEXITY OF THE DISEASE (<i>M</i> = 0.01, <i>SD</i> = 0.11)	<i>diagnósticos</i>	1	1,3%
	<i>início dos tratamentos mais rápido</i>	1	1,3%
	<i>possibilidade maior de cura</i>	1	1,3%
	<i>tratamento precoce</i>	2	2,6%
	<i>contração de outras doenças</i>	1	1,3%
	<i>desenvolvimento assustador</i>	1	1,3%

PAIN AND SUFFERING ($M = 0.01$, $SD = 0.11$)	<i>menor sofrimento</i>	1	1,3%
	<i>atividade física regular</i>	1	1,3%
	<i>atividades diárias saudáveis</i>	1	1,3%
	<i>cuidados de saúde e físicos</i>	1	1,3%
	<i>frequentar espaços ao ar livre</i>	1	1,3%
	<i>hábitos de vida saudáveis</i>	11	14,1%
	<i>hábitos gerais de saúde</i>	1	1,3%
	<i>pouca atividade física</i>	3	3,9%
	<i>prática de desporto</i>	3	3,9%
	<i>praticar exercício físico</i>	29	37,2%
LIFESTYLE ($M = 0.58$, $SD = 0.50$)	<i>sedentarismo</i>	13	16,7%
	<i>ter um estilo de vida saudável e ativo</i>	2	2,6%
	<i>vida ativa</i>	2	2,6%
TREATMENT DEMANDS ($M = 0.01$, $SD = 0.11$)	<i>exames desconfortáveis</i>	1	1,3%
SOCIAL AND ECONOMIC FACTORS ($M = 0.01$, $SD = 0.11$)	<i>fatores socioeconómicos desfavoráveis</i>	1	1,3%
IMPACT IN OTHERS ($M = 0.01$, $SD = 0.11$)	<i>desanimador para os outros</i>	1	1,3%
UNCERTAINTY ($M = 0.04$, $SD = 0.19$)	<i>esperança média de vida</i>	1	1,3%
	<i>inevitabilidade</i>	2	2,6%
	<i>campanhas</i>	1	1,3%
	<i>conhecimento sobre cancro</i>	3	3,9%
	<i>informação divulgada pelas entidades</i>	1	1,3%
	<i>informar-se junto de um profissional</i>	1	1,3%
	<i>mais Informação acerca dos vários tipos de cancro</i>	2	2,6%
	<i>publicidades e campanhas sensibilizadoras</i>	1	1,3%
	<i>sensibilização em relação à prevenção do cancro</i>	2	2,6%
INFORMATION ($M = 0.12$, $SD = 0.32$)			
IMPAIRMENT AND LIFE QUALITY ($M = 0.01$, $SD = 0.11$)	<i>maior autonomia</i>	1	1,3%
	<i>maior funcionalidade</i>	1	1,3%

DEATH ($M = 0.01$, $SD = 0.11$)	<i>fatal</i>	1	1,3%
	<i>meses de vida</i>	1	1,3%
GENETIC PREDISPOSITION ($M = 0.10$, $SD = 0.31$)	<i>conhecimento acerca do histórico familiar</i>	2	2,6%
	<i>hereditariedade</i>	1	1,3%
	<i>não saber/se preocupar com o histórico familiar</i>	2	2,6%
	<i>predisposição genética</i>	2	2,6%
	<i>preocupação excessiva quando existe histórico</i>	1	1,3%
	<i>testes genéticos</i>	1	1,3%
	<i>vigiar presença de cancro na família</i>	1	1,3%
	<i>acompanhamento médico</i>	1	1,3%
MEDICAL CHECK-UPS ($M = 0.53$, $SD = 0.50$)	<i>análises e exames de prevenção</i>	1	1,3%
	<i>autoexames</i>	3	3,9%
	<i>check-ups gerais médicos frequentes</i>	4	5,1%
	<i>colonoscopia</i>	1	1,3%
	<i>consultas de controlo</i>	1	1,3%
	<i>consultas de rotina</i>	7	9,0%
	<i>cuidados de saúde</i>	1	1,3%
	<i>exames/análises anuais</i>	11	14,1%
	<i>exames de despiste regulares</i>	5	6,4%
	<i>exames regulares à mama</i>	1	1,3%
	<i>exames regulares à próstata</i>	1	1,3%
	<i>ir ao médico regularmente</i>	3	3,9%
	<i>mamografia</i>	2	2,6%
	<i>monitorização constante</i>	1	1,3%
	<i>monitorização da saúde</i>	1	1,3%
	<i>não fazer exames de despiste</i>	1	1,3%
	<i>não fazer os tratamentos de forma correta</i>	1	1,3%
	<i>não fazer rastreios</i>	2	2,6%
	<i>palpação da mama</i>	2	2,6%

EXTERNAL RISK FACTORS (<i>M</i> = 0.31, <i>SD</i> = 0.47)	<i>participação em campanhas de rastreio</i>	7	9,0%
	<i>rastreios caseiros</i>	1	1,3%
	<i>rastreios regulares</i>	6	7,7%
	<i>ambiente limpo</i>	1	1,3%
	<i>ambientes cancerígenos</i>	1	1,3%
	<i>evitar agentes cancerígenos</i>	3	3,9%
	<i>evitar exposição a radiação</i>	1	1,3%
	<i>evitar exposição a ultravioleta</i>	1	1,3%
	<i>evitar exposição solar excessiva e sem proteção</i>	3	3,9%
	<i>evitar exposição solar nas horas de maior perigo</i>	1	1,3%
	<i>evitar poluição</i>	1	1,3%
	<i>exposição a agentes poluidores</i>	1	1,3%
	<i>exposição a radiações</i>	5	6,4%
	<i>exposição a toxinas ambientais</i>	1	1,3%
	<i>exposição descuidada a compostos cancerígenos</i>	1	1,3%
	<i>não utilizar protetor solar</i>	1	1,3%
	<i>partículas cancerígenas</i>	1	1,3%
	<i>proximidade de químicos</i>	1	1,3%
	<i>trabalhos de risco</i>	1	1,3%
	<i>usar protetor solar</i>	9	11,5%
	<i>viver em meios urbanos com muita poluição</i>	1	1,3%
	<i>viver em zonas pouco poluídas</i>	1	1,3%
MENTAL HEALTH (<i>M</i> = 0.12, <i>SD</i> = 0.32)	<i>ansiedade</i>	3	3,9%
	<i>boa saúde mental</i>	2	2,6%
	<i>desanimador para o doente</i>	1	1,3%
	<i>gestão de stress</i>	1	1,3%
	<i>níveis elevados de stress</i>	2	2,6%
	<i>promoção da saúde mental</i>	1	1,3%
	<i>stressem níveis saudáveis</i>	1	1,3%
	<i>vida sem stress</i>	1	1,3%

NEGATIVE EMOTIONS ($M = 0.03$, $SD = 0.16$)	<i>medo</i>	2	2,6%
HEALTH SYSTEM ($M = 0.03$, $SD = 0.16$)	<i>desvalorização dos sinais por parte dos médicos</i>	2	2,6%
SLEEP ($M = 0.06$, $SD = 0.25$)	<i>descansar</i>	1	1,3%
	<i>dormir bem</i>	1	1,3%
	<i>dormir pouco</i>	1	1,3%
	<i>falta de hábitos de sono</i>	1	1,3%
	<i>higiene de sono</i>	1	1,3%
	<i>sono regulado</i>	1	1,3%
	<i>sono regular de qualidade</i>	1	1,3%
VACCINES ($M = 0.04$, $SD = 0.19$)	<i>vacinação</i>	3	3,9%

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