'We Poles are pill poppers': Proximity in Polish medical popularisation videos on YouTube

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Abstract

The paper focuses on strategies of creating proximity in multimodal online communication. Based on the case study of a popular Polish YouTube medical channel (*Najprościej mówiąc*), the analysis examined how, relying on different modes of communication, the authors establish a relationship with the audience and how they create and display their identity and their position on the issues discussed. It was also the aim to determine whether the socio-cultural context of communication and the national identity of the YouTubers influences the construction of proximity. To uncover these aspects, the study drew on the concept of proximity as introduced and defined by Hyland (2010). The results show a diversity of multimodal strategies of establishing proximity along the facets of organisation, argument, credibility, stance, and engagement. The original classification into the proximities of commitment and membership was extended to include a third type, i.e. the proximity of experience, which involves the demonstration of communality with and knowledge of the immediate socio-cultural context of communication.

Keywords: proximity, multimodality, YouTube, popularisation, medical communication.

Resumen

'Nosotros los polacos somos adictos a los medicamentos': la proximidad en los vídeos de divulgación médica polacos en YouTube

El artículo trata sobre las estrategias utilizadas para crear *proximidad* en la comunicación multimodal en línea. A partir del análisis de un conocido canal médico polaco en YouTube (*Najprościej mówiąc*), se ha comprobado de qué

manera, mediante diferentes modalidades, los autores crean una relación con su audiencia y cómo crean y expresan su identidad y actitud frente a los temas tratados. Otro de los objetivos ha sido determinar si el contexto sociocultural de la comunicación y la identidad nacional de los usuarios de YouTube determinan la forma de crear proximidad. El análisis de los aspectos mencionados se ha basado en el concepto de *proximidad* definido por Hyland (2010). Los resultados muestran una variedad de estrategias multimodales utilizadas para crear proximidad en función de la dimensión organizativa, la argumentación, la credibilidad, los indicadores de actitud y el compromiso por parte del receptor. La clasificación original, que distingue la proximidad a la comunidad y la proximidad al mensaje, ha sido completada con un tercer tipo, es decir, la proximidad a la experiencia, que abarca la expresión del sentido de comunidad y el conocimiento del contexto sociocultural de la comunicación.

Palabras clave: proximidad, multimodalidad, YouTube, divulgación, comunicación médica.

1. Introduction

YouTube constitutes one of the most popular channels of online communication, whose potential and use in science and popular science communication is worth noting. With numerous channels devoted to science, the platform represents an important medium used for knowledge sharing, dissemination and creation. Its global, multimodal and participatory character make it a perfect space for the presentation of research and for popularisation of science to diversified audiences (Kousha et al., 2012; Dubovi & Tabak, 2020). Scientists may successfully utilise its potential to communicate with peers and the lay public likewise, to promote and inform about research, and to educate and explain science (cf. Luzón, 2019). It is all the more relevant given that members of the scientific community are increasingly frequently expected to mark their presence online, sharing specialised content in ways suited to the communicative needs and expectations of both expert and lay audiences. And since present-day researchers "actively enact and, consequently, reenact social practices, relations, and identities" (Bawarshi, 2001, p. 71), both in real-life and virtual settings, these new communicative practices call for a closer inspection.

Against this backdrop, the present study focuses on popular science communication on YouTube with a particular consideration of medical communication. The practices typical of this type of communication merit

thorough investigation due to the significance of the subject matter and the potential influence they may exert on the users, their health, lifestyles and well-being. The following analysis aims to investigate strategies of creating proximity in multimodal online communication. Based on the case study of a popular Polish medical YouTube channel (*Najprościej mówiąc*), it examines how the authors establish a relationship with the audience and how they create and display their identity and their position on the issues discussed. To uncover these aspects, the study draws on the concept of *proximity* as defined by Hyland (2010). More specifically, the analysis seeks answers to the following questions:

- How is proximity constructed in YouTube popularisation videos in the context of medicine?

- How do the authors of the videos construct proximity multimodally?

- Does the social and linguistic context of communication and the national identity of the interactants influence the construction of proximity?

The choice of a Polish channel has been dictated by a relatively low number of studies devoted to Polish-language YouTube discourse, as most of the existing studies have focused on English-based channels (see, among others, Adami, 2009; Lorenzo-Dus et al., 2011; Bou-Franch & Blitvich, 2014; Benson, 2016; Riboni, 2020). The present study has been designed to fill that niche and offer insights into the practices which are common in YouTube communication in a different linguistic and cultural context.

2. YouTube and medical communication

YouTube exemplifies a multimodal channel of communication, offering audio-visual modes of expression, including moving image, image, speech, and writing (Adami, 2009; Burgess & Green, 2009; Benson, 2016). The content shared via YouTube concerns a range of thematic areas, such as entertainment, music and film, politics, news, as well as medicine, science and technology (Soukup, 2014). Research explaining the popularity and success of science and popular science communication channels on YouTube has shown that viewers appreciate entertaining, topical, medium-length videos with interesting visual content (Thelwall et al., 2014; Sugimoto & Thelwall, 2013). Studies have also underlined the importance of

communicator continuity, i.e. featuring a regular presenter (Welbourne & Grant, 2016), and of the YouTuber's identity in developing the relationship with the viewers and enhancing the channel's popularity. It has been observed that authenticity, credibility, and ordinariness are crucial properties which science communicators strive to achieve. Discourse strategies which help scientists to appear genuine and credible comprise, apart from explanatory and exemplification strategies, also the use of a friendly and informal tone, humour, self-deprecation, and references to emotions (Riboni, 2020). A significant amount of research has concerned strategies of recontextualisation of science in videos available on YouTube. Focusing on such types of videos and genres as TED Talks, vlogs, PBS Space Time videos, the studies have investigated how different modes of communication are applied in the process of knowledge framing and engagement as well as persuasion and identity creation (Compagnone, 2014; Scotto di Carlo, 2014, 2018; Luzón, 2019; Riboni, 2020; Xia & Hafner, 2021).

Research on medical discourse and communication on YouTube has been dedicated to the representation of illnesses and medical conditions in the videos (e.g. rare diseases, cancer, mental illnesses), patient narratives, the impact of sharing personal health-oriented content related to the YouTubers themselves, as well as the influence of the videos on people's (mis)conceptions concerning different medical conditions (e.g. Sangeorzan et al., 2019; Hanchard, 2020; Woloshyn & Savage, 2020; McLellan et al., 2022). However, not much research has been carried out on medical popularisation videos from a discursive perspective. Owing to YouTube's popularity and widespread reach, it is worth investigating the strategies used in the dissemination of health knowledge on its channels, including those related to the construction of proximity.

3. Proximity in popularisation discourse

The concept of proximity, as defined by Hyland, refers "to a writer's control of rhetorical features which display both authority as an expert and a personal position towards issues in an unfolding text" (2010, p. 117). In Hyland's view, proximity encompasses two aspects, i.e. how the authors manage their relationship with others and how the content is presented to the addressees. The author proposes a distinction between the so-called *proximity of membership*, capturing how authors express their disciplinary

expertise and personality, how academic writers "demonstrate their authority to colleagues through use of disciplinary conventions" (Hyland, 2010, p. 117), and the *proximity of commitment*, referring to how authors take "a personal position towards issues in an unfolding text" (Hyland, 2010, p. 117). Proximity is thus said to reveal "the speaker's identity and competence" as well as "features that reveal the speaker's conception of the audience and the types of appeal used to persuade a specific audience" (Scotto di Carlo, 2014, p. 3).

Proximity may be constructed through a range of discursive strategies. Hyland (2010) shows how the two types of proximity are established in popularisations through organisation, argument, credibility, as well as stance and engagement. Organisation refers to the form of argument presentation. In popularisations, the main claim tends to be presented in the initial parts of the text to contextualise the research and to foreground the significance of the subject matter. Hyland also emphasizes the importance of visuals in the organisation of the content and their role as explanations clarifying the topics under discussion. As regards argument presentation, popularisations tend to use the novelty appeal, emphasizing the newsworthiness of a particular study. As to the focus, popular science discourse employs the so-called "narrative of nature" (Myers, 1990), concentrating on the thing studied. Proximity is also constructed through a specific framing of arguments, i.e. tailoring information to the needs of the audience. In popularisations, limited specialised knowledge among the audience is assumed, which is reflected in a frequent use of clarifications of scientific terminology. The construction of credibility also contributes to fostering proximity. Popularisation texts establish credibility by including quotations of scientists associated with the research being reported on. Proximity is constructed by means of stance and engagement devices, too. In popularisation texts, authors do not refrain from expressing their opinions, and they openly emphasize the uniqueness of the research. Engagement strategies comprise the use of pronouns (e.g. inclusive *we*), questions, directives, personal asides and appeals to shared knowledge (Hyland, 2008, 2010).

Most of the studies analysing the above-mentioned facets of proximity have focused on research articles and popularisation texts (Hyland, 2010; Luzón, 2013, 2015; Zou & Hyland, 2019), with only several studies applying the notion of proximity to audio-visual contexts. One such study by Scotto di Carlo (2014), analysing proximity in TED Talk videos, indicates that the

speakers in the analysed corpus focus on emphasizing the proximity of commitment rather than the proximity of membership. It demonstrates that the authors align with the audience by using evaluative and emotive adjectives, inclusive pronouns and strategies enhancing comprehensibility, involving various explanatory strategies, such as paraphrases, definitions, or metaphors. Similarly, focusing on engagement in TED Talk videos, Xia and Hafner (2021) show how not only speech, but also gaze, gesture and visuals are utilised as tools of viewer engagement. Research has also investigated the facets of stance and engagement in the genre of 3MT presentations. Studies show that stance markers tend to be employed more frequently than engagement devices in this genre (Qiu & Jiang, 2021). Differences between sciences in stance-taking have also been outlined, with hard science presenters using more explicit stance markers, accentuating certainty and reliability, and soft science speakers using more explicit affective stance markers (Hyland & Zou, 2021). Engagement strategies employed in the presentations, in turn, comprise catchy titles, quotation of surprising facts, questions, jokes and empathetic stories (Carter-Thomas & Rowley-Jolivet, 2020). Selected facets of proximity have also been investigated in online science videos posted on research groups' websites or websites of science journals. For instance, Luzón (2019) shows how credibility is established in such videos by means of, among others, providing information about researchers' affiliation, representing researchers as experts and informing about the group's network, while audience engagement is achieved by dialogic involvement, attracting attention and raising interest, and by emotional reactions.

4. Multimodal construction of proximity on YouTube

4.1. Materials and methods

As indicated above, the data comprise videos from a popular Polish medical YouTube channel, i.e. *Najprościej mówiąc* ('Simply speaking'). The channel was established in 2016 by two Polish medical doctors and its aim is to popularise medical knowledge, and to show medical knowledge as interesting and relevant for everyone. The channel enjoys widespread popularity, with more than 200,000 subscribers. It offers 32 videos in total (as of May 2022), with an average length of 10 minutes, all of them in Polish, with only a few offering subtitles in English. As for the type and format of the videos,

combinations of different conventions can be seen, including narrative explanatory, presentation, and/or animation films (Muñoz Morcillo et al., 2016; Boy et al., 2020). For the following analysis we selected 29 episodes, excluding three videos unrelated to medicine or representing the format of the so-called shorts (see Appendix). The analysed videos concern a range of medical issues, encompassing, for instance, obesity, hypertension, cancer, anaemia, ovulation, or diabetes.

As for methodology, the study adopts the above-mentioned concept of proximity (Hyland, 2010). It was our aim to uncover how the authors construct proximity through the five facets of organisation, argument, credibility, stance, and engagement. Hyland's model of proximity was subsequently extended to include one more dimension: the proximity of experience. In order to offer an all-encompassing description of the strategies, drawing on multimodal discourse analysis, the study distinguishes between the visual (speech, soundtrack, singing) and auditory (e.g. moving image, image, writing, map, chart) resources as suggested by Adami (2009) and shows how proximity is created through sound, speech, writing, image, and moving image. In the analysis, a bottom-up approach was adopted: first, the most salient strategies were identified independently by each author, next, the strategies were compared and grouped following the interpretative framework referred to above.

4.2. Results

The analysis shows that a wide selection of strategies was employed to establish the five facets of proximity, as outlined in Table 1. The videos utilise visual and auditory semiotic resources in the construction of meaning, in the creation of the authors' relationship with the audience, and their approach towards the presented content.

Facets of proximity in *Najproś ciej mówią c* videos visual and auditory resources				
Organisation	**Argument**	**Credibility**	**Stance**	**Engagement**
Video segmentation intro main body outro	Appeal relevance	Embedded genres interviews with doctors links to studies	Attitude markers	Addressing the audience
Headings	Focus narrative of nature	References to studies	Epistemic and deontic modality	Questions
Sound songs signature sounds segmenting sounds	Frame definitions explanations explications metaphors similes role play material objects	Fictional role play	Personal mentions	Directives
Visuals explanatory illustrative exemplificative		Quotations of historical figures	Visuals graphics symbols	Personal asides
		References to the authors' medical profession	Gestures facial gestures manual gestures	Appeals to shared knowledge
		Setting		Role play
		Material objects		Setting
				Material objects
				Humour
				Informality
				Visuals
				Gestures facial gestures manual gestures
				Sound

Table 1. Facets of proximity in *Najprościej mówiąc* videos.

As can be seen from the classification, the functions of the strategies interweave and a single strategy may serve different purposes, which will also be shown in the analysis to follow.

4.2.1. Organisation

The organisation of the message, as indicated above, constitutes an important means of constructing proximity. In the context of YouTube, organisation is closely associated with the structure of the videos, which most typically comprise three components: the intro, main body, and the outro.

The intro segments are particularly significant in constructing proximity as they initiate interaction with the audience. The authors introduce the topic and contextualise the issues covered in various ways (cf. Scotto di Carlo, 2014), which may involve contextualising the topic by exemplification, appealing to the audience's experience, establishing common ground with the audience, referring to a commonality of experiences, using global and local culture references, using humour, as well as by setting the background of a fictional story (as in 3). The strategies are not exclusive and may co-occur within the same intro, as exemplified below:

(1) Trzy miliardy złotych. Tyle wydali Polacy w aptekach w zeszłorocznym sezonie infekcyjnym. Bardzo możliwe, że chcąc pokonać przeziębienie, sami skusiliście się na któryś z głośno reklamowanych preparatów. Jednak prawdopodobnie zostaliście zrobieni w konia, ale spokojnie, nie wy pierwsi. Postaramy się znaleźć rozwiązanie tej zagadki – czym jest przeziębienie? (NM24)

'Three billion zlotys. This is how much Poles spent at pharmacies during last year's infection season. It is quite possible that you yourselves were tempted to try some of the widely advertised products when combatting a cold. However, you were probably hoodwinked but don't worry, you weren't the first. We'll try to find an answer to the following riddle – what is a cold?'

(2) Kocher, palenie, Andrzejku weź dorzuć coś na rozluźnienie, bo się nam zaczyna spinać. Pani Kasiu, dyszka rokuronium, pęseta … O przepraszam, nie przywitałem się, witajcie na bloku operacyjnym. Dziś dowiecie się, jak twarde reguły tu obowiązują, poznacie też losy chirurga i jego ofiary, zwanej pacjentem. (NM15)

'Kocher forceps, light, Andrzejek [DIM] give him something to relax because he's starting to tense up. Ms Kasia [DIM] ten of rocuronium, tweezers… Oh, sorry, I didn't greet you, welcome to the operation room. Today you'll find out that tough rules apply here, you'll learn the story of the surgeon and his victim, also known as the patient.'

A combination of different strategies in the intros enhances their potential to attract the audience's attention. The persuasive appeal of the opening segments is increased syntactically and lexically by the use of boosters, questions which may raise the viewers' interest, as well as directives encouraging them to watch the video.

The outro segments are also important from the perspective of proximity construction, as they help the speakers to seek further interaction and thus establish a bond with the viewers. The strategies applied here comprise inviting the audience to comment, like and/or subscribe to the channel, appealing to the viewers to take action concerning their health and well-being (as in 3), and referring the users to national health prophylaxis campaigns (4).

(3) Jeżeli jesteś facetem i w ostatnim czasie zaobserwowałeś spadek swojej męskości, nie zwlekaj, wyjdź przed swoją partnerkę i wybierz się do lekarza, bo to może być andropauza, a jeśli terapię testosteronem wesprzesz dużą ilością ruchu i zdrową dietą, to istnieje szansa, że drugą ponoć piękniejszą połowę życia przejedziesz na pełnych obrotach. Do zobaczenia! (NM13)

'If you are a guy and have recently noticed a drop in your masculinity, don't put it off: go and see a doctor before your partner does that for you, as it may be a sign of andropause. If you combine testosterone therapy with a lot of movement and a healthy diet, there is a chance that you will live the second part of your life at full speed. See you!'

(4) Mamy nadzieję że podobał wam się ten odcinek. Więcej o migotaniu przedsionków dowiecie się ze strony kampanii 'Stop udarom' w ramach której powstał ten film. Jeśli nie chcecie przegapić kolejnego odcinka, to subskrybujcie nasz kanał. (NM28)

'We hope you liked the video. You can learn more about atrial fibrillation from the website of the campaign 'Stop strokes', an initiative for which this video was created. If you don't want to miss the next video, subscribe to our channel.'

The means of content organisation and argumentation involve the auditory mode of communication as well. Sound is used to structure the videos, marking their sequential components by way of auditory signals. This mode is typically used in the intros, where it performs an additional function of attracting the audience's attention.

Visuals constitute a significant component of the videos with an important role in content organisation and meaning creation. Clips with headings are used to segment the content and introduce the subject matter to be discussed in the consecutive parts of the videos (as in 5 and 6). Visuals also comprise embedded pictures, graphs, charts or animated graphics, used primarily for explanatory and illustrative purposes. They accompany definitions and explications provided in the videos (see 7 below).

(5)
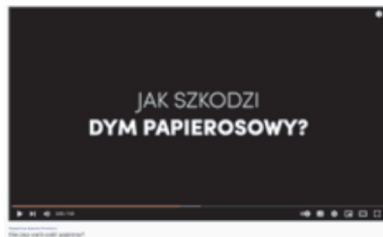
'how is cigarette smoke bad [for you]?' (NM10)

(6)

'targeted therapy' (NM23)

(7)
(NM26)

Jak pamiętacie, krzepnięcie działa jak domino, więc brak lub niedobór jednego z klocków wystarczy, żeby zaburzyć cały proces.[1]

'As you remember, coagulation works like a domino, so a lack or limit of one of the building blocks is enough to ruin the whole process.'

The organisation of the arguments bears an analogy to popularisation texts. The main topic is foregrounded in the intros, with the importance and attractiveness of the content being highlighted with a clear aim of drawing the viewers' attention. As indicated, both visual and auditory semiotic resources are employed to organise the content.

4.2.2. Argument structure

The modes of communication recruited to structure argumentation in the videos comprise moving image, image, speech, and writing. As mentioned above, argumentation in popularisation discourse commonly employs the so-called *newsworthiness* appeal. The videos, rather than novelty or newsworthiness, emphasize the value and significance of the medical issues and phenomena presented. A clear focus is placed on the relevance of the content for the audience. The authors do not concentrate on new or most recent medical discoveries, medicines or treatment options. Instead, the most common diseases, conditions, and/or prophylactic solutions are discussed. The speakers try to convince the viewers that the information provided may be of benefit to them and other people in general. In addition, the authors often emphasize that the content is particularly relevant in the immediate Polish context. This approach, noticeable in the above-mentioned intros, can be further exemplified below:

(8) Temat brzmi groźnie, ale nudno. Może i tak, ale z jego powodu w Polsce umiera kilkadziesiąt osób dziennie. To dużo za dużo i musimy coś z tym zrobić, dlatego dziś zajrzymy do serca i opowiemy wam o jednej z najczęstszych przyczyn udaru, na którą być może choruje ktoś z waszych bliskich. (NM28)

'The subject sounds dangerous but boring. Perhaps, but dozens of people in Poland die from it every day. This is far too much and we must do something about it, so today we are looking into the heart and we will tell you about one of the most common causes of a stroke, something from which perhaps some of your relatives have suffered.'

(9) Dzisiaj taka mała miniaturka tego, co dzieje się codziennie w setkach szpitali w całej Polsce. (NM15)

'Today, what happens in hundreds of hospitals in Poland everyday in miniature.'

The organisation of the content and the focus on the relevance of the discussed phenomena indicate that the videos construct the so-called "narrative of nature" typical of popularisation discourse.

As regards framing, a diversity of practices used to tailor the information to the needs of the audience can be seen. Since framing strategies in online genres have already been widely discussed in previous studies (see Luzón, 2013, 2015, 2019), only selected examples will be provided below. In the data, medical knowledge is framed verbally and visually through speech or writing accompanied by a still or moving image. The most frequent strategies comprise definitions, explanations, and exemplifications. A frequent use of role play, figurative strategies, such as similes and metaphors can be seen, communicated, analogically to the above strategies, through audio-visual means (10). While explaining and defining medical phenomena, the authors resort to references involving the immediate geographical and socio-cultural background (11 and 12), which may be seen as instances of glocalisation considering both global and local dimensions of the said phenomena.

(10)

DNA wygląda jak bardzo długa włóczka zwinięta w mały poręczny kłębek. Dokładnie 46 kłębków i nazywamy je chromosomami. (NM25)

'DNA looks like a long ball of wool rolled into a handy ball. 46 balls to be precise and we call them chromosomes.'

(11)

Nasze naczynia krwionośne i polskie drogi są bardzo podobne. Mamy aortę, czyli nieliczną, bo naszą jedyną autostradę, potem drogi krajowe, tak jak tętnice biodrowe czy szyjne. (NM17)

'Blood vessels and Polish roads are similar. We have the aorta, which is rare as it is our only motorway. Then we have the national roads, like the iliac or carotid arteries.'

(12)

Poznań – ponad pół miliona mieszkańców. A teraz wyobraź sobie, że rocznie w Polsce z powodu nowotworów umiera 20% takiego miasta. (NM9)

'Poznań – a city of more than half a million inhabitants. Now imagine that 20% of such a city dies of cancer every year in Poland.'

The above-mentioned framing strategies, commonly used in popularisation discourse, allow the authors to explain complex phenomena in relatively simple terms. In the videos, analogically to written popularisation discourse, what may be new, scientific and complicated to a lay viewer is "made intelligible by brief definitions and explanations which relate complex processes to everyday events" (Hyland, 2010, p. 121). What distinguishes the videos from more traditional written popularisation texts, however, is the diversity of modes of communication to frame specialised knowledge and tailor it to the needs of the lay audience. The authors utilise the verbal and visual resources in their efforts to clarify and describe medical phenomena, in a way which may cater to the expectations of different audiences. It needs to be underlined that the multimodal channel of YouTube foregrounds the importance of visuals in content presentation, the moving image in particular.

4.2.3. Credibility

Credibility is constructed in the videos verbally and visually by means of different semiotic resources. It is created through references to studies investigating the issues discussed. Attributions are provided in the spoken and visual mode in the form of links to the websites and research paper pages embedded in the videos (as in 13). Further means comprise scenes presenting interviews with doctors (as in 14).

(13)

Inni badają coraz to bardziej znaczący związek między florą bakteryjną jelit, długością snu a zachorowaniem na przeziębienie. (NM24)

'Others are studying the increasingly meaningful relationship between intestinal bacteria, sleep duration and catching a cold.'

(14)

Mamy badanie PSA które można wykonać z krwi. Jest to antygen specyficzny tylko dlatego narządu. (NM4)

'We have PSA tests which can be done on blood. It is a specific antigen only for this organ.'

Another way of enhancing reliability involves role play. Through the characters featured in the videos, medical professionals "are allowed to tell the story themselves" (Hyland, 2010, p. 122). The authors act out the roles of fictional doctors or real historical figures, involving famous Polish specialists who contributed to the advancement of medicine (as in 15).

(15)

Wtedy doktor Pokrzywnicki pierwszy raz w historii Polski a 5 lat po światowej premierze podaje pacjentowi kurarę podczas operacji. Posłuchajmy wrażeń chirurga, który operował wraz z nim: Od początku zadziwiał mnie przebieg operacji, szczególnie w momencie, gdy po otwarciu otrzewnej zobaczyłem jelita, które były porażone, nie utrudniały pracy chirurgowi, jak zazwyczaj. (NM2)

'It was then that, for the first time in Poland and 5 years after the world premiere, Dr Pokrzywnicki gave this treatment to a patient during an operation. Let's listen to the impressions of the surgeon who operated with him: From the beginning I was amazed by the course of the operation, particularly when I saw the intestines after opening the peritoneum, which were paralysed and did not make the surgeon's work more difficult, like they usually do.'

The authors also achieve credibility by providing evidence for their personal expertise and professional knowledge. Credibility is here established through both verbal and visual modes of expression. On the verbal layer, it is created by means of references to the authors' real-life experience as medical practitioners. The authors share their affiliation and familiarity with the medical profession as well as the insider knowledge of medical practices and conventions. This experience is emphasized by the use of exclusive *we*, which indicates the point of view of the community of medical practitioners (16).

(16)

Największym źródłem zakażenia jesteśmy jednak my sami, dlatego ubieramy jałowe fartuchy, jałowe rękawice, naszego pacjenta obłożymy jałowym chustami. (NM15)

'We are the greatest source of infection, so we wear sterile overalls, sterile gloves, and our patients will be given sterile dressings.'

Reliability is also established visually through self-presentation strategies and the choice of the setting. The speakers are often presented wearing doctor's outfits or surgical gowns. The settings comprise a range of locations associated with the medical practice, such as hospitals, doctor's offices and surgeries or operating rooms. Showing the authors' familiarity with medical procedures is an additional means of creating and enhancing credibility (cf. Luzón, 2019). The videos abound in scenes in which the authors show the functioning of medical equipment (17).

(17)
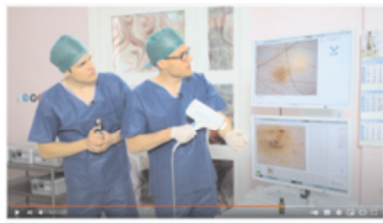
Dermatoskop umożliwia obejrzenie skóry w wielkim powiększeniu. (NM12)

'Dermatoscopes allow us to examine the skin at great magnifications.'

Providing information on consultations with other medical specialists, on cooperation with medical institutions, as well as on sources of funding also contributes to the creation of credibility (18 and 19).

(18)[2]
(NM12)

(19)[3]
(NM6)
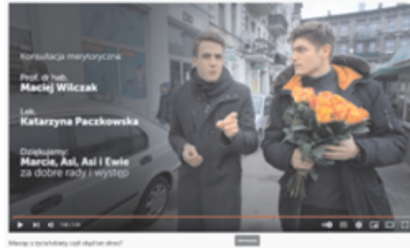
By using the above-mentioned strategies, the authors enhance trustworthiness and make their statements more authentic and convincing to the audience.

4.2.4. Stance

A range of strategies relying on various modes of communication is used to express stance in the videos. Stance-taking devices include attitude indicators, and affective and epistemic stance markers can be found in the videos as well (as in 20). Evaluation concerns common practices observed among people, medical conditions as well as medical procedures and methods of treatment. Stance is communicated through auditory and visual resources, i.e. speech, writing, in the form of headings, as well as graphics and symbols (as in 23) or gestures (as in 24).[4] Evaluations often concern the situation in Poland. Importantly, the authors do not avoid presenting explicit, usually negative, opinions about healthcare in this country (see 21 and 22).

(20) Teraz super ważne: nie wymuszajmy na lekarzu wypisania antybiotyku. (NM3)

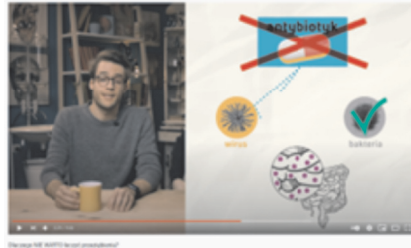'Now for something super important: we shouldn't force the doctor to prescribe an antibiotic.'

(21) W Polsce czerniaki diagnozowane są zdecydowanie za późno. (NM12)

'In Poland, melanomas are certainly diagnosed too late.'

(22) Jesteśmy przerażeni, że ponad 8 milionów Polaków codziennie pali. (NM10)

'We are horrified that more than 8 million Poles smoke every day.'

(23)
(NM24)

'antibiotic; virus; bacterium'

(24)
(NM2)

The references indicate the authors' focus on the immediate socio-cultural and geographical environment in which they work as medical professionals and their possible intention to improve the situation of healthcare in the country. The use of references to the Polish context may also have a stronger persuasive appeal if we consider that the audience comprises primarily Polish viewers.

4.2.5. Engagement

Engagement, similarly to stance, is structured on multiple levels. The presence of viewers is acknowledged by means of address terms, questions, directives, appeals to shared knowledge, personal experiences, references to popular lore, humour, as well as visuals, i.e. the strategies identified in previous research on popularisation discourse in various media (Hyland, 2008; Luzón, 2013, 2015, 2019; Xia & Hafner, 2021).

Different forms of address are used to acknowledge the viewers, including second person singular and plural pronouns and forms of the verb, as well as nominal forms. The use of inclusive *we* to emphasize community

membership, in particular membership in the same national community with the viewers, is especially noticeable. For instance:

(25) My Polacy jesteśmy lekomanami. (NM17)

'We Poles are pill poppers.'

(26) Za to wszyscy możemy mieć pretensje, że nasze podatki idą na spot o rozmnażających się królikach, zamiast na serie edukacyjnych filmów o zdrowiu. (NM27)

'So we can all rightfully resent the fact that our taxes are being spent on an ad about reproducing rabbits instead of a series of educational films on health.'

Questions and directives, frequent in popularisation discourse, are also repeatedly employed, both in speech and writing. By using questions, the authors involve the viewers in the process of reasoning, solve doubts and disprove common fallacies (27). Directives are used to encourage the viewers to follow the presentation (28), but also to encourage or advise against different actions (29).

(27) A może myślisz że zdrowsze są produkty light? Nic bardziej mylnego. (NM7)

'Perhaps you think that "light" products are healthier? Nothing could be further from the truth.'

(28) Spójrzcie, tutaj przepływa krew, a tu w środku płyn, który składem przypomina osocze krwi. (NM16)

'See, this is where the blood flows and here inside is a liquid which resembles blood plasma in terms of its composition.'

(29)[5]

Leki nieznanego pochodzenia?
Ryzykujesz i szkodzisz zdrowiu!

'Medicines of unknown origin? You are risking your life and harming your health!'

Nie rób nic na własną rękę i nie kupuj nieznanych preparatów przez Internet. (NM13)

'Don't do anything on your own and don't buy unknown substances via the Internet.'

Additionally, audience engagement is created by references to the speakers' personal lives. The authors also appeal to the experiences shared with the audience, involving common knowledge about the situation in Poland. For example:

(30) Jeżeli tak jak Kolas macie jasną karnację, melaniny macie wtedy mniej, więc wasza naturalna ochrona jest niewielka. (NM12)

'If you have a light complexion like Kolas, you have less melanin and your natural level of protection is low.'

(31) W końcu chyba każdy z nas słyszał, żeby nie wychodzić na dwór z mokrą głową, ubrać szalik, kurtkę i nie pić duszkiem zimnej coli. (NM24)

'Finally, we've all heard that you shouldn't go out with wet hair, you should always wear a scarf and a jacket, and that you shouldn't drink cold Coke in one go.'

(32) W Polsce w dominuje model pierwszy, z czego na pewno zdaliście sobie już sprawę. (NM27)

'In Poland, the first model dominates, something which you yourselves have surely realised by now.'

As mentioned above, in explaining medical phenomena, the authors often resort to role play and act out the roles of medical scientists or personify body processes. These strategies constitute an interesting means of audience engagement as well. Role play and fictionalised representations and explanations of medical knowledge are associated with intertextuality and interdiscursivity, while references to popular culture, both of a global and local character (with the former exemplified in 33), evidence glocalisation.

(33)

Chcieli już tego starożytni Rzymianie lecząc je rosołem, Chińczycy popijając ziołową herbatkę, czy wreszcie Anglicy przyrządzając napar na bazie rumu. (NM24)

'This is what the Romans wanted to treat with chicken broth, the Chinese by drinking herbal tea, and the English with a drink based on rum.'

References to Polish national and local contexts are particularly abundant. Quite interestingly, the allusions are established though different modes: moving image, image, writing, and speech. For instance, the scene provided

in (34) makes a clear reference to the award-winning picture commemorating the first successful heart transplant in Poland in 1987, and showing prof. Zbigniew Religa, a famous Polish cardiologist, monitoring the patient after the operation. Below, we juxtapose the scene from the video with the original photograph (35).

(34)
(NM15)

(35)[6]

Example (36), similarly, alludes to the historical moment of the introduction of martial law in Poland in 1981. The character shown plays the role of a military leader embodying the human brain, and is presented while addressing the human body with an announcement of a stroke and its tragic consequences. The scene evokes the television announcement made by Wojciech Jaruzelski, the leader of the then Polish People's Republic, informing citizens of Poland that martial law was going to be introduced in the country. To illustrate the correspondence, we provide a photograph of this historical event with a quotation from the original announcement (in 37).

(36)

Wszystkie komórki organizmu ludzkiego! Zwracam się do was jako głównodowodzący mózgiem. Organizm nasz stanął nad przepaścią. Dziś o 9:00 rano doszło do zablokowania przepływu krwi w mózgu. Zator z przedsionka serca zatkał lewą tętnicę środkową. Doszło do awarii i spalenia się wielu połączeń. W warunkach udaru niedokrwiennego przytłoczeni będziemy ogromnym ciężarem. Niepełnosprawność, przykucie do łóżka, problemy z mówieniem, niedowłady, przykurcze, depresja. (NM29)

'Calling all cells in the human body! I am addressing you as the commander-in-chief of the brain. Our body is on the edge of an abyss. Today, at 9 am, there was a blockage to the blood flow to the brain. An embolism from the heart atrium clogged the left middle artery and this caused a failure and the loss of many connections. In the condition of ischemic brain stroke we are going to be overwhelmed with a huge burden. Disability, being bed-ridden, problems with speech, paresis, depression.'

(37)[7]

Obywatelki i obywatele Polskiej Rzeczypospolitej Ludowej! Zwracam się dziś do Was jako żołnierz i jako szef rządu polskiego. Zwracam się do Was w sprawach wagi najwyższej. Ojczyzna nasza znalazła się nad przepaścią. Dorobek wielu pokoleń, wzniesiony z popiołów polski dom ulega ruinie. Struktury państwa przestają działać. Gasnącej gospodarce zadawane są codziennie nowe ciosy. Warunki życia przytłaczają ludzi coraz większym ciężarem. Przez każdy zakład pracy, przez wiele polskich domów, przebiegają linie bolesnych podziałów.[8]

'Female and male citizens of the Polish People's Republic! Today I am addressing you as a soldier and as the head of the Polish government. I address you concerning extraordinarily important questions. Our homeland is on the edge of an abyss. The achievements of many generations and the Polish home that has been built up from the dust are about to turn into ruins. State structures are ceasing to function. Each day delivers new blows to the waning economy. Living conditions are becoming a huge burden to the people.'

As can be observed, the reference is established on the visual and auditory levels. On the visual level, it can be seen in the stylisation of the speaker, in the choice of the clothing and the setting. The correspondence is additionally enhanced by the use of the sepia tint. In speech, the allusions can be found in the use of a similar rhetorical pattern in the announcement, as well as the use of exactly the same words and phrases as those found in the original speech.

The inclusion of the local context in the intertextual and interdiscursive references expressed by different semiotic resources can also be found in the examples provided below. Fictionalised scenes shown in (38) and (39) feature characters representing a tiler (fixing blood platelets) and a hooligan (embodying a white blood cell), respectively. The characters are highly stereotypical and are portrayed in a manner which reflects and emphasizes the negative connotations associated with these social groups in Poland. The allusions to the stereotypes are expressed by means of visual and auditory modes, in the way the characters are stylised, dressed, and named, and in which they speak. The use of a specific jargon and slang is worth mentioning, comprising not only the phonetic, lexical, and syntactic layers of expression, but also pragmatic aspects, i.e. (im)politeness strategies. Worthy of note are likewise address terms (*gościu* 'man', *szefuniu* 'bossman [DIM]'), hesitation markers (*no*), verb forms (*je*, a form of *jest* 'is') and negations (*ni*, a form of the negative particle 'not') found in highly colloquial language, and fixed expressions, slang terms, or polonised anglicisms, such as *referenszyn*.[9]

(38)
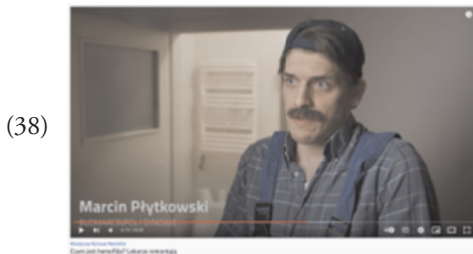
Marcin Płytkowski. Budmarcinpol i Synowie[10]

Panie, no nie czarujmy się. Z łataniem naczyń krwionośnych wielkiej filozofii ni ma. 4 do 8 minut i dziura powinna być zapchana. (...) Fibryna to je genialne spoiwo. (...) No miało się trzymać, no no miało pyknąć, nie pykło. (NM26)

'Man, well, let's not fool ourselves. There isn't [INF] much of a philosophy behind sealing blood vessels. 4-8 minutes and the hole should be filled (...) Fibrin is [INF] a brilliant cement. (...) Well, it was meant to hold, well well it was meant to do the job [INF], it didn't.'

(39)
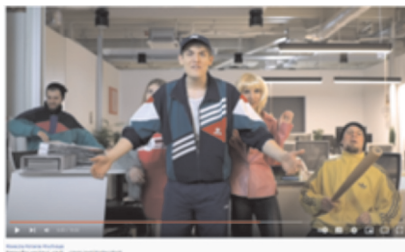
Nie no gościu, sam nie wiem, nie no, generalnie kariera białej krwinki nieźle mi przypasiła. Można sobie później nieźle zarobić. Robisz groźną minę, bijesz się z bakteriami… Szefuniu wbijam w to (…) Gościu, widziałeś moje CV, moje referenszyn? Wyższa szkoła lansu i bansu, zdana karta rowerowa. No staruszku, ja chce w końcu wyjść ze swojej strefy komfortu i zacząć zarabiać pieniądze. (NM20)

'No, man, I don't know, I mean, generally the job of a white cell really got me fired up. You can really earn a lot later. You just put on a face like thunder, and fight some bacteria… Bossman [DIM] I'm easy (…) Dude, have you seen my CV, my referenszyn [polonised English word reference]? Higher school of hard knocks, got my cycling proficiency test done. Come on, old man [DIM], I finally want to get out of my comfort zone and start earning some real money.'

Allusions to the Polish background are visible also in the choice of settings in which the videos are recorded. Many of the places are associated with the Polish healthcare context (e.g. Polish clinics and hospitals, as illustrated in 40), which may be understandable, but there are also locations which are representative of Polish history and culture, and involve for instance museums (e.g. the Greater Poland Uprising Museum) or Lech Poznań football stadium (41).

(40)[11]
(NM10)

(41)[12]
(NM11)

Enactment of body processes in the form of fictionalised scenes, enriched by intertextual and interdiscursive references, allows the authors to explain medical knowledge but also to engage the audience. Visual metaphors, personifications, and similes successfully attract the viewers and make their viewing experience more enjoyable.

Humour, a further engagement strategy, comprises the use of irony or jokes. It is also expressed through the use of slogans or fixed expressions strongly associated with the Polish cultural context. In the following examples, we can see common expressions which originate from Polish movies (42)[13] or memes (43).

(42) No bo mnie oszukasz, matkę oszukasz, badanie na krew utajoną oszukasz, ale kolonoskopii nie oszukasz. (NM5)

'Well, you can cheat me, you can cheat your mother, you can even cheat a latent blood test, but you won't cheat a colonoscopy.'

(43) Wuj Janusz, ciocia Grażyna. Nie oszczędzi nikogo – jedna, jedyna choroba, której ani nie czuć ani nie widać. (NM17)[14]

'Uncle Janusz, aunt Grażyna. It won't spare anyone – the one and only disease which cannot be felt or seen.'

Numerous instances of informality, another engagement strategy, can be identified, as already exemplified above. Since informality constitutes a conspicuous feature of the videos, it is worth providing further examples:

(44) Rób to, co lubisz. Chcesz poharatać w gałę? Bardzo proszę. Lubisz pykać w cs-a z kumplami? Może lepiej meczyk paintballa? (NM11)

'Do what you like. Fancy a game of footie? Do it. Love playing [INF] cs with your mates? How about a paintball match [DIM] instead?'

(45) Przeziębienie to nie alergia, sorry. (NM24)

'A cold is not an allergy, sorry.'

(46) Postanawiasz odmienić swoje życie – wbijasz na siłkę. (NM18)

'You decide to change your life – you hit the gym [INF].'

Informality involves the use of idiomatic language, colloquial address terms, diminutives, and informal English borrowings. Informality, as indicated above, helps the YouTubers to construct genuineness, but also makes the reception of the content more entertaining.

5. Discussion and conclusions

The aim of the study was to investigate how proximity is constructed in selected Polish medical popularisation YouTube videos, and to uncover how argumentation and the relationship with the audience are discursively shaped in this communicative setting.

The study shows that proximity is created multimodally and involves a combination of visual and auditory means of communication (speech, writing, moving image, image, sound, gesture). It also demonstrates that these semiotic resources serve an important function in the management of the YouTubers' identity and their relationship with the audience. The affordances offered by the platform are extensively utilised by the authors and considerably expand the expressive and impressive potential of the videos. The diverse semiotic resources used in knowledge presentation allow the authors to communicate content in multifarious ways. The analysis indicates that the establishment of proximity takes on different dimensions. The authors construct the proximity of commitment in demonstrating their personal positions towards the issues discussed. The proximity of membership, in turn, is created by underlining solidarity with the viewers who are not necessarily specialists in medicine, but who share with the authors their interest in well-being as well as their concern about health and prophylaxis. Additionally, by means of numerous references to the Polish context, the authors underline their affiliation with the local community and create what may be referred to as the *proximity of experience*. The proximity of experience – which, as argued here, may be added to Hyland's (2010) original model – embraces the strategies used to establish the speakers' identity as members of the specific national community and to show their personal connection to the audience. The three types of proximity are further elucidated in Table 2.

Proximity of commitment	Proximity of membership	Proximity of experience
demonstration of personal approach to the presented content	demonstration of communality with a non-specialist audience	demonstration of communality with the audience comprising viewers of the immediate national/local cultural and linguistic background
multimodal expression of stance	demonstration of solidarity with the audience sharing mutual interest in well-being and concern about health care and prophylaxis	
visual and verbal expression of opinion, evaluation and emotion		demonstration of knowledge of national/local social, cultural, linguistic, political and geographical background
multimodal establishment of credibility	relevance appeal	
	multimodal creation of credibility	multimodal references to:
	multimodal	the national context
		the local context
	framing and information tailoring strategies	national/local culture
	multimodal engagement strategies	national/local stereotypes

Table 2. Three types of proximity in YouTube medical popularisation videos.

As mentioned above, proximity projects the speaker's identity, reflects how the speaker perceives the audience, and reveals what appeals they use to influence the addressees. The examined videos reflect the authors' identities as medical professionals, educators in the field of medicine, and proponents of a healthy lifestyle. The authors also quite noticeably express their Polish identity and show their personal involvement in matters concerning healthcare in Poland. The YouTubers emphasize their relationship with the immediate discourse community belonging to the same socio-cultural and geographical environment. The videos point to the authors' conceptualisation of the audience as that composed mainly of Polish viewers, that is viewers who are familiar with the Polish background, with the Polish language, as well as Polish cultural conventions and stereotypes. The authors construct and emphasize the common ground, refer to common values, jokes, traditions, and habits, specific and known only to members of this cultural environment. The emphasis placed on the local context is reflected in all the facets of proximity, i.e. organisation, argument structure, credibility, stance, and engagement. Local references are appropriated to the discussion of complex medical phenomena and serve as tools of explanation of health processes and attracting the viewers. Also, the speakers' stance and the relevance of the content are often expressed by allusions to the socio-cultural background. Thus, the references may facilitate the comprehension of complex medical processes, while also making the content more jocular and engaging.

The videos indicate that the YouTubers resort to diversified strategies to establish proximity, construct an interpersonal relation with the audience and express their identity. An interesting combination of glocalising practices can be seen, expressed in the numerous references to the immediate cultural context. The videos may thus be interpreted as evidence for the ongoing linguistic and socio-cultural diversification of YouTube content, including that related to medicine.

Still, some limitations of the study have to be acknowledged too. The corpus used for the analysis comprises only 29 videos, all of which have been produced by the same authors (and, in all likelihood, the same production team). It may then be the case that the strategies identified in the videos are idiosyncratic choices and are not representative of other Polish medical popularisation videos. Related to this is the fact that the content of *Najprościej mówiąc* combines various generic conventions and displays a high level of hybridity, as a result of which it may not be easily classified as representing

a homogeneous category or a clearly defined genre. What follows is that the term "medical popularisation video" as used in this study may elsewhere be used to describe a different type of content.

As is clear, there is still much room for further investigation. Studies assuming a viewer-oriented perspective could be carried out to examine and evaluate the impact of the strategies on the audience. It would be equally important to investigate the YouTubers' perspective on the strategies employed. Future research might also explore facets of proximity in other languages as well to uncover potential similarities and differences across various cultural and linguistic contexts.

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NOTES

[1] In selected examples, such as (7), (10), and (11), among others, we illustrate the co-expression of speech and image which reinforce and contextualise each other.

[2] The screenshot shows the logos of the Transfiguration Clinical Hospital of the Medical University in Poznań, with the logos of the Greater Poland Oncology campaign, the Ministry of Health, as well as EEA and Norway grants.

[3] The annotations state that the content was verified by Prof. Maciej Wilczak (gynaecologist, professor at the Medical University in Poznań) and Katarzyna Paczkowska (medical professional).

[4] Gestures played a significant role in the videos; however, due to space limitations they are not addressed in detail in this paper.

[5] The example is an allusion to the practice of purchasing petrol from illegal sources.

[6] https://spidersweb.pl/2014/10/historia-jednego-zdjecia-bogowie-kardiochirurgii.html (accessed: 09 June 2022).

[7] https://historia.org.pl/2021/12/10/stan-wojenny-w-polsce-1981-1983-jaruzelski-kontra-solidarnosc (accessed: 16 August 2022).

[8] https://scwis.pl/wp-content/uploads/2021/12/Stan-wojenny-1981-1983-zeszyt-3.pdf, p. 49 (accessed: 16 August 2022).

[9] The example illustrates the use of incorrect forms of English words (a blend of *reference* and the suffix *-tion*), pronounced with a Polish accent, to achieve a humorous effect.

[10] The character's name "Płytkowski" exemplifies wordplay in which the word *płytka* 'tile' serves as the root of the name, combined with the suffix *-owski*, one of the onomastic suffixes typical among Polish personal names. The name of the company "Budmarcinopol i synowie" 'Budmarcinpol and sons' is a blend and hybrid form, derived from the verb *budować* 'to build', the personal name *Marcin* and the suffix *-pol*. This derivation exemplifies a frequent naming strategy in the context of Polish businesses (Przybylska, 1992).

[11] The scene is recorded in front of the building of the Medical University in Poznań, Poland.

[12] The scene is located in Lech Poznań football stadium. The participants are also wearing the club's original outfits: T-shirts and shorts in club colours (blue and white).

[13] Example (42) is a reference to a famous Polish movie *Chłopaki nie płaczą* ['Boys don't cry'] from 2000 and a quote saying "to jest życie. Mnie oszukasz, przyjaciela oszukasz, mamusię oszukasz, ale życia nie oszukasz!" [this is life. You can cheat me, you can cheat your friend, you can cheat your mummy, but you can't cheat life'; see also https://www.filmweb.pl/film/Ch%C5%82opaki+nie+p%C5%82acz%C4%85-2000-843 (accessed: 09 June 2022).

[14] The male name *Janusz* and the female name *Grażyna* have started to embody negative stereotypes associated with Poles and Polish married couples, see also Walkowiak (2020); https://twojememy.pl/category/janusz-i-grazyna (accessed: 17 August 2022).

Appendix

Najprościej mówiąc videos analysed in the study:
NM1 = Za mało krwi we krwi? Niedokrwistość
[Available at: https://www.youtube.com/watch?v=EEe18ir_-IU&t=262s, last accessed in June 2022]

NM2 = Dlaczego operacja nie boli? Narkoza
[Available at: https://www.youtube.com/watch?v=LcvxQt9_ziE&t=131s, last accessed in June 2022]

NM3 = Koniec ery antybiotyków i superbakterie
[Available at: https://www.youtube.com/watch?v=jzR6Fe7NbBk&t=188s, last accessed in June 2022]

NM4 = Męski zabójca? Prostata
[Available at: https://www.youtube.com/watch?v=njayVazTVr8, last accessed in June 2022]

NM5 = Jak znaleźć raka w jelicie? Kolonoskopia
[Available at: https://www.youtube.com/watch?v=Ps3awLvjxKU&t=125s, last accessed in June 2022]

NM6 = Miesiąc z życia kobiety, czyli skąd ten okres?
[Available at: https://www.youtube.com/watch?v=rAOPvjQhWFc&t=368s, last accessed in June 2022]

NM7 = Biała śmierć? Przepis na życie, czyli cukrzyca od kuchni
[Available at: https://www.youtube.com/watch?v=ThxWdkYJHqA&t=338s, last accessed in June 2022]

NM8 = Wirus, który wywołuje raka? HPV
[Available at: https://www.youtube.com/watch?v=tEPvX2umej8, last accessed in June 2022]

NM9 = Kontrola zawodzi czyli jak powstaje nowotwór
[Available at: https://www.youtube.com/watch?v=hMEII8hb5a4&t=91s, last accessed in June 2022]

NM10 = Dlaczego warto palić papierosy?
[Available at: https://www.youtube.com/watch?v=4FYma4QtMPU, last accessed in June 2022]

NM11 = Dlaczego otyłość może spowodować raka?
[Available at: https://www.youtube.com/watch?v=sciw1NsZKUM&t=299s, last accessed in June 2022]

NM12 = Od znamienia do czerniaka? Zanim zaczniesz się opalać…
[Available at: https://www.youtube.com/watch?v=cq2BQA43HaQ, last accessed in June 2022]

NM13 = Andropauza – gdy męskiego paliwa zabraknie…
[Available at: https://www.youtube.com/watch?v=rlNDFGmsVN4, last accessed in June 2022]

NM14 = Panowie, moszny w dłoń! Rak jądra
[Available at: https://www.youtube.com/watch?v=bklNpIyqEB8, last accessed in June 2022]

NM15 = Jak wygląda operacja? Oczami chirurga
[Available at: https://www.youtube.com/watch?v=MbVQ9AD_9nA&t=63s, last accessed in June 2022]

NM16 = Po co nam nerki? Wizyta w moczu
[Available at: https://www.youtube.com/watch?v=THhoYOA_gIA&t=415s, last accessed in June 2022]

NM17 = Zabójczy duet, czyli skąd ta miażdżyca?
[Available at: https://www.youtube.com/watch?v=IYLwUrC4Cww&t=460s, last accessed in June 2022]

NM18 = Dlaczego bolą Cię plecy?
[Available at: https://www.youtube.com/watch?v=OtHbgwbRRXA, last accessed in June 2022]

NM19 = Czy można pić alkohol w ciąży?
[Available at: https://www.youtube.com/watch?v=21AewQYe5q4&t=220s, last accessed in June 2022]

NM20 = Demolka we krwi, czyli… czym jest białaczka?
[Available at: https://www.youtube.com/watch?v=Up-ppToVyLc&t=380s, last accessed in June 2022]

NM21 = Przychodzi lekarz do mechanika… choroba wieńcowa serca.
[Available at: https://www.youtube.com/watch?v=wefpZfTikVI, last accessed in June 2022]

NM22 = Mafia jelitowa, czyli jak bakterie robią interesy?
[Available at: https://www.youtube.com/watch?v=V3BtQ4ONQOk&t=127s, last accessed in June 2022]

NM23 = Jak pokonać białaczkę i chłoniaka? Technologia CAR-T
[Available at: https://www.youtube.com/watch?v=pVqZXEsm0Fw&t=10s, last accessed in June 2022]

NM24 = Dlaczego NIE WARTO leczyć przeziębienia?
[Available at: https://www.youtube.com/watch?v=ShO9T6KAfV4&t=113s, last accessed in June 2022]

NM25 = Genetyka – nowa broń do walki z rakiem?
[Available at: https://www.youtube.com/watch?v=v76YzshLPF4&t=10s, last accessed in June 2022]

NM26 = Czym jest hemofilia? Lekarze remontują
[Available at: https://www.youtube.com/watch?v=Ch13cDKz6c0&t=490s, last accessed in June 2022]

NM27 = Jak naprawić relację LEKARZ-PACJENT?
[Available at: https://www.youtube.com/watch?v=JH4G-GgqnfM&t=102s, last accessed in June 2022]

NM28 = Czym jest migotanie przedsionków? SERCE vs. MÓZG
[Available at: https://www.youtube.com/watch?v=YXYr3soKKeI&t=285s, last accessed in June 2022]

NM29 = Na czym polega udar mózgu? Historia z podziemia
[Available at: https://www.youtube.com/watch?v=J6U5OMh6a-4, last accessed in June 2022]