



Lifestyle versus social determinants of health in the Dutch parliament: An automated analysis of debate transcripts

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ABSTRACT

Although public health scholars increasingly recognize the importance of the social determinants of health (SDOH), health policy outputs tend to emphasize downstream lifestyle factors instead. We use an automated corpus research approach to analyse fourteen years of health policy debate in the Dutch House of Representatives' Health Committee, testing three potential causes of the lack of attention for SDOH: political ideology, by which members of parliament (MPs) from some political orientations may prioritize lifestyle factors over SDOH; lifestyle drift, by which early attention for SDOH during problem analysis is replaced by a lifestyle focus in the development of solutions as the challenges in addressing SDOH become clear; and focusing events, by which political or societal chance events, known to the public and political elites simultaneously, bolster the lifestyle perspective on health. Our analysis shows that overall, the committee spent most of its time discussing neither SDOH nor lifestyle: healthcare financing and service delivery dominated instead. When SDOH or lifestyle were referenced, left-leaning MPs referred significantly more to SDOH and right-leaning MPs significantly more to lifestyle. Temporal effects related to election cycles yielded inconsistent evidence. Finally, peak attention for both lifestyle and SDOH coincided with ongoing political debate instead of exogenous, unforeseen focusing events, and these peaks were rendered relatively insignificant by the larger and more consistent attention for health care. This paper provides a first step toward automated analysis of policy debates at scale, opening up new avenues for the empirical study of health political discourse.

1. Introduction

A substantial body of literature documents how health behaviour and outcomes are to a large extent determined by broad social, economic, and environmental conditions (Braveman & Gottlieb, 2014; Mackenbach, 2020; Marmot, 2020). A resultant public health policy message is that improving health equity requires tackling the upstream social and environmental determinants of health, such as inequitable access to education or housing (WHO, 2008). However, policy attention and efforts to tackle the social determinants of health (SDOH) remain limited (Marmot, 2020; Williams & Fullagar, 2019), and health inequalities are high (OECD, 2019) and widening (Marmot, 2020). In the Netherlands, inequalities in self-reported health were larger than the EU average prior to the pandemic (OECD & European Observatory on Health Systems and Policies, 2021). During the COVID-19 pandemic,

people in the lowest income quintile died from COVID-19 twice as often as compared to people in the highest income quintile (CBS, 2021).

What explains the lack of progress in achieving health equity through SDOH policy outputs? In this paper, we aim to elucidate this issue by investigating the policy-making process through the lens of parliamentary discourse. We analyse publicly available debate transcripts from the Health Committee of the Dutch House of Representatives (*Tweede Kamer*) to evaluate evidence for three hypothesized mechanisms that may drive the lack of policy action on SDOH. First, the SDOH may cater more to certain ideologies rather than others. Specifically, left-leaning members of parliament (MPs) are expected to pay more attention to SDOH while right-wing MPs support the personal responsibility implied by the lifestyle perspective (Mackenbach & McKee, 2015). Second, there may be a tendency towards 'lifestyle drift' in policy-making, whereby new policy initiatives and newly installed governments start with a

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commitment to dealing with the upstream determinants of health when they are planning their policies, but shift to working on downstream individual lifestyle interventions as the challenges to addressing SDOH become clear when enacting these policies (Hunter, Popay, Tannahill, & Whitehead, 2010). A similar mechanism might apply to parliamentary debates as well, as these track and discuss the policies put forward by the government and parliamentarians themselves have an electoral incentive to get measurable success near the end of a term (e.g. in passing motions). Research assessing when and why this phenomenon occurs has been limited, with academic publications on lifestyle drift mostly being perspectives or editorials stating this is an important area for research and action (Hoenink & Mackenbach, 2021; Hunter et al., 2010; Marmot & Allen, 2014; Popay, Whitehead, & Hunter, 2010). Third, focusing events—sudden, rare chance events that reveal (potential) harms and are known to politicians and the public simultaneously, such as natural disasters or crises occurring to famous people (Birkland, 1997; O'Donovan, 2017)—can cause significant spikes in political attention (Weible & Sabatier, 2018) and shape agenda change (Kingdon, 1995). However, it remains unknown whether and how such events impact policy attention for SDOH and lifestyle (Baker et al., 2018; Embrett & Randall, 2014).

We test our three hypotheses using a computer-automated analysis of debate transcripts in the Dutch national parliament. This approach has several advantages. First, it allows analysing political discourse at scale, investigating each word spoken in a relevant committee of the Dutch parliament over more than a decade. Second, it allows for longitudinal analyses of the popularity of healthy lifestyle and SDOH in policy debates over the course of multiple years, which is crucial to the lifestyle drift and focusing events hypotheses. Existing empirical work has a much shorter duration of analysis. For instance, Powell, Thurston, and Bloyce (2017) used an ethnographic approach that spanned three years, which is exceptionally long for these types of studies, but still a short period of time since theories of policy change emphasize how decades-long analyses are necessary to truly understand policy stability and change (Jenkins-Smith, Nohrstedt, Weible, & Ingold, 2018). Third, data extracted from transcripts of political debates allows differentiation across political ideologies, as we can assign contributions to political

parties. With the release of ever larger databases of political debate transcripts (Barari & Simko, 2023), these advantages may prove increasingly impactful in health policy research. The approach has downsides as well. It requires the formation of a reliable lexicon of terms representing lifestyle and SDOH topics, and it relies on merely counting whether a topical term is present in a contribution in parliament without interpreting *how* the term is used. It nevertheless proved feasible to use automated analysis of transcripts for policy analysis, leading to substantive lessons on SDOH and lifestyle related political discourse in the Netherlands, as well as methodological lessons on using corpus research in health political science.

2. Materials and methods

2.1. Data

We employed a quantitative corpus research study using transcripts of parliamentary debates of the committee of *Volksgezondheid, Welzijn en Sport* (Population Health, Welfare and Sport; VWS for short) in the Dutch *Tweede Kamer* (second chamber or House of Representatives). See [box 1](#) for relevant information about the Dutch political context and appropriateness of this committee for our purposes. We examine trends in SDOH- and lifestyle-related MP contributions in the VWS committee between September 4th, 2008 and October 5th, 2022. We used this period for practical reasons: the complete and labelled transcripts of the 773 VWS committee meetings held in this period were available (explicitly labelled by date and committee) from the parliamentary website <https://www.tweedekamer.nl/kamerstukken/commissieverslagen>. This approach thus allowed us to analyse about 14 years' worth of debate specific to the VWS committee. (Older transcripts are available from the House of Representatives archives, but not labelled in the same way.) One Prime Minister, Mark Rutte from the right-wing VVD party, has been in office during most of this period (2010 – present). However, the Ministers and State Secretaries of Health represented several different parties in this period, and since the House of Representatives consists of many parties (see [Box 1](#) and [Table 2](#)) the voices heard in the VWS committee are much more diverse.

Box 1

Context: Dutch political system and the role of the House of Representatives Health, Welfare and Sport committee.

Context: Dutch political system and the role of the committee for Population Health, Welfare, and Sport in the House of Representatives.

The Netherlands has a parliamentary democracy with legislative powers exerted by two chambers: the *Eerste Kamer* (First Chamber or Senate) and the *Tweede Kamer* (Second Chamber or House of Representatives). The primate is with the House of Representatives, which has the task to amend and approve legislation put forward by the government as well as scrutinize the implementation of legislation by the government. The Senate can only reject or approve laws passed by the House of Representatives.

Every four years, or earlier in case of the government resigning, 150 House Representatives are directly elected. As [Table 2](#) shows, in the latest elections in 2021, these 150 members of parliament represented 17 political parties with a wide variety of ideological backgrounds. Due to this fragmented political landscape, governments are based on a coalition of parties which together form a majority in the House of Representatives, and that have negotiated a policy programme and government posts for the coming four years.

Two 'policy arenas' can be identified within the House of Representatives. First, there are plenary meetings held in the plenary hall, during which representatives can vote for legislation and discuss policy in general terms. Second, there are specialized committee meetings. A committee is a group of representatives of various political parties who work on a specific area within a ministry or with a specific subject. Representatives sit on multiple committees. Discussion in plenary hall often happens after an issue has already been discussed in one or more specialized committee meetings.

The *Volksgezondheid, Welzijn en Sport* committee (VWS for short) scrutinizes the policies and prepares legislative proposals of the Ministry of *Volksgezondheid, Welzijn en Sport* (Population Health, Welfare, and Sport). The term "welfare" in this committee's name in practice refers to social care, ranging from assisted living facilities to housekeeping services as part of the *Wet Maatschappelijke Ondersteuning* (WMO, Social Support Act). This committee is responsible for anything related to population health including public health and prevention and the regulation, financing, and delivery of health care.

https://www.euro.who.int/_data/assets/pdf_file/0016/314404/HIT_Netherlands.pdf

<https://www.houseofrepresentatives.nl/how-parliament-works/house-representatives-work>.

Every parliamentary debate is transcribed in full. These transcripts provide a rich source of data for political sciences, but they are not often used for health political analysis. A reason may be that these transcripts constitute big and unstructured data ('big qualitative data'). Automated corpus research can help deal with this type of data.

Our attempt to use the VWS committee transcripts for health political analysis was inspired by text mining efforts using electronic health records. In clinical research, scholars are increasingly using notes written by health professionals in electronic health records to understand how social and behavioural risk factors are documented and how this might relate to subsequent actions like referrals or treatments (Bejan et al., 2017; Chen, Carter, Sarkar, Winden, & Melton, 2014; Conway et al., 2019; Feller et al., 2020). We intended to take a similar approach by analysing debate records to gain insights on the process that leads to health policy outputs.

2.2. Lexicon development

Corpus research first requires the selection or creation of a lexicon of purposively-identified terms. We developed a lexicon of terms best representing the broad concepts of healthy lifestyle and SDOH in three steps (see appendix 1 for a flowchart of this process). First, we established a longlist of terms, on the basis of existing reports in the literature (Artiga & Hinton, 2018; Van Baar, Bos, Kramer, & Shields-Zeeman, 2022) as well as the common understanding of how politicians operationalize the constructs of healthy lifestyle and SDOH in words, according to our research team that consists of an interdisciplinary group of scholars with expertise of health policy in the Netherlands. Second, five researchers (including the authors) scrutinized this longlist by individually coding each term's sensitivity (does it accurately reflect the category?) and specificity (does it *not* reflect any other category or concept?). If four or five out of five judged a term as specific and sensitive enough, the term remained. Third, authors JvB and LH validated the term selection by sampling parliamentarians' use of them in 2009 and 2015. Terms that were used in the context of lifestyle or SDOH in less than 80% of their total occurrence were deemed not specific enough and therefore excluded (see Appendices 2 and 3). For instance, income and debt are important upstream determinants of health, but these terms were mostly used in the context of wages of healthcare professionals and the financial situation of healthcare delivery organizations, respectively, and were therefore removed. Terms that did not occur in 2009 or 2015 were also excluded. Table 1 presents the final terms list.

2.3. Data preprocessing

All preprocessing and statistical analysis was carried out using the Python programming language. All analysis code can be found on GitHub: https://github.com/jeroenvanbaar/SDOH_parliament.

To download the debate transcripts, we used the *Requests* and *Urllib* packages for Python to access the Dutch parliament's online debate transcript database. We scraped the database's search website for URLs referring to transcripts in the VWS committee and download the linked documents, keeping only documents of the pdf file format (as these indicate officially deposited, definitive transcripts) and extracting date information from the file header. We then used the package *Pdfplumber* and custom code to read the pdf text, pulling missing debate dates from the front matter and correctly handling multi-column pages.

The basic unit of our analysis was a single MP contribution (speaking turn) in a transcript. We chose this unit of analysis because each contribution is a political action: a choice of a representative to discuss a certain topic in an abundance of other potential topics that they deem less important at that moment. Furthermore, MP contributions are time-standardized and larger parties in parliament are allowed more contributions. For these reasons, the corpus of MP contributions in the VWS committee forms an acceptable approximation of the Dutch political discourse on public health in the selected period.

Table 1

Lexicon used for corpus research. This lexicon was generated and vetted by five judges (see Methods). In the lexicon, Dutch terms are sometimes shortened to a stem to ensure that both the singular and plural forms are included in the search. Underscores in this table indicate that a space is required before and after the term, effectively excluding words that contain the same letters but do not indicate lifestyle or SDOH (e.g. 'afgesproken' (agreed) contains the word 'roken' (smoking) but does not share its meaning).

	Dutch term	English translation
Lifestyle	alcohol	alcohol
	drugs	drugs
	leefstijl	lifestyle
	lichaamsbeweging	physical activity
	roken	smoking
	voeding	dietary intake
Social determinants of health	analfabetisme	illiteracy
	dakloos(heid)	homeless(ness)
	echtscheiding	divorce
	eenoudergezin	single-parent family
	eenzaamheid	loneliness
	gezondheidsachterstand	health disparity/-ies
	gezondheidsverschil	health inequality/-ies
	laaggeletterd	low-literate
	laagopgeleid	low-educated
	rondkomen	making ends meet
	sociale cohesie	social cohesion
	voedselbank	foodbank
	werkloosheid	unemployment
zorgmijding	healthcare avoidance	

We coded MP contributions by automatically extracting the MP's name and political party from the debate transcripts. We omitted any contribution from persons without a party affiliation (e.g. external experts). After splitting the transcripts into contributions, all contribution text was stored in an analysis table with columns for a document identifier, the date, a number indexing the order of contributions within a day, the speaker's name, and their party. This yielded an analysis table of about 52,500 MP contributions totalling more than 10 million words. We labelled the entries in the analysis table by a) theme, adding a 1 in a column for lifestyle and a column for SDOH if any of the lexicon terms for those themes was present in the contribution text and a 0 otherwise; b) parliament period, adding the associated cabinet's name (e.g. "Rutte-I") in another column. This table was the data source for all following analyses.

2.4. Hypothesis 1: MP contributions referencing lifestyle and SDOH differ by political orientation

To analyse political preferences for using terms related to lifestyle and SDOH, we assigned parties on left-right and progressive-conservative scales in accordance with the classification of Dutch political information tool *Kieskompas* (2022). *KiesKompas* has estimations of the left-right and progressive-conservative positions of each political party at the time of parliamentary elections and these data were graciously shared with us by the *KiesKompas* team. The progressive-conservative dimension (also known as "GAL-TAN", i.e. Green-Alternative-Libertarian versus Traditional-Authoritarian-Nationalist) may be viewed as orthogonal to the left-right axis and has implications for one's culture and way of life (Hooghe, Marks, & Wilson, 2002). Although progressive values are often associated with the political left and conservative values with the right, we treat these two dimensions of political attitudes as independent and follow *KiesKompas* in referring to the primary axis as 'left' and 'right'. Readers familiar with the Dutch political landscape will recognize the left/right scores associated with the political parties in our dataset, as visible in e.g. Fig. 1. Since parties tend to shift their political orientation somewhat during each parliamentary period, we imputed political orientation data for each party for each year using the distance-weighted mean of

Table 2

A brief description of the political parties that sat in parliament in the period 2008–2022. Members of Parliament who resigned from the party with which they were elected are excluded.

	Party name (Dutch, English)		Main ideological signature	Seats won in 2021 (out of 150)	
Larger parties >500 speaking turns in VWS committee between 2008 and 2022	Volkspartij voor Vrijheid en Democratie (VVD)	People's Party for Freedom and Democracy	Conservative Liberalism	34	
	Democraten 66 (D66)	Democrats 66	Social Liberalism	24	
	Partij voor de Vrijheid (PVV)	Party for Freedom	Right-wing Populism	17	
	Christen-Democratisch Appèl (CDA)	Christian Democratic Appeal	Christian Democracy	15	
	Socialistische Partij (SP)	Socialist Party	Democratic Socialism	9	
	Partij van de Arbeid (PvdA)	Labour Party	Social Democracy	9	
	GroenLinks (GL)	GreenLeft	Green Politics	8	
	ChristenUnie (CU)	Christian Union	Christian Democracy	5	
	Staatkundig Gereformeerde Partij (SGP)	Reformed Political Party	Christian Right	3	
	50+	50Plus	Pensioners' interests	1	
	Forum voor Democratie (FvD)	Forum for Democracy	National conservatism	8	
	Smaller parties <500 speaking turns in VWS committee between 2008 and 2022	Partij voor de Dieren (PvdD)	Party for the Animals	Animal Rights	6
		Volt	Volt Netherlands	European Federalism	3
		Juiste Antwoord 2021 (JA21)	'Correct Answer 2021'	Fortuynism	3
		DENK	'Think'	Minority Rights	3
		Boer-Burger Beweging (BBB)	Farmer-Citizen Movement	Agrarianism	1
BIJ1	'Together'	Egalitarianism	1		

KiesKompas observations around each year in the dataset. Political parties that originated by splitting off from another party were initially assigned the political orientation of that origin party until they were themselves included in KiesKompas upon a new election. The full data set of political orientation scores per party and year is available on this study's GitHub page: https://github.com/jeroenvanbaar/SDOH_parliament.

For the analysis of the relationship between political orientation and SDOH/lifestyle contributions, we a) visualized the prevalence of lifestyle- and SDOH-related language in contributions from each political party, and b) statistically analysed the political ideology scores of the MPs who produced the contributions relating to lifestyle, SDOH, or neither category, using two-sided non-parametric Mann-Whitney U tests.

2.5. Hypothesis 2: lifestyle drift affects SDOH-related contributions over the course of a parliamentary period

According to the lifestyle drift hypothesis, “governments start with a commitment to dealing with the wider social determinants of health but end up instigating narrow lifestyle interventions on individual behaviours” (Hunter et al., 2010). Although generally applied to understanding the formation and enactment of policies, we here use the same

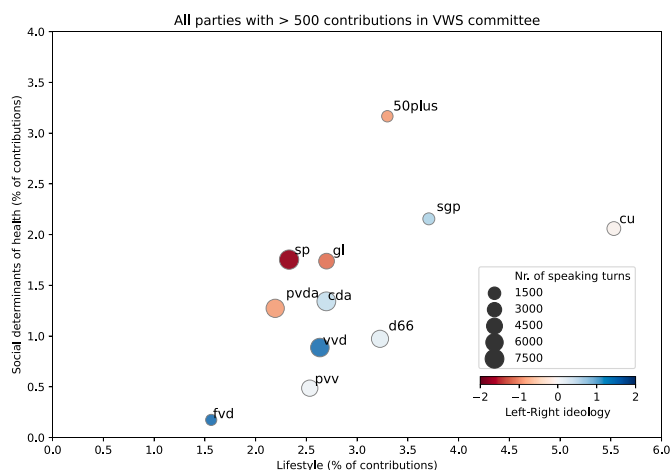


Fig. 1. Variation in prevalence of lifestyle (horizontal axis) and SDOH (vertical axis) terms used by the 11 political parties with more than 500 contributions in the VWS committee between September 2008 and October 2022. Overall, these parties mention lifestyle terms from the lexicon more often than SDOH terms. However, since the prevalence rates are not directly comparable between lifestyle and SDOH (see Results), interpreting the relatively prevalence rates within category (lifestyle/SDOH) is more informative. Specifically, this figure highlights differences in category prevalence rates between parties in the House of Representatives. This figure suggests that left-leaning parties (shades of red) tend to speak more about SDOH and right-leaning parties (shades of blue) tend to speak more about lifestyle, which is confirmed by the follow-up analyses described in the main text and shown in Fig. 2. Dot size indicates total contribution volume (number of MP contributions i.e. ‘speaking turns’). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

analytical lens to understand how parliamentary discourse about health develops and incorporates insights about SDOH and lifestyle. Specifically, we hypothesize an increased focus on SDOH-related terminology by MPs at the start of parliamentary terms (in 2010, 2012, 2017, and 2021 in our period of analysis), which is then gradually replaced by increased focus on lifestyle during each term. To evaluate this hypothesis, we first plotted and visually inspected the monthly prevalence of contributions on lifestyle and SDOH in the parliamentary debate transcripts. This measure was computed by dividing the number of contributions in a given month that contained any of the lexicon terms by the total number of contributions in that month.

We then applied a statistical test of the lifestyle drift hypothesis. Since the assumptions underlying parametric statistical tests such as t-tests and ANOVAs are unlikely to hold for the text data of interest here, we employed permutation testing to evaluate all further hypotheses in this work (Collingridge, 2013). To do this, we divided the data into the separate parliamentary periods (keeping only the ones whose start date was contained within the dataset), labelling all contributions in a given theme by the number of days that had passed since the installation date of the parliament. From this, we computed the median number of days passed since parliament instalment across all contributions referencing a given theme (i.e. lifestyle or SDOH). We then used permutation testing to evaluate whether this median time delay exceeded the time delay expected under the null hypothesis that there is no association between the theme and parliamentary time. To do so, we shuffled the theme labels (e.g. SDOH) across all contributions within the cabinet period and recomputed the median time delay for these shuffled (and thus meaninglessly labelled) data 10,000 times. This permutation resampling procedure yields an empirical null distribution to which the actually observed median time delay can be compared; the share of permuted median time delays that exceed the true median time delay equals the p-value for the null-hypothesis test of lifestyle drift.

2.6. Hypothesis 3: focusing events shape MP attention for SDOH and lifestyle

We took an inductive exploratory approach to the question whether focusing events influence MP contributions about lifestyle and SDOH. To do so, we searched for peak months of parliamentary attention defined as three or more standard deviations from the mean of lifestyle- and SDOH-related contributions. We then qualitatively investigated the transcripts of all debates in these peak months to see which focusing events (sudden and rare events, often calamities, known to the public and policy-makers simultaneously) may have driven the increased interest in both SDOH and lifestyle.

3. Results

Upon labelling the 52,500 MP contributions with our lexicon terms, we found that 2.8% of contributions in the VWS committee referenced lifestyle while 1.3% of contributions referenced SDOH. At first glance, these percentages suggest that a) lifestyle is a more common explanatory model for health problems than SDOH and b) the vast majority of MP contributions must be about other topics. A face-valid interpretation for Dutch health policy followers suggests this means that Dutch MPs spend the vast majority of their time talking about health care services and insurance. However, there are caveats to this conclusion. Our lexicon is not exhaustive and the true percentages of SDOH and lifestyle topics may thus be greater. Furthermore, since some MP contributions might reference multiple topics and others might reference no topic at all (instead constituting a brief retort or a quip between parliamentarians) we cannot infer the prevalence of non-SDOH and non-lifestyle topics from the percentages mentioned above. Importantly, though, assuming that these limitations apply to all MP contributions in the dataset equally, we can statistically contrast the prevalence of SDOH and lifestyle topics between sets of MP contributions within the larger dataset, e.g. between political parties and over time. All following results are based on this contrast principle.

3.1. Hypothesis 1: MP contributions referencing lifestyle and SDOH differ by political leaning

We first aimed to understand the correlation between political party affiliation and MP contributions on the themes of lifestyle and SDOH. As a first step, we visualized the percentage of lifestyle- and SDOH-related contributions per party, and plotted these for all parties with at least 500 contributions in the VWS committee within the study timeframe (Fig. 1). Exploring these results, we first observed that between about 1.5% and 8.0% of a party's total contributions referenced either SDOH or lifestyle. This suggests that MPs in the VWS committee likely spend a majority of their contributions on other topics than SDOH or lifestyle, such as health system topics—but this interpretation is subject to the caveats outlined at the start of the Results section.

Within SDOH and lifestyle, we observed variation in the degree to which parties use the associated terms. The 50plus party used SDOH-related terms in over 3% of contributions while the PVV and FVD parties used them in less than 0.5% of contributions (see Table 2 for a list of Dutch political parties that were part of the house of representatives during the time period of analysis). For lifestyle-related contributions, most major parties (larger dots in Fig. 1) clustered between 2% and 3.5% of contributions, revealing more consistent attention for lifestyle than for SDOH across parties.

It is noteworthy that the smaller parties end up further away from this large-party cluster: either in the north-eastern area of the plot (50plus, SGP, CU) or in the south-western area (FVD). For the north-eastern group, possible explanations are that these smaller parties are more interested in the root causes of health problems (lifestyle/SDOH) and/or that they use their time more sparingly, making more concrete points per speaking turn. For FVD, the opposite interpretations may

apply. Follow-up studies are needed to investigate why the smaller parties become relative outliers in this figure.

Although absolute differences in SDOH and lifestyle-related contributions between parties were small, there appeared to be a gradient from the left-leaning parties (SP, GL, PvdA) speaking more in parliament about social determinants and less about lifestyle, to the right-leaning parties (VVD, D66, PVV) speaking more about lifestyle and less about social determinants. Indeed, one could draw a straight line through the lifestyle-SDOH plane that separates the left-wing parties (shades of red in Fig. 1) from all other parties (shades of blue) with 100% accuracy. Due to the small number of parties, it is not clear whether this effect would generalize to other parties, historical periods or political contexts, but the trend is suggestive of underlying associations between political orientation and lifestyle-versus SDOH-related interpretations of health issues. We thus set out to test these associations statistically in the next analysis step.

To statistically evaluate the relationship between political ideology and SDOH-/lifestyle-related contributions, we analysed the political orientation of the MPs for all contributions related to lifestyle, SDOH, and neither theme (a control category). Here, based on the hypothesis and the previous result, the prediction would be that the MPs who deliver lifestyle-related contributions are more right-leaning than those delivering the control category, and the MPs who deliver SDOH-related contributions are more left-leaning than controls. We partially confirmed these hypotheses. Mean left-right orientation μLR was indeed greater (more right-wing) for lifestyle ($\mu LR = -0.140 \pm 0.027$ s.e.m.) than for control ($\mu LR = -0.183 \pm 0.005$) but this difference was not significant ($\Delta LR = 0.043$, Mann-Whitney $U = 35800583.5$, p (one-sided) = 0.053; Fig. 2). As expected, μLR was significantly lower for SDOH contributions ($\mu LR = -0.418 \pm 0.041$) than for control contributions ($\Delta LR = -0.235$; $U = 13212538.5$, $p < 0.001$). Adding up these opposing effects, μLR was significantly greater for lifestyle contributions than for SDOH contributions, as expected ($\Delta LR = 0.279$; $U = 482743.0$, $p < 0.001$).

We ran four sensitivity analyses to test the robustness of these results. First, although the terms 'health disparity' and 'health inequality' are used in the Dutch parliamentary context mostly to discuss the impact of socioeconomic status on health outcomes, i.e. SDOH, in some other contexts these terms may additionally refer to health differences that result from differences in lifestyle. Therefore, we repeated the left-right analysis without these two terms in the SDOH lexicon. Here, again, μLR was significantly lower for SDOH contributions than for control contributions ($\Delta LR = -0.102$; $U = 11364254.5$, $p = 0.017$) and μLR was significantly greater for lifestyle contributions than for SDOH contributions ($\Delta LR = 0.124$; $U = 367519.5$, $p = 0.009$). These results thus confirm our previous finding with a more stringent SDOH lexicon. Second, given the relative outlier position of the smaller parties in Fig. 1, we ran a sensitivity analysis on these results, repeating the same analyses using only the seven larger parties in the central cluster of Fig. 1 (GL, CDA, SP, D66, VVD, PvdA, and VVD). Within this subset of about 45,600 MP contributions, the aforementioned effects were again confirmed, with μLR significantly greater for lifestyle than for control contributions ($\Delta LR = 0.083$, $p = 0.006$), smaller for SDOH than for control contributions ($\Delta LR = -0.279$, $p < 0.001$), and greater for lifestyle than for SDOH contributions ($\Delta LR = 0.362$, $p < 0.001$). Third, given that D66 is the party that scores highest on the progressive end of the GAL-TAN axis and discusses lifestyle most among the cluster of large parties, we repeated the main analysis without D66 in the dataset. The results did not change: μLR was greater for lifestyle than for control contributions but not significantly so ($\Delta LR = 0.042$, $p = 0.057$), significantly smaller for SDOH than for control contributions ($\Delta LR = -0.232$, $p < 0.001$), and greater for lifestyle than for SDOH contributions ($\Delta LR = 0.275$, $p < 0.001$). Fourth, we repeated the analysis excluding the latest addition to parliament with enough contributions to show in our data, the Forum for Democracy (FVD) party, which is often considered to have an ideology that differs from all other parties in important respects and

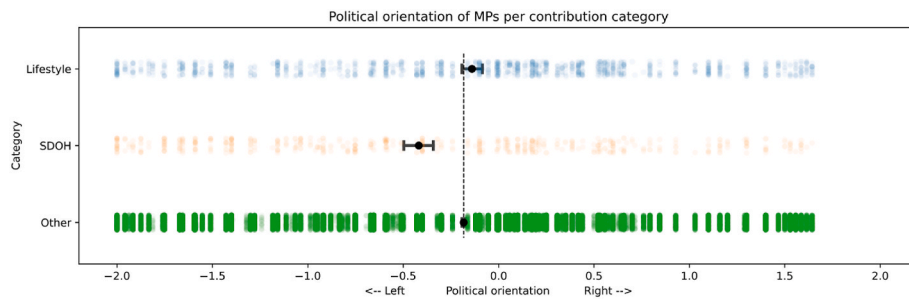


Fig. 2. Distribution of the political orientation (left-right axis) of members of parliament making contributions in the House of Representatives about social determinants of health (SDOH; green), lifestyle (orange), and all other topics (Control; blue). SDOH is discussed significantly more by left-leaning MPs and there is a trend for lifestyle being discussed more by right-leaning MPs (see statistics in main text). Individual MP contributions are shown as dots; dots are semi-transparent and shown with a vertical jitter to increase visibility of the empirical distribution. Black dots represent the mean of the distribution, with black error bars representing the standard error of the mean (s.e.m.). (For interpretation of the references to

colour in this figure legend, the reader is referred to the Web version of this article.)

cannot be captured appropriately by existing left-right and GAL-TAN qualifications. Removing this party did not change the results: μ LR was significantly greater for lifestyle than for control contributions ($\Delta LR = 0.051, p = 0.028$), significantly smaller for SDOH than for control contributions ($\Delta LR = -0.220, p < 0.001$), and greater for lifestyle than for SDOH contributions ($\Delta LR = 0.272, p < 0.001$).

When measured along the conservative-progressive (GAL-TAN) axis, political orientations of MPs speaking on lifestyle, SDOH, and control topics are not significantly different (all pairwise $ps > 0.05$).

3.2. Hypothesis 2: lifestyle drift affects SDOH-related contributions over the course of a parliamentary period

If lifestyle drift reflects a shift from problem analysis (SDOH focus) to solution identification (lifestyle focus (Hunter et al., 2010), the language used throughout an MP term may serve as a proxy for this process. We therefore predicted that a) SDOH-related contributions occur earlier in a parliament period, and b) lifestyle-related contributions occur later in a parliament period. Visually inspecting the lifestyle and SDOH contributions over time (Fig. 3), however, we see no obvious decrease of contributions referencing SDOH in subsequent months after instalment of a new house of representatives, nor an increase in lifestyle-related contributions later on.

To test the lifestyle drift hypothesis statistically, we computed, for each of the four parliament periods of interest, the median number of days since parliament installation across all SDOH or lifestyle-related contributions, and compared these observations to null distributions of the same measure with two-sided permutation tests, expecting to see SDOH terms occur earlier and lifestyle terms later than expected under the null. This analysis yielded divergent results across parliamentary periods. (Parliaments are referred to by the cabinets that were formed in them, i.e. Rutte-I, Rutte-II and so on.) For SDOH, contrary to our expectations, there were no parliaments where SDOH-related contributions occurred earlier than expected under the null; instead, in Rutte-I and Rutte-IV, SDOH-related contributions occurred significantly later than one would expect by chance (both two-sided, Bonferroni-corrected $p < 0.001$; see Fig. 4). For lifestyle, we confirmed our expectation that lifestyle-related contributions occurred significantly later than expected

under the null for Rutte-I and Rutte-IV (both $p < 0.001$); however, lifestyle-related contributions occurred significantly earlier than expected by chance for Rutte-II ($p < 0.001$). These results therefore do not point to a consistent lifestyle drift effect as expressed in the proxy of MP contributions.

3.3. Hypothesis 3: focusing events shape MP attention for SDOH and lifestyle

To evaluate the role of focusing events, we inductively explored the issues discussed in parliament during time windows where SDOH or lifestyle terms peaked temporarily. Using the cut-off level of three standard deviations above the mean in category references, we found one lifestyle peak where 32.6% of all contributions were lifestyle-related in February 2013 (Fig. 3), and two SDOH peaks: November 2009 (where 8.3% of contributions were SDOH-related) and January 2014 (8.1%).

Going back to the associated debate transcripts, we found that the February 2013 lifestyle peak stemmed from contributions during a VWS committee meeting about an EU tobacco products directive revision and the outcomes of the fifth Framework Convention on Tobacco Control (FCTC) conference (Tweede Kamer, 2013). In this case, an entire committee meeting was dedicated to a single topic (smoking) based on exogenous (EU and WHO) action. The topic gained a lot of traction in parliament, especially considering that the VWS committee held only two other meetings in February 2013 (both unrelated to tobacco). However, the EU and WHO actions do not in themselves represent a sudden or rare (calamity) event and were possibly known to political elites before the public, meaning that this lifestyle peak did not follow from a classical focusing event.

The November 2009 SDOH peak stemmed from a meeting on November 19th of that year between the VWS committee and Ministers Klink (Minister of VWS from the CDA party) and Van der Laan (Minister of Living, Neighborhoods, and Integration from the PvdA party). In this debate, the term ‘health disparity (-ies)’ was used 18 times by parliamentarians from diverse parties: CDA, SP, VVD, GL, and PvdA. Loneliness, educational differences and illiteracy were also mentioned in relation to this topic. The agenda for the meeting contained three letters from the Minister of VWS about socioeconomic health disparities. These

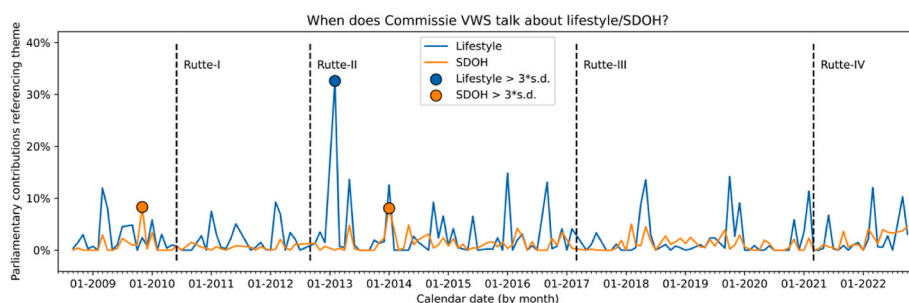


Fig. 3. Monthly average percentage of house contributions referencing either lifestyle or social determinants of health (SDOH). Dashed vertical lines: dates of house of representatives instalment; house periods are labelled by the Cabinets that were formed in them (Rutte I through IV). Blue and orange dots: peaks of lifestyle and SDOH prominence, respectively, defined as any month where the % of contributions referencing this theme lies more than three standard deviations above the mean of the distribution across months. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

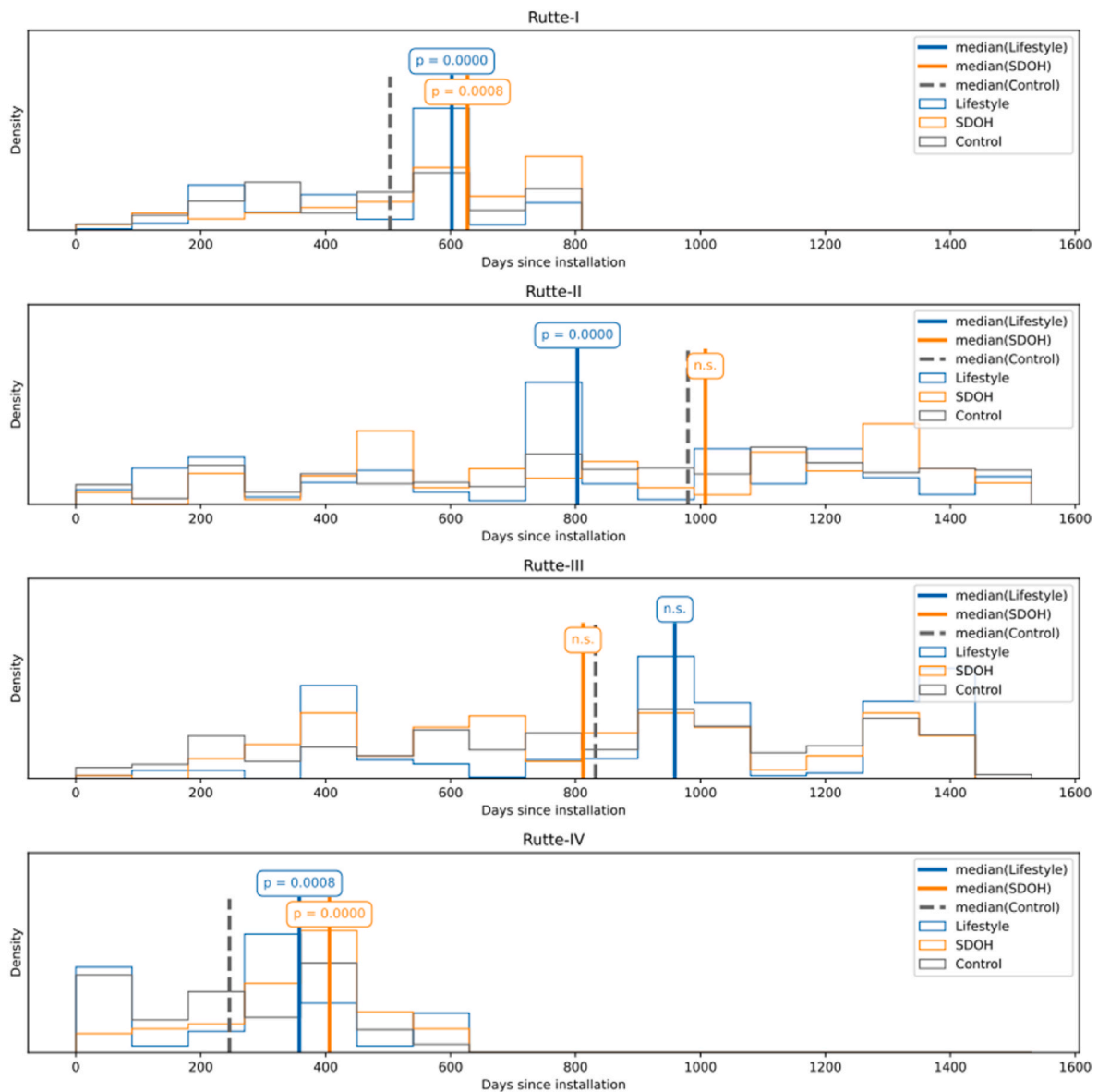


Fig. 4. Evidence for and against lifestyle drift across the four consecutive parliaments. Histogram outlines show binned distributions of days since installation of MP contributions referencing lifestyle (blue), SDOH (orange), or neither theme (grey; “control”). These histograms thus reveal the distribution of SDOH and lifestyle contributions over time during the four parliaments of interests (i.e. houses of representatives installed after four subsequent elections and that led to the formation of the governments Rutte-I through Rutte-IV). Medians for each category are shown in thick vertical lines for lifestyle (blue), SDOH (orange), and control (grey, dashed). P-values indicate two-sided, Bonferroni-corrected permutation test p-values comparing the medians to those of the null distribution from permuted data. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

letters referred back to the Coalition Accord of cabinet Balkenende-IV (between CDA, PvdA and CU), which had identified the goal of reducing differences in life expectancy as a result of socioeconomic background. During the discussions of the Ministry of VWS budget in 2008, a motion by MP Eeke van der Veen (PvdA) was accepted that called for a more concrete action plan on reducing socioeconomic health disparities. It thus appears that this peak in SDOH attention in November of 2009 was driven by ongoing political debate and goals agreed on by the coalition partners, and not by an external focusing event.

The January 2014 SDOH peak stemmed from a VWS committee meeting in which the *Nationaal Programma Preventie* (National Prevention Programme) was discussed, a programme launched by the Minister and State Secretary of Health in April 2013 (Tweede Kamer, 2013b). This did not gain as much traction, however, as five other committee meetings were held in the same month, all of which were about healthcare policy and less related to SDOH. Moreover, the event itself

cannot be said to be a classical focusing event as, again, the peak attention was triggered by political action and not by a sudden, rare event known to elites and the populace at the same time.

4. Discussion

4.1. General discussion

In this work, we have used automated corpus research to evaluate three potential mechanisms that may shape attention for social determinants of health and lifestyle in the Dutch House of Representatives. Overall, we found that SDOH and lifestyle are mentioned in a small minority of MP contributions in the VWS committee, suggesting that other topics such as health service provision and insurance are much more prominent. As predicted, we found that SDOH-related language was used significantly more often by left-leaning members of parliament

and lifestyle-related language significantly more by right-leaning members. Our lifestyle drift and focusing events hypotheses were not confirmed: temporal effects of election cycles did not consistently predict lifestyle drift as reflected in language, and empirical peaks in lifestyle and SDOH language use coincided with action from political authorities (i.e. the EU, WHO and state secretary) rather than with broader focusing events that are more exogenous to political institutions.

Given that the responsibilities of the VWS committee include population health, we were surprised to find that the use of SDOH- and lifestyle-related terms in the VWS committee was rare. Manual investigation of the data revealed that most discussions in the committee were on issues revolving around health services and insurance provision. Although the VWS committee is expected to consider the root causes of population health, it appears that discussions on these root causes remain limited. In practice, most policies that affect social determinants such as income and housing will be discussed in the parliamentary committees that cover those topics, such as the committee for Social Affairs and Employment (*Sociale Zaken en Werkgelegenheid*). A future investigation could test whether those committees explicitly consider the health outcomes of policy-making in their domain.

The finding that attention for SDOH was associated with left-leaning political ideology on is in line with previous literature (Mackenbach & McKee, 2015). Here, we add to this work by providing quantitative evidence for the SDOH-on-the-left hypothesis using the large-scale analysis of political discourse over more than a decade. However, we cannot generalize our findings beyond the time period (2008–2022) and political arena (VWS committee) under investigation. In addition, we note that the Netherlands has had a right-wing prime minister during most of the studied period (2010 – present). This prime minister, Mark Rutte, oversaw center-right, right and center-left cabinets. Given the association between ideology and attention for SDOH, this mostly right-leaning political season may have contributed to reduced action on SDOH. It can be speculated that a power shift to the left could result in more policy attention for social determinants of health, although it remains to be seen whether this would overcome other factors that impede the translation of SDOH thinking into action, and which were not of scope of our analysis of political discourse.

The lifestyle drift and focusing events hypotheses were not borne out by the data we collected. Although some parliamentary periods did contain more lifestyle-related language near the end of their term, others covered this topic more in the beginning, suggesting that other agenda-setting factors were at play. When investigating the empirical peaks in SDOH and lifestyle-related language, we found that the peaks followed specific policy initiatives or planned policy evaluations that in all likelihood did not garner much public attention, rather than publicly known focusing events. This suggests that from 2008 to 2022 in the Dutch political context, agenda-setting in SDOH and lifestyle has been dominated by specific policy initiatives rather than broader societal focusing events (e.g. a pandemic), which can trigger larger policy change (Baumgartner, Jones, & Mortensen, 2018; Birkland, 1997). Attention for SDOH and lifestyle in our period of analysis thus appears to vary mostly because of the changing topics placed on the parliamentary agenda: parliamentarians bring up SDOH and lifestyle analyses of health and health inequalities when this is appropriate in relation to the topic at hand.

We used an automated corpus research approach to study these questions. Although this method is not new, to our knowledge this is the first time it is applied for the analysis of health policy debate in parliament. Automating the processing of debate transcripts allowed analysis at scale, including an amount of data (over 50,000 MP contributions and 10 million words) that would not have been feasible with manual coding. Our method automatically labelled utterances in parliament by date and political affiliation of the MP, which provided sufficient information to evaluate the three hypotheses in this paper.

4.2. Limitations

Our approach also came with limitations. Most importantly, the corpus research technique we used relied heavily on counting the use of specific terms and was thus dependent on the formation of a reliable lexicon. Building the lexicon was time-consuming and the result was imperfect, as we were forced to exclude several terms that were relevant to a social determinants perspective but were not *specific* to this topic (e.g. because they also occur in healthcare provision discourse, such as debt; Roos, Diepstraten, & Douven, 2021). A potential way to overcome this limitation in future work is to use sense disambiguation techniques to count only MP contributions that use a given word with a specific meaning (Navigli, 2009). Furthermore, SDOH-related terms may be used by some parliamentarians in a negative light, which is by default not picked up by our method (but could potentially be implemented in a future study). Thus, automated corpus research comes with a trade-off between scale and power on the one hand and precision on the other. As such, we see our work as a new perspective on health policy questions in the literature that should always be interpreted in relation to other work with more traditional methods.

Our study has some further limitations. It may be that modest lifestyle drift and focusing events effects were not picked up by our analysis as they were in absolute terms overshadowed by other, much more popular topics such as health service provision. Using the terminology of Sacks, Swinburn, and Lawrence (2009), the Dutch VWS committee may not have experienced a drift from ‘upstream’ policy targeting the economic, social and physical environment to a ‘midstream’ approach targeting population behaviours, but it may simply have had a major ‘downstream’ focus on health services. Other parliamentary committees, such as those on social affairs or housing, do consider these upstream policies but it is at present unclear whether they link this explicitly to health outcomes (let alone steer on those). We do not consider these other committees in the present work, which is a limitation. Furthermore, it was unclear how to define peaks in SDOH and lifestyle attention. We approximated relative attention for a theme by dividing the number of MP contributions referencing this theme by the total number of contributions in the same month, making this measure sensitive to the number of other ongoing discussions and potential confounds such as holiday breaks and week distributions. That it is sensitive to other ongoing discussions is precisely the point, i.e., if a topic pushes another topic off the agenda it is clearly deemed more important. However, that it is sensitive to other confounders such as the distribution of weeks and recesses is unintentional; occasionally the most important issues are even discussed during recesses. One obvious alternative is to simply count the number of MP contributions referencing a given theme, without normalizing this by total contribution volume, but this may be easily confounded by the total debate volume, which varies considerably throughout the year. There seems to be no obvious answer to this dilemma and future work should consider the pros and cons of both before committing to either one.

Another limitation of this study is that we did not include plenary debate transcripts: some health-related issues are deemed so important that they are lifted into plenary debate by political party leaders and thus disappear from the scope of our analysis (Baumgartner et al., 2018; Kingdon, 1995). This mostly happens after an issue has already been discussed by committees, however, so we do not think that this omission invalidates our results. Plenary debates are likely to show more stochastic results, where longer periods in which lifestyle and SDOH are never or rarely mentioned with short periods in which they are mentioned extensively.

4.3. Future directions

Based on our efforts and the limitations of our analyses we suggest some strands for future work. First, it would be interesting to repeat our analysis with transcripts of plenary debates or debates from non-health

committees that influence social determinants such as housing. However, this will require building and validating a lexicon specifically for these new contexts. Second, our analyses proxied attention for lifestyle and SDOH with contributions that contained specific terms. The lexicon used was imperfect and we do not see an immediate way to improve it, but it is possible to use word sense disambiguation (Navigli, 2009) to achieve higher precision. Third, sentiment analysis (Feldman, 2013) could be used to analyse whether terms are used in a positive (supportive) or negative (rejecting) context. The application of text mining tools to answering health policy questions thus holds promise for increased depth and precision.

4.4. Conclusions

The conceptual notion of lifestyle drift was not reflected in the language used by Dutch MPs in the parliamentary health committee between 2008 and 2022. What we found instead was that both lifestyle and SDOH seem to have been marginal issues in the subsystem of Dutch parliament that is responsible for health inequalities, which appears to talk about healthcare and health insurance mostly. When MPs do talk about SDOH, they tend to be more left-wing, and lifestyle is brought to the fore more by right-wing MPs. Future research might expand on these conclusions by examining plenary debates, and by incorporating other text mining methods in discourse analyses to yield richer insights.

Author statement

Jeroen van Baar: Conceptualization, Data curation, Investigation, Methodology, Project administration, Software, Visualization, Writing – original draft, Writing – review & editing. Laura Shields-Zeeman: Conceptualization, Investigation, Supervision, Writing – review & editing. Karien Stronks: Conceptualization, Investigation, Supervision, Writing – review & editing. Luc Hagenaars: Conceptualization, Data curation, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

Declarations of interest: none.

Data availability

All preprocessed data and analysis code is available from https://github.com/jeroenvanbaar/SDOH_parliament.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2023.101399>.

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