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REVIEW

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Why we struggle to make progress in obesity prevention and how we might overcome policy inertia: Lessons from the complexity and political sciences

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Summary

Despite evidence for the effectiveness of policies that target obesogenic environments, their adoption remains deficient. Using methods and concepts from complexity and political science (Stock-and-Flow analysis and Punctuated Equilibrium Theory) and a qualitative literature review, we developed system maps to identify feedback loops that hinder policymaking on mitigating obesogenic environments and feedback loops that could trigger and sustain policy change. We found numerous self-reinforcing feedback loops that buttress the assumption that obesity is an individual problem, strengthening the biomedical and commercial weight-loss sectors' claim to "ownership" over solutions. That is, improvements in therapies for individuals with obesity reinforces policymakers' reluctance to target obesogenic environments. Random events that focus attention on obesity (e.g., celebrities dismissing soda) could disrupt this cycle, when actors from outside the medical and weight-loss sector (e.g., anti-weight stigma activists) successfully reframe obesity as a societal problem, which requires robust and politically relevant engagement with affected communities prior to such events taking place. Sustained prioritization of policies targeting obesogenic environments requires shared problem ownership of affected communities and nonhealth government sectors, by emphasizing cobenefits of policies that target obesogenic environments (e.g., ultraprocessed food taxation for raising revenue) and solutions that are meaningful for affected communities.

KEYWORDS
advocacy, framing, obesity, policymaking, public policy, system analysis

1 | INTRODUCTION

Overweight and obesity account for 4 million annual deaths globally[1] and are estimated to reduce gross domestic product by 3.3% in Organisation for Economic Co-operation and Development countries.[2] Overweight prevalence is on a steep rise in Europe while having stabilized at an all-time high of 73.1% among US adults.[2,3] Individuals with obesity have an approximately two times higher risk of being hospitalized after contracting COVID-19.[4] Thus, obesity is an important health crisis in itself and one that exacerbates other crises.[5,6]

There is increasing consensus that changes in obesogenic environments—"the collective physical, economic, policy, and sociocultural surroundings, opportunities, and conditions that promote obesity"[5]—are key drivers of the rising obesity rates.[3,5] Curbing the rise in obesity requires obesity prevention policies that target obesogenic environments with healthy urban planning policies[7] and regulation of ultraprocessed foods,[8] rather than relying exclusively on individual behavior change through dieting and exercise, surgery, and medications.[3,6,9] For a more comprehensive picture and a better understanding of the interconnectedness between the environmental factors that produce obesity, public health researchers are increasingly approaching obesity from a complex systems perspective,[10–14] the most notable being the Foresight systems map in the United Kingdom.[15] Yet so far, systems analyses have focused on understanding complex array of self-reinforcing factors that drive obesity and those self-neutralizing factors that block change, rather than investigating systems of obesity prevention policymaking.[16–18] This gap in research is all the more striking given the insufficient progress toward curbing obesogenic environments in the European Union,[3,19] United Kingdom,[20] and United States.[21]

This study used a complex systems approach to understand why public health policies that target obesogenic environments often fail to gain political support, despite evidence they are effective for combatting obesity.[22–26] A complex system is a multitude of interdependent elements within a connected whole, where the whole is greater than the sum of its parts.[27] Complexity science offers systematic ways to illuminate all parts and interrelations of the system at once, to uncover unintended consequences of well-intentioned but ill-considered interventions. Using systems mapping methodology, feedback loops can be discovered that explain why a system may show patterns of self-perpetuation or resistance to change and feedback loops that could disrupt such lock-in.[5,10,11,27–31]

While the causes of inertia in addressing obesogenic environments have been described before, for example, the dominance of biomedical and weight loss enterprises and the lack of serious political attention devoted to the issue,[32–34] it is less clear how these elements might be self-reinforcing. Similarly, remedies to this situation include the needs for reframing obesity,[35–37] effective advocacy coalitions,[38,39] the leveraging of exogenous focusing events,[40,41] and a whole-of-government approach,[5,8,9,42] but it is less clear how these elements together might provoke a sustained public health policy focus on obesogenic environments.[11] This study brings these singular insights together by analyzing the feedback processes that produce current policy inertia in addressing obesogenic environments, leverage points for change, and mechanisms that would sustain change, based on a qualitative literature review of obesity prevention policymaking in high-income countries, providing a detailed analysis of which obesity prevention policymaking strategies might work best in different stadia of obesity prevention policymaking inertia.

2 | METHODS

We followed standard methods[12,27–29,43–45] to develop system maps that visualize all parts of the obesity prevention policymaking system at once.[27,28] Our objective was to identify two types of feedback loops: (1) self-reinforcing feedback loops that amplify change in a vicious or virtuous cycle and (2) balancing feedback loops that block or reverse change in the system.[27,28] An interdisciplinary team of health scientists, political and public administration scientists, and sociologists followed an iterative process to define system boundaries, collecting existing evidence from the literature and analyzing inputs and outflows using Stock-and-Flow analysis.[12,28,29,43,45] Drawing on Punctuated Equilibrium Theory, an extensively validated theory from the political sciences that explains why policies stay the same for long periods of time with the ever-present potential for quick and dramatic change (see Table S1 for a summary of the theory's core components),[46,47] we developed three systems maps to explain (1) the current policy inertia in addressing obesogenic environments, (2) leverage points for breaking free from inertia, and (3) the system elements required to lock in those changes.

2.1 | Data collection

We conducted a qualitative review of the literature focusing on relevant policy change processes in high-income countries, to derive elements for inclusion in the system maps. Guided by Punctuated Equilibrium Theory and starting with systematic reviews, we used snowballing procedures based on bibliography and citation records, to purposively sample published studies about obesity and nutrition policy processes ($n = 7$),[1617,48–52] studies of health policy change[46,47] in sectors outside of medicine and nutrition ($n = 6$),[53–58] and studies of community mobilization inputs on policy change ($n = 6$).[14,59–63]

The multidisciplinary team came to this selection of studies after experiencing data saturation based on coding the following elements: study setting, government level, topic focus, study design, participants, methodological quality, system dynamics (e.g., system elements and interconnections), and elements of policy analysis (e.g., stages of policymaking, governance, and policy outcomes) (Table S2). The coding effort produced syntheses, structured by Punctuated Equilibrium Theory, with potential elements for inclusion in system maps (Table S3), which were specified using published guidelines for system mapping.[64]

2.2 | Stock-and-flow analysis

By distinguishing between more and less volatile elements of the system, Stock-and-Flow Analysis allows analysts to identify dynamics that produce system stability or inertia and dynamics that could disrupt the system, leading to change.[28] System elements identified in the qualitative coding (Table S3) were analyzed using the Vensim software (version PLE 9.3.0). "Stocks" are nonvolatile, foundational elements of a system that gain or lose weight through the interaction of other system elements (e.g., political influence of the food industry). Stocks are shown as boxes in system maps. "Inflows" and "outflows" directly affect stocks and represent arrows going toward and moving from the stock, respectively (e.g., food industry lobbying and industry credibility, respectively).[43] "Parameters" are volatile factors (e.g., profitability of food markets and media attention), shown as unboxed elements in system maps. They causally relate to other parameters, inflows, and outflows, sometimes involving delay when one acts on a clearly different temporal scale as the other.[27] Finally, "feedback loops" are produced by the interactions of stocks, flows, and parameters, shown as circular arrows (e.g., food industry profitability leads to more lobbying resources, which undercuts regulation, further enhancing profitability). Reinforcing and balancing feedback loops are indicated with an "R" and "B," respectively.

In accordance with system mapping guidelines,[28] results from the literature review were sorted into three system maps as defined by Punctuated Equilibrium Theory. The multidisciplinary research group agreed upon which elements identified in the literature (Table S3) were stocks, inflows, outflows, and parameters, and we connected these elements based on whether the literature identified causal linkages between them, adding delay markers when deemed appropriate (Table S4). We used the Vensim feedback loop function to identify feedback loops. We discussed the observed feedback loops at length in our multidisciplinary research group to interpret the systems' paradigms, in accordance with standard methods for interpreting system maps.[12,27,28,43,65]

3 | RESULTS

Figure 1 illustrates why the current system of obesity policymaking fails to address obesogenic environments (see Table S5 for results on all feedback loops). The map identifies nine stocks, eight flows, five factors, and eight reinforcing and zero balancing feedback loops. The core system structure revolves around the fact that politicians and the general public tend to assume obesity is an individual problem.[16,48,49,51,54] This causes inertia in policymaking institutions (institutional friction) and political decision makers (cognitive friction) toward addressing obesogenic environments[16,17,49,51] and leads to policies that target an individual's lifestyle only.[16,17,48–52,54–58] The focus on policies that support individual-level solutions (e.g., prescribing diets, fitness regimens, and obesity medication) directly strengthens the framing of obesity as an individual problem (R1–2) and indirectly strengthens the biomedical and weight-loss industry's ownership of the problem (R3–7).[46] The dominant role of the biomedical and weight-loss sector also frustrates the development of reciprocity between health and other relevant public sectors (e.g., urban planning and taxation) by reinforcing their problem ownership (R8).[14,53,54,56,57] With eight self-reinforcing feedback loops and no balancing feedback loops, this system is set up to continuously reinforce the framing of obesity as an individual problem, thus making the system increasingly inert to addressing obesogenic environments.

Figure 2 visualizes leverage points for overcoming the observed inertia to addressing obesogenic environments. The map identifies 9 stocks, 13 flows, 13 factors, and 8 reinforcing and 5 balancing feedback loops. The system revolves around a change in the public conceptualization of obesity. When the complex societal causes of obesity prevail over proximal biomedical and behavioral risk factors in policymaking processes, awareness grows that current individual-focused solutions are insufficient.[16,60] When the axiom of individuals not balancing their calorie intake and output gets replaced by increasing awareness that obesity involves societal causes in the food, physical activity, socioeconomic, and sociocultural environments,[59,60,63,66] in the short term, inertia increases by stymying policymaking institutions and political decision makers with the problem's complexity (B1–2).[48,51,67] In the long term, this awareness strengthens obesity prevention advocates' framing of obesity as a societal problem (R9),[62] as well as enhancing the chance that random, exogenous shocks can become focusing events that reinforce a societal perspective on obesity prevention in the political arena.[46,47] An example of such a focusing event concerns football player Christiano Ronaldo's dismissal of soda during a press conference in 2021. An example from another policy field is the Master Settlement Agreement between the tobacco industry and US state governments. This agreement suddenly focused substantial attention on tobacco regulation, produced major policy change, and shifted the image of smoking.[68] Shocks to the system lead to a rapid increase in political demand for obesity evidence,[46,47,51] which further increases awareness that obesity has societal and economic causes and consequences (R10–11). It also leads to greater awareness that targeting obesogenic environments (e.g., healthy urban planning or regulating ultraprocessed food) has more impact than individual-oriented policies and that these policies can be implemented.[17,51,54,55,62,63] All these factors contribute to overcoming inertia and, consequently, the greater likelihood of adopting policies that address obesogenic environments.

Figure 2 further suggests that exogenous shocks, or focusing events, in themselves are not enough for policy change. For events such as Ronaldo's dismissal of soda to lead to change, there must already be awareness that obesity has a large societal and economic impact. Policymaking institutions and political decision makers must see that current policies lack effectiveness, while seeing more effective targeting of obesogenic environments as a salient alternative. This, in turn, requires a demand for real-world obesity evidence, which includes evidence on the effectiveness of specific policies, salient and timely published reports about the societal and economic causes and consequences of obesity, and public demonstrations by advocacy groups who attack dominant framing of obesity as an individual

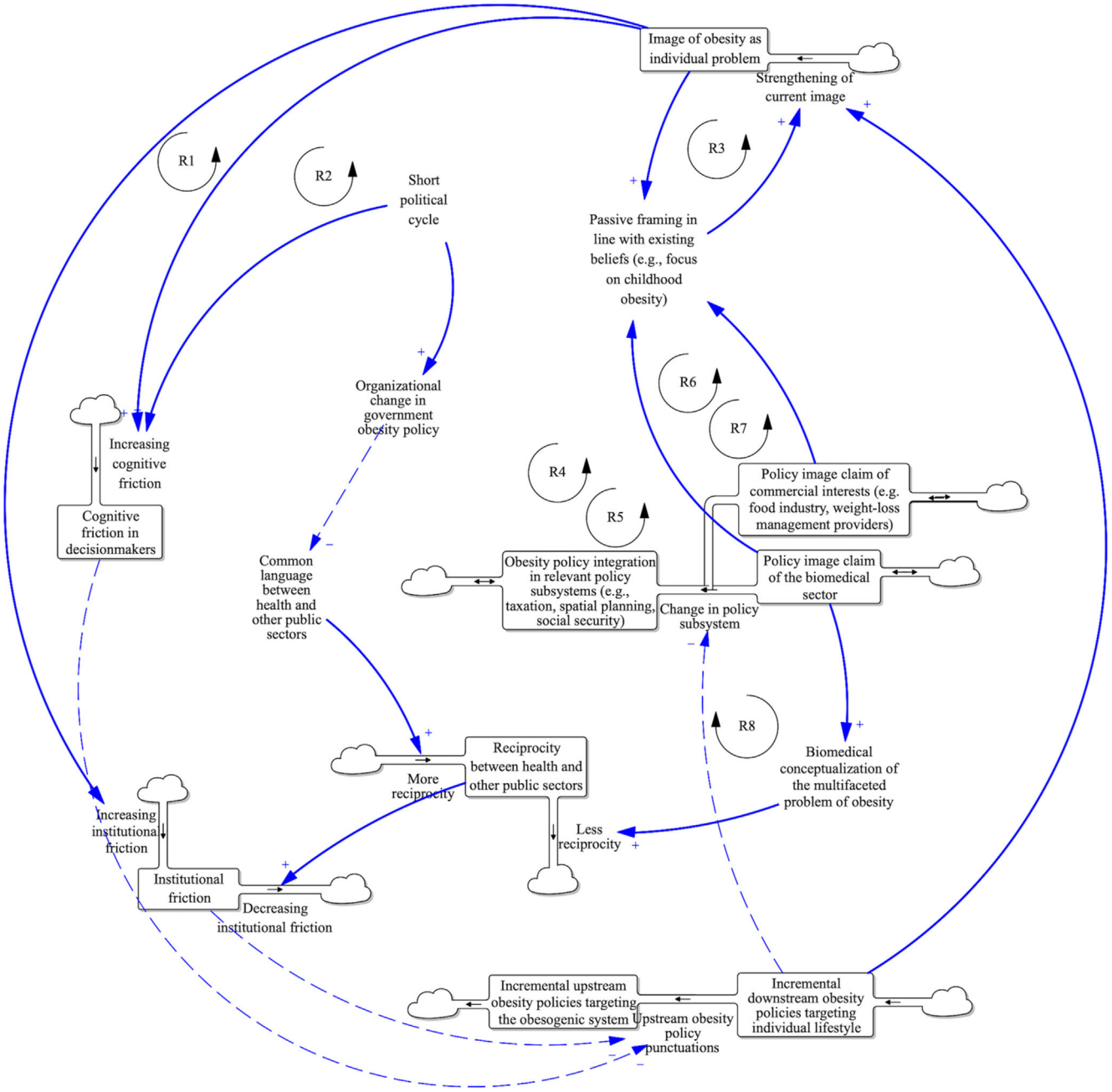

FIGURE 1 Stock-and-flow diagram that visualizes why the current system of obesity policymaking fails to address obesogenic environments. Connections with a positive polarity indicate positive causation (as a cause increases, the effect increases; as the cause decreases, the effect decreases), expressed with an uninterrupted arrow and a "+" symbol. Connections with a negative polarity indicate negative causation (as a cause decreases, the effect increases; as the cause increases, the effect decreases), expressed with an interrupted arrow and a "−" symbol. Delays are marked with the "||" symbol. Stocks are marked by square boxes with corresponding inflows and outflows, which start from a "cloud" symbol indicating that potential other factors fall outside the system boundaries. Reinforcing and balancing feedback loops are indicated with an "R" and "B," respectively.

behavioral and biomedical problem (e.g., anti-weight stigma advocates). This active presentation style of showing obesity's real world problems and its solutions is notably different from merely reporting abstract data on the slow rise of obesity and associated diseases in the scientific literature.[51,54,57] But for real-world obesity evidence to become part of formal policymaking processes, obesity advocates need to actively engage with formal policymaking institutions (B3),[54,56–58,61–63] thereby challenging the individualized framing of the biomedical sector and weight-loss industry. Policy brokers who can span boundaries play a pivotal role in this process: politicians, bureaucrats, interest group representatives, or any other policy relevant individuals who are skilled in and sensitive to bridging interests, professions, and organizations.[55,56,61] In Figure 2, policy brokers help mobilize obesity advocates such as weight stigma

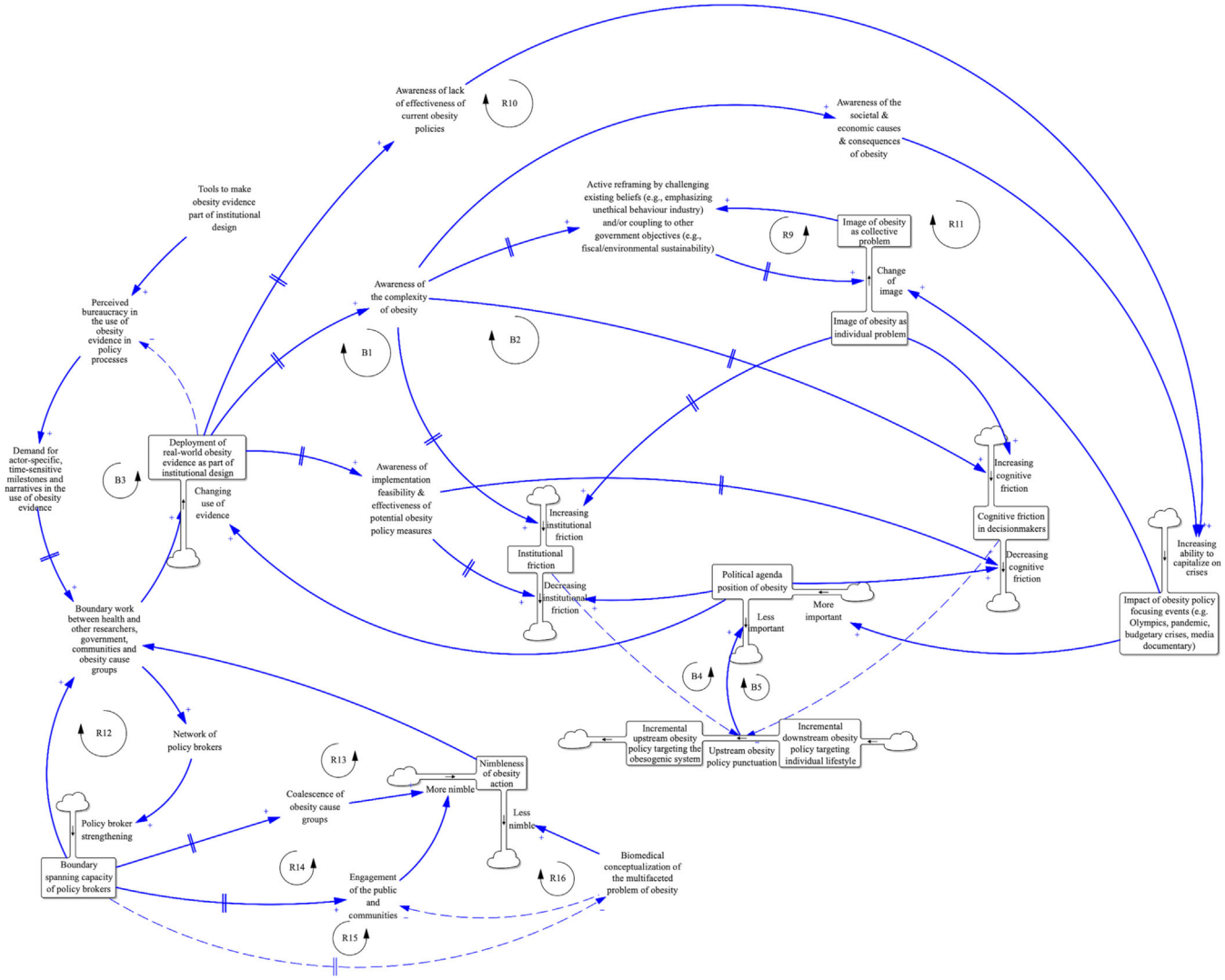

FIGURE 2 Stock-and-flow diagram that visualizes how to overcome inertia in addressing obesogenic environments. See Figure 1 for a legend of the symbols.

activists,[16,48,51,54,55,61,62] to mitigate the biomedical conceptualization of obesity,[17,55] leading to nimble obesity advocacy[16,48,50,51,53,54,56] and strong engagement with formal policymaking institutions (R12–16).[51,55]

Figure 3 visualizes a system that sustains a public policy focus on obesogenic environments. The map includes 8 stocks, 7 flows, 15 factors, and 7 reinforcing and 2 balancing feedback loops. The feedback process visualized by R23 contains most of the system's elements and therefore resembles the core system structure. It stipulates that obesogenic environment policy breakthroughs further decrease the problem ownership of the biomedical sector and commercial interests, increasing obesity policy integration between sectors who regulate underlying causes instead (e.g., transportation and trade). This in turn improves administrative leadership toward obesity, leading to more common language and reciprocity between the public health care sector and other government silos[54,57] (e.g., when health and finance departments realize that ultraprocessed food taxes benefit short-term fiscal need and long-term fiscal and workforce sustainability of health care).[2] Subsequently, policy networks expand and become increasingly intersectoral, strengthening the capacity of individuals who connect networks. This improves the generalized capacity of communities to help design policy strategies that impact obesity in a way that is meaningful for the community.[29,61] Consequently, structural engagement develops between affected communities and other government silos than the public health care silo. Of note, the feedback process visualized by R23 is lengthy and involves much delay. The same applies to the strengthening of real-world obesity evidence as policy networks expand (R19–21). Reaching reciprocity between the public health care sector and other government silos and community engagement therefore requires a long lead time.

4 | DISCUSSION

A classic public health approach combats obesity by changing food and physical activity environments, not relying exclusively on

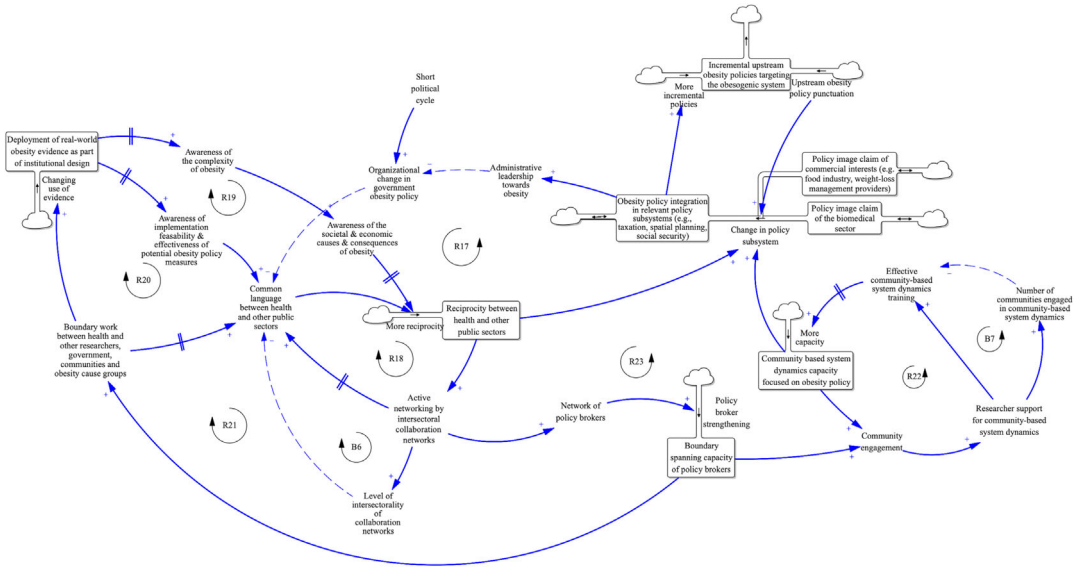

FIGURE 3 Stock-and-flow diagram that visualizes how to sustain a public policy focus on obesogenic environments. See Figure 1 for a legend of the symbols used.

individuals to change through dieting and fitness programs. Using complexity science methods based on a literature review, this study visualized the dynamics of overcoming policy inertia to reduce obesogenic environments. We found that the current system fails to address obesogenic environments because of self-reinforcing feedback loops that spontaneously bolster the assumption that obesity is an individual problem, while reinforcing the biomedical and weight-loss sectors' claims to "ownership" over solutions to it. The complex systems approach also yielded the finding that random events, such as celebrities dismissing sodas or infectious disease pandemics that focus attention on obesity, can disrupt these vicious cycles, but only if the advocacy community takes advantage of these opportunities by successfully reframing obesity as a societal problem. Sustaining these changes would require active, continual engagement by affected communities and governmental sectors outside of biomedicine (e.g., transportation and education). Virtuous self-reinforcing feedback loops develop when communities and nonhealth government silos become co-owners of the problem, leading to policy successes in tackling obesogenic environments that further strengthen their engagement.

This study supports existing evidence on policy framing in many public health issues, including obesity. The general tendency is to focus on the "public" (health) issues as attributable to individual choice. This prevents collective action.[11,16,18,69] Our systems analysis transcends this relatively simple framing. It adds novelty through finding self-reinforcing feedback loops that perpetuate this framing: Continued efforts to change individuals through dieting, fitness, medications, and surgery come with the unintended consequence of strengthening the image of obesity as an individual problem. That is, focusing on therapies for individuals with obesity might increase reluctance by policymakers to consider policies that target obesogenic environments. This suggests that, from a systems perspective, medical researchers and providers would focus on solutions to obesogenic environments during public discussions, even if they advocate dieting and medical solutions with individual patients. A timely observation in the context of the disruptive market entrance of new obesity medications[70,71] and the (social) media hype around these drugs.[71–73]

Findings from this study's complex systems perspective suggest that, because so many elements in the current status quo are self-reproducing, change will require an abrupt break, perhaps triggered by random exogenous events that temporarily focus political attention on obesity as a public health problem. To lock-in change, vigorous grassroots activism must consistently reassert this reframing. Disruptive events, in the absence of such activism, are likely to reinforce the status quo.[46,47,74] The COVID-19 pandemic exemplifies this vicious cycle. Research has shown that the pandemic strengthened beliefs in obesity as an individual responsibility in several countries.[75–77] People with obesity were often blamed for pandemic-era problems with health care and the economy, while obesity was portrayed less often as a consequence of obesogenic environments.

Our complex systems perspective underscores the key role of nimble and responsive activism in reframing obesity as a societal problem, but the literature has so far been unclear which specific activists might successfully do so. Our systems perspective points to some important activist attributes that allow these actors to reframe the issue by bringing alive the real-world evidence of obesity's societal and economic causes and consequences (Figure 2) and by highlighting solutions that are meaningful for affected communities (Figure 3). We would argue that today, at least two communities of grassroots activists possess these attributes: advocates working for food justice and those fighting weight stigma. Food justice activists reframe obesity by positioning it as a consequence of poor access to affordable, sustainable, healthy food. Weight stigma activists, such as the Health at Every Size movement,[33] critically appraise the usefulness of weight

science as a lifestyle change model and challenge the stigmatization of people whose appearance defies societal stereotypes of "healthy." Because these advocacy efforts could "normalize" obesity, obesity prevention advocates in the public health community are not currently aligned.[33,78,79] Here, reaching common ground and building advocacy coalitions is still quite possible because all ultimately share a common cause in tackling obesogenic environments; all share a desire to promote access to healthy foods, food security, and stigma reduction.[33,79,80]

Our complex systems perspective allowed us to find sequentiality in the reframing of obesity, underscoring the importance of timing. Obesity can be reframed, we found, during focusing events by grassroots obesity prevention activism. Because most exogenous shocks only focus attention on obesity for a short amount of time and because it takes considerable time to build advocacy coalitions, obesity prevention advocates, affected communities, and formal policymaking institutions must have already reached a common ground and prepared their reframing strategy, before a focusing event takes place. This resembles analyses of the policy process that preceded the adoption of sugar-sweetened beverage taxes, where successful adoption in many jurisdictions has been related to the level of organization of advocacy coalitions prior to the policy reaching the agenda.[41,81]

Like prior studies,[54,57,82] we found that engagement between affected communities and nonhealth government silos (e.g., transportation) is required to achieve a sustained, whole-of-government or whole-systems approach to targeting obesogenic environments.[3,83] Using punctuated equilibrium theory (PET), however, our systems mapping approach stipulates that this approach would be futile if a policymaking system still resides in a paradigm where obesity is seen as an individual problem. Advocates in such a context should therefore first reframe obesity to a societal problem, before trying to convince government nonhealth sectors of their co-problem ownership.

Once obesity is reframed to a societal problem, our systems analysis further suggests that a sustained focus on obesogenic environments requires emphasizing reciprocity in obesity policymaking, emphasizing cobenefits to other sectors.[84] To engage government silos that regulate aspects of obesogenic environments (e.g., tax bureaus that could be taxing ultraprocessed foods), public health advocates will frame obesity as situated in the root causes and/or consequences of their policy priorities. Regulating the plastic waste associated with ultraprocessed foods benefits the priorities of government agencies responsible for environmental protection. Ultraprocessed food taxes, in turn, benefit the fiscal agenda of agencies responsible for finance.[85] Indeed, fiscal need has been proven as an important reason for several governments to implement sugar-sweetened beverage and ultraprocessed food taxes.[85] In Mexico, for instance, revenue generation ensured buy-in from the Ministry of Finance.[86] Also, programs that reduce obesogenic environments in public schools benefit from situating them in the institutional goals of schools—learning and equality in the broadest sense of the word—rather than presenting these as a responsibility to schools per se, as has been shown in the Netherlands.[87] In sum, a whole-of-government approach to obesity reaches common ground within government, by positioning obesity's causes and consequences in the sectoral priorities of other government sectors than health and by emphasizing the cobenefits associated with policies that reduce the severity of obesogenic environments.

4.1 | Limitations

Political science theory is underused in public health policy research generally[49,50,88] and in obesity research in particular.[16] Relevant reviews were limited to seven, which indicated that many of the included studies were methodologically limited. We somewhat compensated for this by using a theory-driven approach tested in other public policy areas[46,47] and by including studies that investigated health policy change in areas outside of medicine and nutrition, as well as studies of community mobilization inputs on policy change.

Another limitation is that our methods relied on expert interpretation of the literature. We included a large team of multidisciplinary health and social scientists in our expert review process. Finally, our reviews were limited to literature on high-income countries, and policy systems likely differ across national contexts, especially in middle and lower income countries. Comparative studies are required to specify the observed dynamics across different contexts.

5 | POLICY IMPLICATIONS

Inertia in obesity prevention today is in part due to a self-reinforcing dynamic by which incremental improvements in therapies for individuals with obesity (e.g., prescribing diets, fitness, or obesity medication) increase reluctance by policymakers to consider more impactful policies targeting obesogenic environments. Ideally, medical researchers and providers would focus on solutions to obesogenic environments during public discussions even if they advocate dieting and medical solutions with individual patients. Policymakers and obesity prevention advocates should invest in robust relationships with communities affected by obesity's economic and societal consequences, such as weight stigma and food justice activists. These relationships are necessary for timely reframing of obesity as a societal issue when chance events focus attention on obesity, as just occurred with the COVID-19 pandemic. For transforming such a shock to the obesity prevention policymaking system into a sustained focus on obesogenic environments, obesity researchers and funders should invest in studies of obesity's societal and economic causes and consequences. Such efforts are consistent with a whole-of-government approach that situates obesity within the priorities of nonhealth policy silos (e.g., education) and with the overarching socioeconomic welfare of affected communities.

AUTHOR CONTRIBUTIONS

L. L. H. conceived the study, reviewed all literature, developed all models, and led the writing. L. A. S. critically reviewed the analysis and codeveloped the manuscript. J. O. G., F. t. E., K. M. O. H.,

and F. J. v. L. reviewed portions of the literature, codeveloped portions of the models, and reviewed the manuscript. M. P. M. B. codeveloped the models and reviewed the manuscript. E. d. L. reviewed the manuscript. K. S. supervised the study, reviewed part of the literature, codeveloped the models, and reviewed the manuscript.

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CONFLICT OF INTEREST STATEMENT

No conflict of interest statement.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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