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**CONTRIBUTED PAPER**

# Taking a more nuanced look at behavior change for demand reduction in the illegal wildlife trade

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**Abstract**

The illegal wildlife trade threatens the future of many species, and undermines economies and livelihoods. Conservationists have largely responded with supply-side interventions, such as antipoaching patrols, but these often fail to stem the tide of wildlife trafficking. There is now increasing interest in demand-side interventions, which seek to lower poaching pressure on sought-after species by reducing consumer's desire for, and purchase of, specific wildlife products. Individual behavior change approaches, from environmental education to social marketing, have been widely advocated by academics, practitioners, and policy makers. However, this is an emerging field and we lack the breadth of evidence needed to understand and predict the potential outcomes of demand reduction interventions. To help us gain broader insights, we examine the literature from public health and international development on the effectiveness of behavior change interventions, and critique the current conceptualization of strategies for reducing consumer demand in the illegal wildlife trade. We show that behavior change is difficult to achieve and interventions may have unintended and undesirable consequences because of unaddressed systemic, cultural and environmental drivers, and limited resourcing. We conclude that some sections of the conservation community are advocating a shift from one reductionist approach based on limiting supply, to another based on limiting demand, and argue that conservationists should learn from the public health and international development projects that have integrated systems thinking. By accounting for the multiple interactions and synergies between different factors in the wildlife trade, we can develop more strategic approaches to protecting endangered species.

**KEYWORDS**

consumers, ivory, rhino horn, social marketing, socioecological frameworks, whole systems approaches, wildlife trade

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## 1 | INTRODUCTION

The illegal wildlife trade is a major global problem that causes wildlife declines and undermines economies and livelihoods (t Sas-Rolfes et al., 2019). Traditional supply-side interventions such as antipoaching measures have largely failed to stem the tide; the loss of tigers, elephants, pangolins, and other high-value species continues, driven by growing demand from consumers (Challender & MacMillan, 2014). This failure is partly because these supply-side interventions, while important, do not address the root cause of demand. Thus, conservationists increasingly recognize the importance of demand-side interventions, aiming to reduce the desire for, and purchase of, specific wildlife commodities to lower poaching pressure on sought-after species. This was acknowledged at the Kasane Conference on the Illegal Wildlife Trade in March 2015, which set its first future action as “Eradicate the market for illegal wildlife products” (Kasane Conference, 2015). Similarly, there have been multiple calls for demand reduction in both the academic and gray literature (Veríssimo, Challender, & Nijman, 2012; Challender, Wu, Nijman, & MacMillan, 2014; Burgess, 2016) and it was raised as an important global issue by the United Nations General Assembly in 2015, 2016, and 2017 (General Assembly resolution 69/314, 70/301, 71/326).

Demand reduction interventions aim to influence behavior. Common approaches have focused on legal regulation or prohibition (e.g., trade bans) and law enforcement (Wyatt, 2013), but these are not the only ways to persuade people to stop consuming wildlife and/or shift their consumption to more sustainable choices (Felbab-Brown, 2017). Conservationists have become increasingly interested in achieving voluntary change through approaches such as behavioral economics interventions, environmental education, and social marketing campaigns (Hungerford & Volk, 1990; Smith et al., 2020; Veríssimo & Wan, 2018). This involves understanding consumer motivations and the key drivers of demand for wildlife products to more effectively alter people's behavior (Phelps, Biggs, & Webb, 2016; Thomas-Walters, 2017). This is why a number of authors have advocated the use of behavior change interventions for demand reduction (Veríssimo et al., 2012; Veríssimo & Mckinley, 2015; Wright et al., 2015), and several new projects have pioneered this approach (Chaves et al., 2017; Offord-Woolley, 2016; Veríssimo et al., 2018, 2018). Within the conservation community, there has also been much discussion around knowledge sharing across sectors to achieve change (e.g., TRAFFIC, 2016) and these new studies provide a number of insights. However, research to assess their likely effectiveness or to identify factors

that might improve success is lacking (Veríssimo and Wan, 2018).

By examining research and learning on behavior change in other fields such as public health and international development, we may anticipate some of the issues in demand reduction. This is because both public health and international development have made substantial advances in recent years in their approach to designing and evaluating behavior change interventions, and there is much we can learn from their experience. Here, we assess the evidence from these other sectors and discuss its relevance for demand reduction in conservation. We highlight how achieving behavior change can be slow and expensive, and suggest that much of the current discussion in policy circles about demand reduction for illegal wildlife products may be overly optimistic. We acknowledge that there are differences between this conservation issue and other fields, notably the international nature of wildlife trade and the illegality of the behaviors, but the additional difficulties faced by conservation practitioners only serve to underscore the challenges of successfully changing behavior.

Based on evidence from these other sectors, we first discuss why the illegal wildlife trade is conceptualized as a “wicked problem” perpetuated by various systemic and environmental drivers, making it comparable to complex issues in other sectors. We then highlight specific challenges that may make behavior change in wildlife consumers difficult to achieve, drawing on evidence from public health and international development. Finally, we introduce the concept of systems thinking, a holistic approach to complex issues that is increasingly used in these other sectors to account for the interactions between constituent parts of a problem. As part of this, we argue for integrating systems thinking into demand reduction interventions to reduce the potential for unintended consequences and increase the likelihood of sustained impact, as well as emphasizing again the need to temper our expectations of demand reduction interventions.

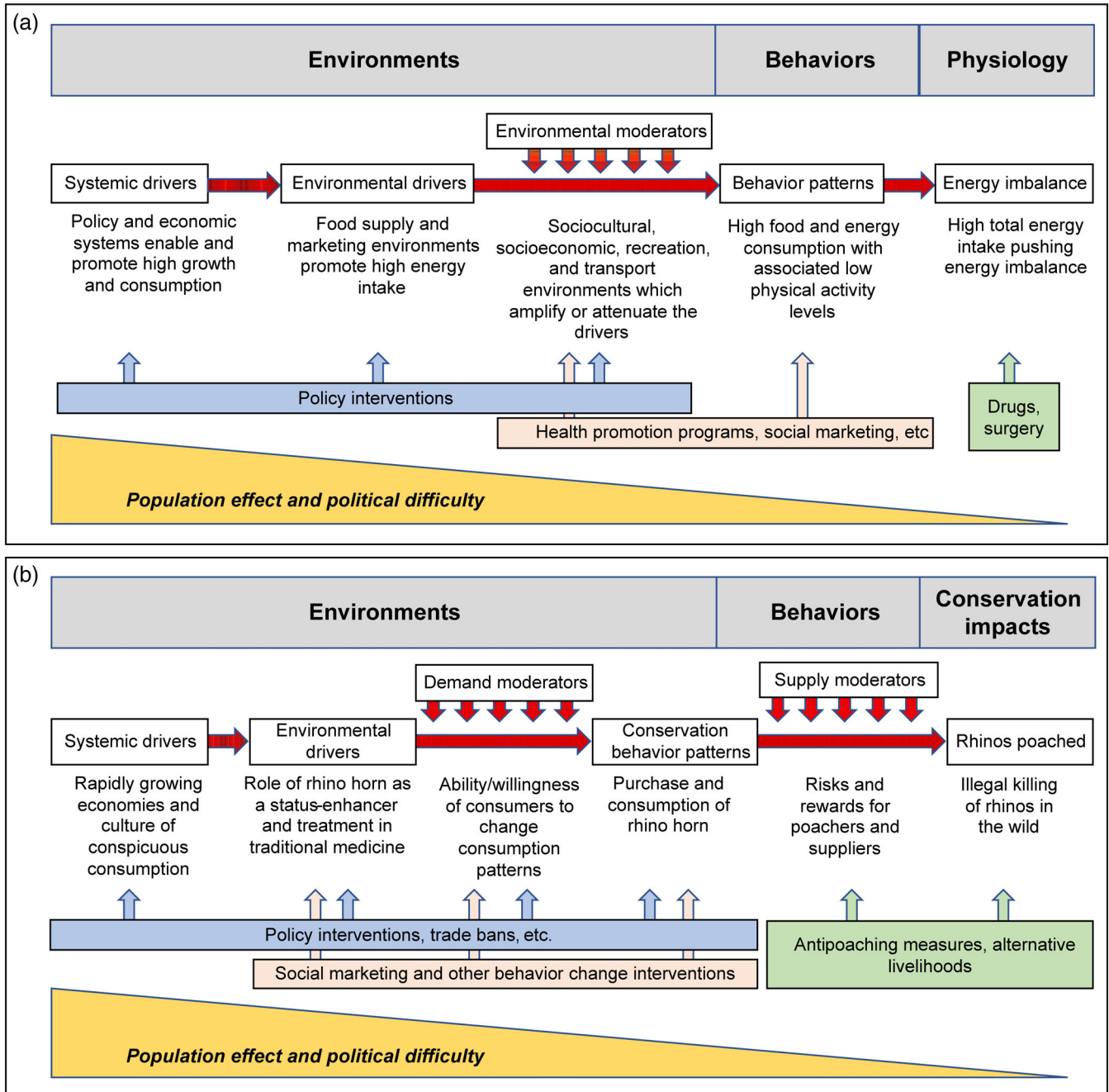
## 2 | UNDERSTANDING “WICKED PROBLEMS”

The illegal wildlife trade, like many conservation issues, can be described as a “wicked problem” because it is embedded in complex social–ecological systems linked to other problems (Game et al., 2014). This situation is also common in health and development, where evidence has shown it is vital to focus on more than the immediate impacts of concern. Instead, success often depends on understanding the systemic drivers and then developing

both upstream and downstream interventions (Laverack, 2017; Swinburn et al., 2011). For example, a review of projects to raise women’s social status in lower-income countries found that simultaneous programs for different audiences were needed to influence the

underlying determinants of gender inequity (Keleher & Franklin, 2008).

Similar insights come from health studies, as illustrated by the framework of determinants and solutions of obesity (Figure 1a) developed by Swinburn



**FIGURE 1** A comparison of the determinants and solutions for (a) obesity and (b) the rhino horn trade. The more distal drivers are to the left and the environmental moderators that have an attenuating or accentuating effect are shown, along with some examples. The usual interventions for environmental change are policy based, whereas health promotion programs/social marketing can affect environments and behaviors. For obesity drugs and surgery operate at the physiological level, while in the rhino trade antipoaching measures, alternative livelihoods are a response to conservation impacts. The framework shows that the more upstream interventions that target the systemic drivers might have larger effects, but their political implementation is more difficult

Source: Adapted from Swinburn et al. (2011)

et al. (2011). This shows that while the immediate cause is an energy imbalance from people expending less calories than they consume, intervening with drugs, surgery or counseling at the individual level fails to tackle the wider obesogenic environment that is causing the society-wide problem. For more sustainable population health impact, the authors (Swinburn et al., 2011) argue for a focus on interventions that target socio-environmental drivers related to the food, physical, cultural, or economic environment that enable or constrain human behavior. However, the framework shows there are trade-offs between the potential size of an impact and the difficulty of achieving it. For example, policy interventions are the most likely to have a large impact but are often the most challenging to implement (Figure 1a), particularly where they are seen to restrict freedom of choice, impose mandatory obligations or introduce new taxation (Swinburn et al., 2011).

The relevance of this approach for understanding the illegal wildlife trade can be illustrated by adapting the obesity framework to help understand the trade in rhino horn (Figure 1b). This trade also has multiple drivers, which may be moderated on both the demand and supply side. On the supply side, analogous to drugs or surgery for tackling obesity at the physiological level, conservationists adopt antipoaching and alternative livelihood measures to reduce the number of rhinos illegally killed. The supply of rhino horn is then moderated by the risks and rewards for poachers and suppliers (Holden et al., 2019), but this does not address the systemic and environmental drivers of the trade. Thus, demand reduction interventions at multiple levels are also needed (Challender & MacMillan, 2014; Verissimo & Wan, 2018). These might seek to change the purchase and consumption of rhino horn, echoing antiobesity campaigns in public health that try to reduce people's excess energy consumption. Other solutions which aim to tackle the more distal drivers of trade, such as rapidly growing economies and a culture of conspicuous consumption, include policy interventions and trade bans (Ayling, 2015; Duffy et al., 2014).

Evidence from the health sector suggests that the use of upstream interventions for tackling the illegal wildlife trade could have larger effects than antipoaching measures or alternative livelihood projects alone (Hastings, MacFadyen, & Anderson, 2000; Venturini, 2016). However, there is likely to be a similar trade-off with feasibility and potential size of impact, as decisions that impact more people are likely to be more politically contested and more difficult to implement. Similarly, there are a number of insights from the health and development sectors that should inform projects and policies to reduce demand; these are outlined below.

## 3 | CHALLENGES TO ACHIEVING BEHAVIOR CHANGE

### 3.1 | Success may be partial at best

When behavior change specialists in other fields such as public health undertake an intervention to reduce the prevalence of a behavior, they generally do not expect to completely modify the actions of their target audience. For example, one meta-analysis of mediated health campaigns showed 8% of the target audience changed their behavior on average, while systematic reviews of interventions to prevent female genital mutilation show a 14–23% reduction in prevalence (Berg & Denison, 2012; Salam et al., 2016; Snyder et al., 2004). This is an important finding for conservationists, whose interventions are often framed as attempting to eradicate demand. Expecting to change the behavior of an entire target audience with one intervention is unrealistic. However, average effect sizes differ depending on the focus of a campaign, from 1 to 2% of the target audience for youth drug and marijuana campaigns to 15% for seatbelt campaigns. In particular, campaigns that promote the adoption of a new behavior are twice as effective as those that aim to prevent or reduce a behavior (Snyder et al., 2004). This suggests that promoting an acceptable alternative to an illegal wildlife product is likely to be more successful than asking people to simply stop using it.

Just as pertinently, many health and development interventions make no impact. For example, one systematic review of the effectiveness of social marketing interventions in increasing physical activity and reducing the use of alcohol, tobacco, and illicit drugs found that of 54 studies, 64% had no positive impacts on individual behavior after 2 years (Stead et al., 2007). This may be explained in part by varying campaign quality, as shown by a recent systematic review (Firestone et al., 2017) that classified global health programs by adherence to social marketing benchmarks (Table 1). They found few studies considered behavior change theories or competition to desired behaviors in their design, but effective programs were more likely to have addressed the costs and benefits of behavior change and used research to apply audience insights. However, even among programs with high adherence to social marketing benchmarks, only 10 out of 21 studies reported significant positive behavioral results (Firestone et al., 2017). This pattern is likely to be mirrored in conservation, as while there are currently few rigorous evaluations of demand reduction interventions (Verissimo & Wan, 2018), the published studies include examples where the desired conservation outcomes were not achieved (e.g., Verissimo et al., 2018). Initial evidence also suggests that these campaigns lack design rigor, as a review of

**TABLE 1** Six benchmarks for identifying a social marketing campaign

1. Focus on behavior change
2. Consistent use of audience research
<ul style="list-style-type: none"> <li>• Understand the target audience</li> <li>• Pilot intervention elements</li> <li>• Monitor interventions</li> </ul>
3. Audience segmentation
<ul style="list-style-type: none"> <li>• Maximizes efficient use of resources</li> </ul>
4. Creation of attractive and motivational exchanges with target audiences
5. All four Ps of traditional marketing mix used
<ul style="list-style-type: none"> <li>• Attractive benefit packages (products)</li> <li>• Minimized costs (prices)</li> <li>• Convenient and easy exchange (place)</li> <li>• Powerful messages communicated (promotion)</li> </ul>
6. Competition to desired behavior considered

<sup>a</sup>Source: Adapted from Andreassen (2002).

demand reduction campaigns for elephant ivory and rhino horn found that while the majority considered at least three of the social marketing benchmarks, no campaigns fulfilled all eight (Greenfield & Verissimo, 2018).

### 3.2 | Success can be expensive

Studies of effectiveness from other sectors are sobering but demand reduction interventions in the wildlife trade are likely to be even less effective, as public health and development projects generally have much higher budgets than are available to conservationists. For example, the annual costs of three UK Government campaigns to tackle road safety, smoking and obesity were £1.8 million, £5.8 million, and £25 million, respectively (Department for Transport, 2014; NSMC, 2010). This is more than the total amount of US\$32 million spent each year by the international community on tackling the illegal wildlife trade through demand reduction (The World Bank, 2016). These lower budgets for the conservation projects may be due in part to purchasing power differences between low- and high-income countries, but probably also reflects lower political will and ambition.

### 3.3 | Success may depend on the target audience receiving direct benefits

Behavior change interventions often focus on positive exchange, where practitioners encourage the adoption of a new behavior by promoting the benefits and minimizing the costs to the target audience (Firestone et al., 2017).

This is fairly straightforward in public health or development, as changing behavior generally involves immediate and obvious personal benefits. For instance, interventions to decrease smoking can highlight that participants will experience esthetic and health benefits, compensating for any loss of social status (McCaul et al., 2006). While in some cases behavior change in conservation can avoid personal costs, such as reducing the risk of disease transmission from eating particular species (Karesh et al., 2005), direct benefits are often lacking for wildlife consumers. For example, the benefits of reducing rhino horn consumption mostly accrue to rhinos, whereas the loss of status accrue to the former user. Thus, demand reduction interventions have to rely more on emphasizing costs or changing social norms by altering what the audience considers typical or appropriate behavior, and so are less able to focus on direct personal benefits (McDonald et al., 2020; Verissimo, 2019).

### 3.4 | Success depends on cultural contexts

Older ideas and technologies are more likely to persist over time, a principle known as the Lindy Effect (Taleb, 2012). This may help explain the finding that people still prefer traditional biomass stoves to improved stoves that use cleaner fuels, despite clear health and environmental benefits and huge efforts from governments and development organizations encouraging people to switch (Lewis & Pattanayak, 2012). Thus, demand reduction may be harder to achieve in cultures in which a product has been used for a long time. For example, ivory has been carved in China for thousands of years and demand continues, despite huge efforts from governments and NGOs (Vigne & Martin, 2014), whereas the 1921 Importation of Plumage (Prohibition) Act in the United Kingdom all but eradicated the fashion for hat feathers that had arisen a few years earlier (Anon, 2017). A long tradition of using wildlife often reflects the high value that a society places on a species, whether as an exploitable resource or as something with intrinsic value. Disrupting a behavior that is deeply entrenched in cultural history is likely to be more difficult, and practitioners need to adjust their expectations of success accordingly or focus first on less intractable behaviors.

### 3.5 | Success with alternatives is not guaranteed

One way of minimizing the costs of a new behavior is to promote a mutually acceptable substitute, as it is

generally considered easier to modify an existing behavior than stop it completely (Snyder et al., 2004). The use of electronic cigarettes for instance is more effective at stopping smoking than other alternatives, likely because they fulfill both the behavioral and chemical dimensions of smoking (Bullen et al., 2013; Kalkhoran & Glantz, 2016). Similarly, the promotion of culturally acceptable, farmed, or synthetic substitutes in relation to decreasing demand for wildlife products has frequently been suggested (Shairp et al., 2016; TRAFFIC, 2008; Venkataraman, 2007). For example, a Traditional Chinese Medicine user may be more willing to substitute bear bile tonic for a herbal tonic than to switch completely to Western medicine. Likewise, substituting wild meat for beef or chicken may be an acceptable substitute for some consumer segments, such as those in informal dining contexts or those who consider price a major factor (Shairp et al., 2016). For the more status-conscious consumer, however, it is not an appropriate substitute because it lacks expense and rarity (Courchamp et al., 2006). Thus, to identify and market the right substitutes, it is vital to understand the motivations behind wildlife use and the role of quality, price, and availability.

Where substitutes are promoted, care is needed to ensure they do not lead to perverse outcomes. For instance, in the 1980s and 1990s low-fat diets were frequently recommended to tackle the growing obesity crisis. However, low-fat foods tend to be higher in added sugars, and there is an inverse relationship between the proportion of dietary calories obtained from fat and from sugar (Nguyen, Lin, & Heidenreich, 2016; Sadler, McNulty, & Gibson, 2015). Similarly, herbal tonics are seen as a preferable alternative to animal products but this overlooks the possibility that the plants used may themselves be threatened, for example, species in the genus *Coptis* are considered an acceptable traditional medicine alternative but at least one is classified as Endangered (Feng et al., 2009; Saha et al., 2015). Even if the overt aim is not to promote a substitute, practitioners should account for likely audience responses to a successful intervention. For example, the conservation benefits of an intervention to reduce demand for ebony furniture are negligible if consumers instead buy furniture made from equally threatened, wild-harvested mahogany.

### 3.6 | Success may be accompanied by unintended consequences

Given the complexity of behavior change interventions, care is needed to avoid unintended negative consequences. For example, research into obesity messaging shows that audiences may feel threatened and reject the

message, be attracted to things that they are told are harmful, or think that an undesirable behavior is more common and, therefore, more attractive (Byrne & Niederdeppe, 2011). Negative spillovers are another potential problem, where the promotion of one specific behavior change leads to a different but undesirable behavior (Thøgersen & Crompton, 2009; Thøgersen & Olander, 2003). This occurs when a person has the psychological perception that they have developed “moral credentials” by carrying out a specific proenvironmental behavior, making them feel entitled to perform other, unsustainable behaviors (Mazar & Zhong, 2010). For example, when some American apartment residents were asked to save water to help preserve the environment, they used 6% less water but 5.6% more electricity (Tiefenbeck et al., 2013). This is a particular risk for awareness-raising campaigns that focus on low-impact individual behaviors (Thøgersen & Crompton, 2009). Thus conservation interventions that seek to address behaviors with a comparatively negligible effect, for example, the use of ivory chips to treat colds, could encourage people to behave in ways that have worse conservation impacts, for example, buying ivory as an ornamental status symbol (Thomas-Walters, 2017).

Motivation and desires are another key determinant of behavior, and unintended consequences may again result if they are not taken into consideration when designing interventions. For example, pregnant women who give up smoking for the sake of their baby may be more likely to relapse after they have given birth (Taylor et al., 2009). Thus, coercive, baby-centered messages may be counterproductive in the long term. Similarly, using financial incentives to quit smoking through “quit and win” contests frequently fails to achieve long-lasting behavior change, as the issue of motivational context for smoking is not adequately addressed (Taylor et al., 2009). This means it can be difficult to predict what happens to the underlying motivation for a wildlife product when demand is reduced. If the motivation has not also been addressed, then it is likely that an unintended consequence will emerge, such as the consumer seeking a new product to fulfill their desires. For instance, the traditional medicine industry in Japan responded to the 1980 import ban on rhino horn by switching to saiga antelope, as rhino and saiga horn were believed to have similar medicinal effects (Kitade & Toko, 2016). Unfortunately, the saiga antelope is now classified as Critically Endangered, due in part to illegal hunting for horns (Mallon, 2008).

Another important consideration is the potential impacts of a behavior change intervention on social norms and values. For example, the US teen substance abuse prevention program Drug Abuse Resistance

Education (D.A.R.E.) involved uniformed police officers visiting schools to warn students about the harmful effects of drug use, which in many cases normalized a previously unfamiliar behavior and made drug use seem more prevalent than it was. This explains why initial evaluations found no beneficial effect, and even an increase in illegal drug-taking by suburban students (Lynam et al., 1999; Rosenbaum & Hanson, 1998), although later campaign iterations had more success by addressing participants' normative beliefs and encouraging the adoption of refusal skills to resist substance use (Nakashian, 2010). Similarly, mass media conservation interventions addressing behaviors exhibited by only a small fraction of the population could unwittingly demonstrate a social norm around wildlife consumption.

## 4 | SYSTEMS THINKING

We have argued above that examples from the health and development sectors can provide insights into the likely effectiveness of demand reduction campaigns to tackle the illegal wildlife trade. This is because all of these wicked problems involve dealing with uncertainty, interconnectedness, unpredictability, and context-dependence between many different factors. This suggests we could also learn from these other fields how to tackle such complex problems. Within public health and public policy, the notion of a “whole systems approach” is gaining momentum, as it responds to complexity through an ongoing, dynamic, and flexible way of working, using stakeholder engagement and coproduction methods (Public Health England, 2019). Its advantages come from an emphasis on relationships between systems/societal levels and the use of systems language, science, and tools (National Institute of Health and Care Excellence, 2010).

The Government of Viet Nam has used systems thinking to engender social change for smoking cessation through a wide range of interventions, from public education campaigns about the harmful impacts of smoking to tailored training programs for health professionals and community health workers (Truong, 2016). Program messages are spread through multiple media channels, and in more rural areas local spokespeople champion the cause. There are also interventions to restructure marketing systems, by prohibiting advertisements of tobacco products, raising taxes on cigarettes, and introducing bans in many public areas. Since the implementation of this program, there have been steady declines in tobacco use (World Health Organization, 2010). By widening the focus away from solely voluntary individual behavior change the organizers have used education, community

engagement, and policy initiatives as complementary strategies to creating social change on a macro level (Truong, 2016).

Systems thinking is highly relevant for understanding the wildlife trade, with its distant and long-term consequences (Blair, Le, Sethi, et al., 2017; Larrosa, Carrasco, & Milner-Gulland, 2016), and conservation scientists are also beginning to use it. For example, a system mapping process was used recently to understand the dynamic relationships driving demand for ivory in China, letting the project team identify which interventions would most likely be effective (Mahajan et al., 2019). Researchers have also advocated for the use of a conceptual framework incorporating systems thinking to analyze wildlife trade in primates (Blair, Le, Thach, et al., 2017). Our comparison of the determinants and solutions for obesity and the rhino horn trade (Figure 1) also suggest a systems approach to tackling the latter, focusing on addressing the root causes of the trade, including the moderators of demand, to produce long-lasting conservation impacts.

Thus, by understanding the complexity of the wildlife trade, we can hopefully take a more holistic view of the successes and failures of any one intervention (Ayling, 2015). However, systems thinking does not represent a catchall solution to the illegal wildlife trade; rather, it suggests ways to recognize complexity, the dynamic nature of the issue, and the potential for both positive and negative feedback. Incorporating systems thinking into future demand reduction interventions acknowledges that no one thing is going to “work” in isolation, providing more support for our argument that while demand reduction is a valuable approach, it is not a panacea.

## 5 | CONCLUSION

Behavior change interventions are prominent in public health and international development but their effectiveness is often low, despite relatively high resourcing and the experience and expertise of practitioners in these fields. This suggests that much of the current discussion in policy circles about demand reduction for illegal wildlife products may be overly optimistic, as such, change is often slow and expensive. Thus, there is a danger that demand reduction is currently being oversold and that without more critical assessment of its potential, it could end up as yet another conservation fad (Redford, Padoch, & Sunderland, 2013). Instead, we need to be more realistic and develop a better understanding of how to maximize the success of demand reduction interventions, integrating systems thinking to help address the



unintended consequences of our interventions (Laverack 2017; Mahajan et al., 2019; Swinburn et al., 2011). By taking this more nuanced view, we will help cement the rightful place of demand reduction and other behavior change approaches in conservation.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## AUTHOR CONTRIBUTIONS

Laura Thomas-Walters, Robert J. Smith, and David Roberts conceptualized the idea. Laura Thomas-Walters led the drafting of the manuscript. All authors contributed to providing critical feedback, writing, and editing various parts of the manuscript. All approved the final submission.

## DATA AVAILABILITY STATEMENT

No data were collected for this article.

## ETHICS STATEMENT

This manuscript is solely the work of the authors. This study did not involve any experiments on animal or human subjects.

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